Innovation in Greece: scientific collaborations and initiatives of Ionian University in the field of Digital Health

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Summary
This article briefly summarizes some of the scientific collaborations and initiatives of Ionian University (IU) in the field of Digital Health. The Bioinformatics and Human Electrophysiology Laboratory (BiHELab), under IU's umbrella, is involved in more than 20 research projects that focus on Digital Health with both national as well as international partners.

Ionian University (IU) has established numerous collaborations with international institutions in Europe and the USA, with a common goal of promoting scientific innovation. The Department of Informatics at IU comprises a range of disciplines, including computer science, bioinformatics, computational biology, and AI and Machine Learning. These areas enable IU to utilize technology and data-driven approaches to address various research hypotheses. The Bioinformatics and Human Electrophysiology Laboratory (BiHELab), under IU's umbrella, partakes in more than 20 research projects focusing on Digital Health.

The most recent one is the Emblematic Action (1 out of the 8) entitled "National research network for elucidating the genetic basis of neurodegenerative diseases Alzheimer's and Parkinson's, the detection of reliable biomarkers, and the development of novel computational technologies and therapeutic strategies based on precision medicine. BiHELab has also established partnerships with various international institutions in recent years in the framework of improving healthcare, patient outcomes, the overall efficiency of the healthcare system, and big data analytics can help in early disease detection and prevention, and many more.

Some noteworthy partnerships include the collaboration of BiHELab and Johns Hopkins Precision Medicine Center of Excellence in Alzheimer's Disease. This collaboration engages in ongoing projects, diligently executing them with a commitment to excellence and innovation and utilizes cutting-edge technologies, incorporates best practices, and leverages valuable expertise from distinct fields from both universities to analyzse data, identify patterns, and overcome challenges. With this goal in mind, the Center of Excellence for Precision Medicine in Dementia and Alzheimer's Disease at FORTH (Foundation for Research and Technology Hellas) was established. The Center is based in Crete with FORTH, the Richman Family Center at Johns Hopkins, and BiHELab at Ionian University being the main collaborators. The collaboration involves data analysis from longitudinal studies, integrating various data sources to create comprehensive biological profiles of individuals, and conducting clinical evaluations. The ultimate goal is to advance precision medicine in the field of neuroscience, leading to improved patient care and personalized treatment approaches.

Another interesting collaboration that focuses on a similar framework is that with the University of Texas Health Sciences Center at Houston (McGovern School of Medicine's Center for Neurocognitive Disorders). This collaboration aims to modernize personalized medicine in Greece by focusing on people at high risk for developing dementia and it involves joint research

activities, exchange of university community members, training of Ph.D. candidates, student exchanges, and the exchange of information and results of teaching and research.

The collaboration with the Kentros Laboratory of the Norwegian University of Science and Technology also focuses on research related to normal and pathological brain function, with an emphasis on their relation to the pathogenesis of neurodegenerative diseases, which showcasesa shared effort to explore brain-related research topics.

The collaboration with the Dutch biotechnology company "Treeway" which aims to study treatments against neurodegeneration using computational approaches was also built with the digital health research framework in the forefront. This indicates a joint effort to advance research in neurodegenerative diseases.

A scientific partnership with the TranslaTUM Oncology Research Center, of the Technical University of Munich that aims to advance research in oncology has also been established.

These collaborative efforts in digital biomedicine and research on neurodegenerative diseases can lead to improved healthcare outcomes and better treatments, contributing to good health and well-being. In this regard, BiHELab has developed 10 digital biobanks. The Biobanks focus on various neurological disorders, neurodevelopmental disorders, psychiatric disorders, infectious diseases, and oncological disorders. By studying these conditions, the biobanks can contribute to improved diagnosis, treatment, and understanding of diseases, ultimately promoting good health and well-being.

Collaborative innovation in science can drive advancements in various industries, including biotechnology and healthcare, contributing to innovation and infrastructure development. Developing the Digital Biobanks required advanced informatics and data management infrastructure. These biobanks contribute to innovation in the medical and healthcare field, providing valuable resources for research and potential breakthroughs in disease prevention and treatment. Lastly, these academic collaborations and international partners, as well as the exchange of students and researchers, can enhance educational opportunities and promote knowledge sharing.