POLITECNICO DI MILANO

PhD in BIOINGEGNERIA / BIOENGINEERING - 39th cycle

THEMATIC Research Field: SMART, NON-INTRUSIVE & TRUSTWORTHY STRATEGIES TO GATHER USER INFORMATION AND PROMOTE BEHAVIORAL CHANGES TOWARDS THE IMPROVEMENT OF LONG-TERM PRIMARY CANCER PREVENTION

Monthly net income of PhDscholarship (max 36 months)
€ 1400.0
In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	Europe 's Beating Cancer Plan set has ambitious goals addressing key behavioral risk factors for cancer development, such as tobacco (target reduction of 30% by 2025), alcohol consumption (target reduction of 10% by 2025), unhealthy diets and physical inactivity (see also the HealthyLifestyle4All campaign). As about 40% of cancer cases in the EU are preventable, health promotion and preventive measures for cancer can benefit from the implementation of digital technologies based on behavioral change and emotional management and from their adoption in the general population.However, previous research and practice have generally failed to achieve sustainable behavioral change due to two factors: 1) not taking into account recent behavioral change concepts showing the need of personalizing interventions and techniques; 2) not considering psychosocial features and emotions (e.g. anxiety and depression), which can interfere with effective behavioral change and increase the risk of developing cancer. The European project iBeChange (Addressing psychosocial and lifestyle risk factors to promote primary cancer prevention: an integrated platform to promote behavioural change) aims to tackle these limitations. The main objective of the iBeChange project is to design, develop, and test a user-focused platform that empowers people to achieve healthy and sustainable behaviors and emotions. The iBeChange innovative system will be developed by

	experts from clinical and health psychology, oncology, epidemiology, ICT, data science, and the health policy. The iBeChange project will go beyond the state of the art of sustainable behavioral change and emotional management by combining practice- and evidence-based knowledge coming from clinical psychology and behavioral change theories with the potentialities of adaptive digital technologies and artificial intelligence. Thus, the iBeChange system will be able to dynamically observe, learn about user behaviors, and then deliver tailored and effective health interventions in a dynamic learning process. The final goal of the iBeChnage project is to contribute to the goals of Europe?s Beating Cancer Plan and European Code Against Cancer by improving long-term primary cancer prevention through informing, supporting, and empowering EU citizens. Within this framework, one of the specific roles of Politecnico di Milano, and therefore of the proposed PhD project will be the design and implementation of smart, non-intrusive, and ethical strategies to gather users information about their health and lifestyle.
Methods and techniques that will be developed and used to carry out the research	This PhD project aims at developing and implementing smart, non-intrusive, and ethical strategies to gather users' information about their health and lifestyle. It is foreseen to implement various sources of data collection: 1) wearable sensors, possibly certified as medical devices (e.g. HUAWEI WATCH D) will be exploited to monitor health and fitness metrics, e.g. heart rate variability, skin temperature variation, blood oxygen saturation, blood pressure, sleep quality, and physical activity; 2) personal smartphones will be used to analysis voice signals in order to inform about stress level and emotions – voice features not related to the information content of the speech will be computed on the fly directly on the smartphone in order to guarantee the privacy of the user; and 3) Patient-reported Outcome measures about psychosocial and lifestyle risk factors identified in strict collaboration with clinical partners will be digitalized and integrated within the iBeChange platform. Smart and transparent strategies for data collection will be exploited in order to minimize user's burden, when possible. It is

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	foreseen a collaboration with Prof. Francesco Trovò from the Computer Science and Engineering Section of the Department of Electronics, Information and Bioengineering of Politecnico di Milano and with the other technical partners of the iBeChange project (e.g. Eurecat - Centro Tecnológico de Cataluña, Technische Universiteit Eindhoven, SOFTWARE IMAGINATION &VISION SRL – Romania). An abroad period at the premises of the other iBeChange technical partners will be also evaluated.
Educational objectives	We provide doctoral candidates with high-level scientific training, fostering and refining research and problem-solving abilities by focusing on both theoretical and experimental skills. A PhD in Bioengineering will be able to layout, draft and carry-on original research, by leading a research group or working in a team.
Job opportunities	National and international academic and non-academic institutions and organizations, engaged in innovation, research and technical development, high-tech SMEs, government departments.
Composition of the research group	2 Full Professors 1 Associated Professors 3 Assistant Professors 10 PhD Students
Name of the research directors	Proff. Emilia Ambrosini - Simona Ferrante

Contacts
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Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad

Amount monthly	700.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
This research activity will be carried out at the Neuroengineering section of the NEARLAB, within the Department of Electronics, Information and Bioengineering of Politecnico di Milano https://nearlab.polimi.it/ A shared desk and computer will be given to the PhD student for the time needed to carry out research. Short periods of teaching assistantship are encouraged during the program.