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 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. Emotionally Intelligent Social Robots for Healthcare and Assistive Contexts – University of Genova

Curriculum: Healthcare and wellness of persons	Università di Genova
Hosting Institution: Università degli Studi di Genova	
Department: DIBRIS: https://dibris.unige.it/ RICE lab: https://rice.dibris.unige.it/	
Tutor(s): Carmine Recchiuto	

Description:

Social robots can be used as long-term companions and assistants in critical settings such as healthcare, elderly care, and inclusive education. In these areas, where users are vulnerable, Human–Robot Interaction needs more than just technical complexity and reliability. Instead, it also requires social intelligence, emotional awareness, and the ability to act in ways that people can understand, predict, and find supportive.

For example, social robots have shown strong potential in helping people with neurodegenerative diseases [1]. Studies suggest these robots can ease the workload for caregivers, encourage positive emotions, and improve users' well-being. To work well, though, these systems need empathetic and context-aware ways of interacting. This is especially important in difficult situations like delusions, which often happen in Alzheimer's disease and involve misunderstandings of reality, such as beliefs about theft or infidelity [2]. In practice, supportive approaches that use emotional validation and gentle redirection work best in these cases.

In these situations, emotions are very important. They help with choosing goals, making decisions, and deciding how to behave socially. Just like in people, emotions can guide interactions, help predict outcomes, and support good responses to complex situations. Social robots that work closely with people, especially in assistive roles, can include emotional processes in their planning and decision-making [3].

Because of these factors, the project will bring together:

- emotional planning and decision-making methods inspired by how people think and feel, with
- perception and reasoning modules that can spot emotionally important situations, like delusional statements or signs of distress, as well as other relevant cases, and choose the right supportive responses.

In this PhD project, emotions will be seen not just as things the robot shows, but also as internal factors that guide its choices and ways of interacting. For instance, if the robot

notices a delusional belief, it should both recognize the situation and think about its emotional impact, then pick a response that helps the user's well-being.

This project will build on current research in affective computing and socially assistive robotics. It will go further by creating an emotion-based planning system that lets the robot consider different strategies and adjust its responses based on the emotional context and past interactions. The new system will be tested on a humanoid social robot, such as NAO, Pepper, or Navel, in realistic interaction scenarios.

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] Karami, V., Yaffe, M. J., Gore, G., Moon, A. J., & Abbasgholizadeh Rahimi, S. (2024). Socially Assistive Robots for patients with Alzheimer's Disease: A scoping review. Archives of Gerontology and Geriatrics, 123, 105409. https://doi.org/10.1016/j.archger.2024.105409
- [2] Rao, V., & Lyketsos, C. G. (1998). Delusions in Alzheimer's Disease. Journal of Neuropsychiatry and Clinical Neurosciences, 10(4), 373–382. https://doi.org/10.1176/jnp.10.4.373
- [3] Maroto-Gómez, M., Alonso-Martín, F., Malfaz, M., Castro-González, Á., Castillo, J. C., & Salichs, M. Á. (2023). A systematic literature review of decision-making and control systems for autonomous and social robots. International Journal of Social Robotics, 15(5), 745–789. https://doi.org/10.1007/s12369-023-00977-3

Number of positions available:

1

Main Research Site

Università degli Studi di Genova, DIBRIS, RICE lab, via all'Opera Pia 13, 16145, Genova

Contacts:

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

Scholarship Amount:

- Fascia 4: 19,500 €/year

2. Technologies for rehabilitation and healthcare simulation – University of Genova

Curriculum: Healthcare and wellness of persons

Hosting Institution: University of Genoa

Department:

Informatics Bioengineering Robotics and Systems Engineering - DIBRIS

Tutor(s): Serena Ricci, Camilla Pierella, Maura Casadio

Description:

Recent advances in healthcare technologies are progressively converging toward integrated systems that combine immersive simulation, robotics, and intelligent human–machine interaction for many applications, including surgery and rehabilitation. In recent years, Extended Reality (XR), wearable sensors, and human-machine interfaces have enabled the development of interactive healthcare environments capable of supporting clinicians and patients across different stages of care, from preoperative planning to post-operative rehabilitation.

In the field of surgical simulation and preoperative planning, immersive technologies and virtual simulations have been increasingly used to improve the understanding of patient-specific anatomy, support surgical decision-making and deliver realistic training. Similarly, rehabilitation technologies are increasingly exploiting immersive environments and human-machine interfaces to create personalized and interactive therapeutic experiences. Both domains rely on accurate patient-specific 3D modeling, real-time interaction, multimodal feedback, and user-centered design principles.

Rehabilitation robotics and sensorimotor technologies are becoming fundamental tools in neurorehabilitation and physical therapy, especially in integrated clinical pathways where recovery and training can benefit from the same simulation paradigms adopted in surgical contexts. Human–robot interfaces, wearable sensors, robotic exoskeletons, haptic systems, and immersive rehabilitation environments allow clinicians to provide adaptive, intensive, and personalized therapy. These technologies can improve motor recovery and patient engagement by combining real-time feedback with quantitative assessment of movement and performance.

Despite significant progress, important challenges remain open regarding the integration of these technologies into standardized programs. In surgery, simulators providing realistic and patient-specific cases for training and preoperative planning are still lacking, and trainees have limited opportunities to be exposed to real cases, especially in high-risk surgeries.

In rehabilitation, current systems often lack adaptability, intuitive interfaces, and seamless integration between robotic devices and immersive environments.

This PhD project aims to contribute to the development of advanced healthcare technologies in either surgical applications or sensorimotor rehabilitation.

The main objective of this PhD research is to investigate and develop integrated technologies for healthcare simulation or rehabilitation through the combination of 3D models, XR, robotics, and human–machine interface.

Aim 1 – Development of patient-specific surgical simulators for training and preoperative planning

This aim investigates imaging segmentation techniques, 3D modelling, FEM simulations, surgical simulators, hardware and software solutions, and XR to implement a simulator able to simulate patient-specific cases.

The activities will include:

- Development of a segmentation pipeline to automatically obtain patient-specific 3D anatomical models from CT and MRI images
- Design and implementation of XR environments for surgical simulation by exploiting graphic engines
- Development of a sensorized simulator connected to the XR environment to simulate the surgery in a realistic setup
- Simulator validation with surgeons and trainees

Aim 2 – Body–Machine Interfaces and Adaptive Systems for Sensorimotor Rehabilitation

This aim focuses on developing a new generation of Body–Machine Interfaces (BoMIs) designed to support both individual and group-based motor training within interactive rehabilitation environments. The system will enable users to control virtual or robotic tasks through their available sensorimotor abilities, allowing the interface to adapt to heterogeneous or evolving motor conditions.

The activities will include:

- Development of wearable sensor-based or markerless interfaces for motor assessment.
- Integration of robotic devices, wearable sensors, and immersive simulation environments.
- Design of adaptive multimodal feedback systems.
- Development of interactive rehabilitation and motor training exercises where participants—each with different sensorimotor abilities—will be able to collaborate, compete, or co-regulate movements within a shared virtual or physical environment.
- Quantitative evaluation of motor performance and user interaction.

The goal is to improve personalization, usability, and effectiveness of healthcare technologies through adaptive and user-centered interaction strategies that can support both rehabilitation and clinical simulation scenarios.

Requirements:

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

References:

- "A Visuo-Haptic System for Nodule Detection Training: Insights from EEG and behavioral analysis" Ricci S., Torrigino D., Minuto M., Casadio M. IEEE Transaction on

Haptics 2025

- "A Novel Affordable User Interface for Robotic Surgery Training: Design, Development and Usability Study" Neri A., Coduri M., Penza V., Santangelo A., Oliveri A., Turco E., Pizzirani M., Trinceri E., Soriero D., Boero F., Ricci S., Mattos L.S. Frontiers in Digital Health 2025
- "Body-machine interfaces for upper-body control of virtual devices", Rizzoglio F. et al., 2020.

Number of positions available:

1

Main Research Site

DIBRIS, Simulation and Advanced Education Center - SimAv

Contacts:

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

Funding Scheme: This doctorate grant is fully funded by the University of Genova

Scholarship Amount:

- Fascia 3: 18,500 €/year

3. Learning Individual Cognitive and Behavioral Dynamics for Early Detection of Stress, Fatigue, and Attention Deficits – Italian Institute of Technology

Curriculum: Healthcare and wellness of persons

Hosting Institution: Istituto Italiano di Tecnologia

Department:

Human-Robot Interfaces and Interaction https://hri.iit.it/

Tutor(s): Drs. Arash Ajoudani, Marta Lorenzini

ISTITUTO ITALIANO DI TECNOLOGIA

Description:

This PhD research focuses on the development of **next-generation AI-driven frameworks for the early detection and prediction of stress, fatigue, and attention** deficits through the **continuous learning of individual cognitive and behavioral dynamics**. The project explores advanced machine learning architectures, including multimodal deep learning, temporal transformers, graph neural networks, self-supervised representation learning, and probabilistic sequence models, to model subtle variations in human behavior from heterogeneous data streams such as physiological signals, speech patterns, interaction dynamics, posture data, and contextual environmental data. A central objective is the creation of **personalized adaptive models capable of capturing longitudinal intra-subject variability** rather than relying on population-level assumptions, enabling highly sensitive and real-time cognitive state estimation. The research further integrates Generative AI and foundation models to synthesize realistic behavioral trajectories, augment scarce labeled datasets, simulate cognitive degradation scenarios, and enable explainable human-centered interaction through large language models and multimodal reasoning systems.

Particular emphasis will be placed on the **analysis of non-verbal behavioral cues and body language through advanced markerless motion capture systems**, enabling unobtrusive, real-time, and ecologically valid assessment of cognitive and affective states.

By combining predictive intelligence, uncertainty-aware inference, and continual learning mechanisms, the proposed framework aims to move beyond reactive monitoring toward proactive cognitive health assessment and intervention, with transformative applications in healthcare, transportation, industrial safety, defense, and human-machine collaboration systems.

Requirements:

The successful candidate must have an MSc degree with a strong background in Biomedical Engineering, Robotics, Machine Learning and/or computer vision.

The successful candidate should have:

- Good skills on C++ and Python
- Experience with ROS
- Confidence with version control tools (specifically git)
- Good communication skills and ability/willingness to integrate within a multidisciplinary international research group
- Good knowledge of written and spoken English.

References:

- Lagomarsino, Marta, et al. "An online framework for cognitive load assessment in industrial tasks." Robotics and Computer-Integrated Manufacturing 78 (2022): 102380.
- Lorenzini, Marta, et al. "Ergonomic human-robot collaboration in industry: A review." *Frontiers in Robotics and AI* 9 (2023): 813907.
- Lagomarsino, Marta, et al. "Maximising coefficiency of human-robot handovers through reinforcement learning." *IEEE Robotics and Automation Letters* 8.8 (2023): 4378-4385.

Number of positions available:

1

Main Research Site

Center for Robotics and Intelligent Systems (CRIS), IIT, Genova

Contacts:

Arash.ajoudani@iit.it

Funding Scheme: This open position is financed by Ministero dell'Università e della Ricerca (MUR) nell'ambito del "Bando FIS – Fondo Italiano per la Scienza – PROCEDURA COMPETITIVA PER LO SVILUPPO DELLE ATTIVITÀ DI RICERCA FONDAMENTALE, A VALERE SUL FONDO ITALIANO PER LA SCIENZA 2024–2025 (BANDO FIS 3)" – MACROSETTORE PE – Physical Sciences and Engineering, Decreto Direttoriale n. 1802 del 21/11/2024, e il Decreto "Approvazione delle Graduatorie Finali, Ammissione a Finanziamento – Disposizioni per l'avvio delle Attività Progettuali" prot. n. 18010 del 12/11/2025, within "The Ergonomics Embodied: Predictive and Inter-Causal Representation of Mind and Body in Robot-Assisted Occupational Ergonomics" project; Acronym: EPIC; Grant Agreement number: FIS-2024-026564; CUP: J53C25002230001.

Scholarship Amount:

- Fascia 4: 19,500 €/year

4. Soft Robotics for Human Cooperation and Rehabilitation – Italian Institute of Technology

Curriculum: Healthcare and wellness of persons	
Hosting Institution: University of Pisa	
Department: IIT - Università di Pisa, Centro E. Piaggio	
Tutor(s): Antonio Bicchi, Giorgio Grioli, Manuel Catalano	

Description:

The candidate will work with the supervisors on a research program oriented to analysis and control of grasping an manipulation of soft and deformable objects. This will include their modeling and control. This could either be physics or data-based – depending on the respective advantages in applications. The comparison of methodologies is itself a possible objective of the study. The candidate will also pursue applications of methods to manipulate soft objects - in recycling of flexible materials, in garment manipulation, and for new applications of soft robotics.

Requirements:

The candidate would have a degree in Engineering, Physics or Mathematics

Number of positions available:

1

Main Research Site

IIT - Università di Pisa, Centro E. Piaggio

Contacts:

Email: antonio.bicchi@iit.it

Funding Scheme: This doctorate grant is funded by IIT internal funding

Scholarship Amount:

- Fascia 4: 19,500 €/year

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

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

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:

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

6. Virtual reality and agent-based training for prosthetic hands – Free University of Bozen

Curriculum: Healthcare and wellness of persons	unibz
Hosting Institution: Free University of Bozen-Bolzano	
Department: Faculty of Engineering	
Tutor(s): Angelika Peer	

Description:

The loss of hand function due to upper limb amputation represents a significant challenge for individuals, impacting their ability to perform daily tasks, maintain independence, and engage in social interactions. Prosthetic advancements, particularly in myoelectric devices, have improved motor functionality. However, the lack of effective sensory feedback continues to limit prosthesis acceptance and usability. This sensory gap often results in prosthetic rejection, phantom limb pain (PLP), phantom limb sensation (PLS), and neuroma pain (NP), further reducing quality of life.

Targeted Sensory Reinnervation (TSR) is an innovative surgical approach designed to reroute sensory nerves from the amputated hand to a reinnervated skin area on the residual limb. By restoring somatotopic sensory maps, TSR can potentially address sensory deficits, reduce pain, and enhance the functionality of myoelectric prostheses. While preliminary case studies and smaller trials have shown promising outcomes, a more comprehensive study is required to validate these results, establish standardized training protocols, and identify factors influencing the success of TSR [Lit. Gardetto 2025 et al].

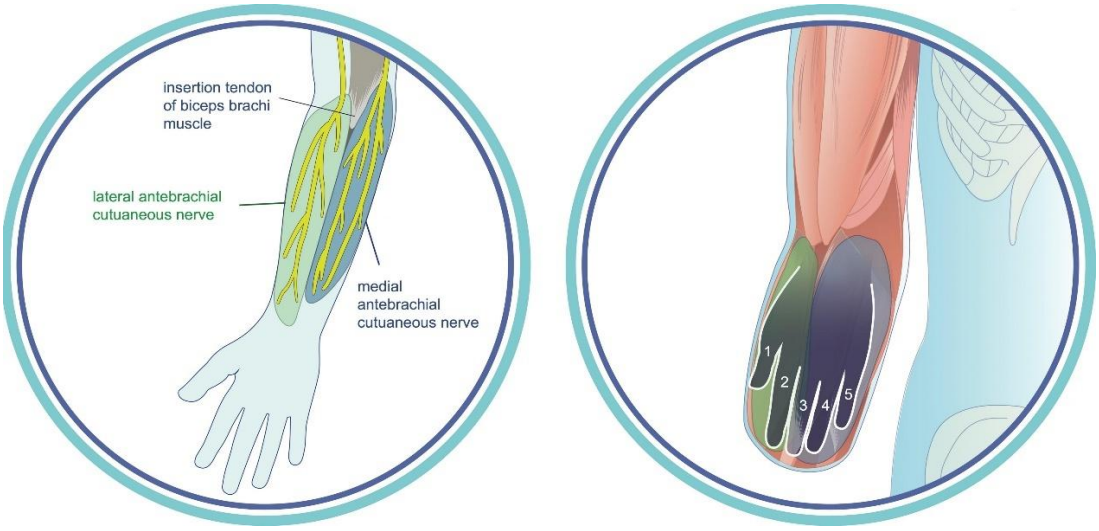

Figure 1: Concept of Targeted Sensory Reinnervation surgery

In the context of this PhD fellowship, the PhD student will contribute to this goal with i) the development of a vibrotactile device that can be mounted on the stump of the upper arm to allow for tactile stimulation of the reinnervated skin region and that allows the variation of location, amplitude and frequency of stimulation patterns, ii) the development of a virtual environment (VR) that allows for visual and haptic rendering of interactions with virtual objects to simulate touch interactions, iii) the design of training scenarios based on the virtual reality platform that may contribute to the formulation of rehabilitation plans in collaboration

with partners in the consortium, iv) the optimization of the provided tactile feedback patterns by the research of an optimal mapping of object properties to stimulations, v) psychophysical studies to identify the perception capabilities of the reinnervated skin region in scenarios of passive and active touch based on interactions in the virtual reality as well as object interactions in the real world using the prosthetic hand.

The work will be conducted in collaboration with Prof. Alexander Gardetto from the Center of Plastic, Aesthetical and Reconstructive surgery with Hand Surgery and Competence Centre for bionic prosthetics of the Brixsana Private Clinic.

Requirements:

The ideal candidate would have a degree in bioengineering, robotics, or human computer interaction and have strong interests in multidisciplinary research and the work with patients. The candidate should ideally come with previous experience in VR environment design and haptics as well as strong programming skills in C++, Python and Matlab.

References:

- Gardetto A, Müller-Putz GR, Eberlin KR, Bassetto F, Atkins DJ, Turri M, Peternell G, Neuper O, Ernst J. Restoration of Genuine Sensation and Proprioception of Individual Fingers Following Transradial Amputation with Targeted Sensory Reinnervation as a Mechanoneural Interface. J Clin Med. 2025 Jan 10;14(2):417. doi: 10.3390/jcm14020417. PMID: 39860422; PMCID: PMC11765609.

Number of positions available:

1

Main Research Site

Faculty of Engineering, Via Bruno Buozzi 1, 39100 Bolzano

Contacts:

Email: angelika.peer@unibz.it

Funding Scheme: This doctorate grant is funded by the Free University of Bozen-Bolzano

Scholarship Amount:

- Fascia 4: 19,500 €/year