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| ICT Ecosystems for Precision Medicine Initiatives **Irini Fundulaki** 1#,, **Vassilis Papakonstantinou** 1, **Tzanina Saveta** 1, and **Yannis Rousakis**11 Institute of Computer Science - FORTH# Presenting author: Irini Fundulaki, fundul@ics.forth.gr\* Corresponding author: Irini Fundulaki, fundul@ics.forth.gr |

abstract

Precision medicine is an *“emerging approach for disease treatment and prevention that takes into account individual variability in genes, environment, and lifestyle for each person”*. Precision Medicine allows treating doctors to decide on the appropriate treatment for a patient who is suffering from a specific disease and who has a specific genotype. This approach *differs from the traditional approach* in which the treatment of diseases follows a *“one-size-fits-all” approach* focusing on the average person without considering the differences exhibited by the various patients. Precision medicine is a model in which the *individuals’ phenotype* and *genes*, *environment*, and *lifestyle* are used as *additional layers of patient data* in d*isease treatment and prevention plans*.

The Institute of Computer Science has been involved in the following Precision Medicine initiatives:

1. The Hellenic Precision Medicine in Oncology ([oncopmnet.gr](file:///C%3A%5CUsers%5Celeni%5CAppData%5CLocal%5CTemp%5Cpid-9192%5Concopmnet.gr))
2. The National Network for Genetic Cardiovascular Diseases Study and Prevention of Sudden Death in The Young on The Basis Of Precision Medicine[[1]](#footnote-1) ([icardiacnet.gr](file:///C%3A%5CUsers%5Celeni%5CAppData%5CLocal%5CTemp%5Cpid-9192%5Cicardiacnet.gr))
3. The National Research Network for Genetic Neurodegenerative Diseases[[2]](#footnote-2) ([neuropmnet.gr](file:///C%3A%5CUsers%5Celeni%5CAppData%5CLocal%5CTemp%5Cpid-9192%5Cneuropmnet.gr))
4. National Research network to elucidate the genetic basis of Alzheimer's and Parkinson's neurodegenerative diseases, detect reliable biomarkers, and develop innovative computational technologies and therapeutic strategies underpinning precision medicine
5. The Hellenic Network on Molecular Oncology ([edimo.gr)](file:///C%3A%5CUsers%5Celeni%5CAppData%5CLocal%5CTemp%5Cpid-9192%5Cedimo.gr)

In this poster we discuss the innovative ICT Ecosystems [1] we implemented in the context of Networks (2) – (5). The Ecosystems consist of a set of systems that support MDs and, Biomedical Analysis Lab personnel who manage clinical and genomic patient data respectively, in addition to epidemiologists who want to be aware of the epidemics of a disease, to decide on actions that must be undertaken to address the challenges presented. We adopted a patient-centric approach for the Ecosystem supporting interoperability with third-party systems and providing a complete image of the patient’s profile. The Ecosystems are in production mode and currently store approximately 6.000 patient clinical and genomic data.

**REFERENCES**

[1] Irini Fundulaki, Tzanina Saveta, Vassilis Papakonstantinou, Yannis Roussakis: An Ecosystem for Precision Medicine: Closing the Cycle from Doctor to Patient. Int’l Workshop Semantic Web meats Health Data @ International Semantic Web Conference 2020: 1-6.

***Irini Fundulaki – Short CV***

Irini Fundulaki is a Research Director (Grade A) at FORTH-ICS. She holds a Ph.D. degree (Diplôme de Docteur en Informatique) from the Conservatoire National des Arts et Métiers Paris (C.N.A.M, France.). From 2003 to 2006 she worked at the Network Data and Services Research Department of Bell Laboratories, Lucent Technologies (USA) first as a Postgraduate researcher and then as a Member of Technical Staff where she worked on the topic of personal data management focusing on access control. In 2006 she moved to the Database Group of the Laboratory for Foundations of Computer Science of the School of Informatics, University of Edinburgh (UK) where she continued her work on access control for XML data. In 2008 she returned to Greece as a Research Associate (Grade C) at the Information Systems Laboratory of ICS-FORTH. She is interested in Database Management and Information Systems for the World Wide Web, Provenance Models for RDF Data, Storage and Indexing Schemes for RDF Provenance, Storage, Indexing and Scalable RDF Query Processing, Access Control for RDF and XML Data, Benchmarking, Online Bias, Precision Medicine, Health Information Systems, Genomic Databases and Analysis tools. Since 2018 she has been the scientific supervisor on behalf of the Institute of Computer Science – FORTH in the National Flagship Actions on Precision Medicine: (a) The Hellenic Precision Medicine Network on Cancer (b) The National Network For Genetic Cardiovascular Diseases Study And Prevention Of Sudden Death In The Young On The Basis Of Precision Medicine (Phases I and II) (c) The National Research Network for Neurodegenerative Diseases on the basis of Precision Medicine and (d) the Hellenic Network on Molecular Oncology. She is leading team of ICS-FORTH research and software engineers who designed and implemented the integrated health information systems of the projects that manage clinical, genomic, molecular and imaging data of patients. She has authored many papers in Semantic Web and Database Conferences, and she has been member of Program Committees of renowned conferences and journals in the field of Data Management.

1. [↑](#footnote-ref-1)
2. [↑](#footnote-ref-2)