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Transforming Healthcare with the Internet of Things

Proceedings of the EFMI Special Topic Conference 2016

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Preface

This volume contains the proceedings of the Special Topic Conference (STC) of the European Federation for Medical Informatics (EFMI). The organisation of the STC is part of a long tradition of EFMI working groups to organise scientific events focused on important trends in medical informatics and eHealth. In 2016, the special topic is "*Transforming Healthcare with the Internet of Things*" in relation to the EFMI working group Personal Portable Devices (PPD). STC 2016 takes place in Paris, France, organised by the *Laboratoire d'Informatique Médicale et d'Ingénierie des Connaissances en e-Santé* (LIMICS) under the auspices of EFMI and the French Association for Medical Informatics (AIM).

Only a few years ago, devices were limited to health cards and personal portable devices. Since then, devices have dramatically evolved to include wearables, sensors, and actuators for measuring health values. The application of such technologies in the field of health, social care and wellness has attracted the attention of both patients and members of the general public interested in supporting or improving their health and wellbeing. One of the characteristics of these 'devices' (sometimes too small to observe thanks to nanotechnology) is to be 'connected' and to communicate with other connected devices and systems. This has been the game changer, as it replaces the cumbersome and often error-prone intervention of the human being who was previously necessary to enter data.

The Internet of Things (IoT) is thus turning out to have a major impact on the information paradigm in healthcare. The patient can now become their own Chief Operational Officer, as described by Eric Topol in his recent book *The Patient will see you now*[1]. By providing tools that are able to generate large quantities of data that must be processed in real time, the IoT can have a potentially transformative effect on healthcare, allowing medicine and patient management to evolve from a discrete encounter-based process to a continuous patient-empowering management. This requires an adequate answer from traditionally organised healthcare, which will have to find ways to address new challenges related to respect for consumer privacy, cyber security and data integrity.

STC 2016 deals with the convergence of a process originally fuelled by technical and scientific forces, and the current political forces driven by the sustainability agenda of health and social care. This emphasises the process to humanise the individual who is more and more connected and surrounded by the IoT. Our ambition is to concentrate on this debate and create a platform for these different dimensions of this unstoppable development.

As a conclusion, we quote the Blue Line Statement presented at the 31th PCSI Conference in The Hague on October 16th 2015 in order to emphasise the transition of health and social care systems and the shift from care to citizen-driven health:

> *In order to achieve meaningful improvements in the health of the population, it is essential to understand the combination of health and social care issues for people. This requires health and social care systems to be interoperable, both from*

[1] Eric Topol, The Patient Will See You Now, Basic Books, New York, 2015.

a technological and semantic point of view. Care should be aligned around the person and strive for social interoperability between the professions serving them, and systems must be designed with empathy and respect as core underpinning values. The pillars of the Blue Line model represent key principles for the design and delivery of person-centred, integrated care systems. We encourage policymakers and health system leaders to adopt these principles and create the societal incentive framework to enable this vision to be realised. The Village Track participants of the PCSI Conference recommend that further support be sought to continuously develop and formalise the Blue Line principles as requirements for supporting holistic, person-centred, integrated care systems in the Netherlands, and beyond.

STC Programme

The call for papers has resulted in 70 submissions from 30 countries, which were peer-reviewed by over 160 highly appreciated experts of the EFMI biomedical informatics network. Over 400 authors and co-authors are involved in the accepted contributions that shape the programme. The conference starts with a key contribution from Bernard Benhamou entitled Internet of Things & Medicine: A European Perspective. Then, Peter Pharrow explains how 'We are entering the era of the Internet of (every)-Thing'. Christian Lovis, as the third keynote speaker, ends the conference by addressing the key to 'Moving from a care-driven system to a health-centred paradigm: active objects, data, and information'.

The reviewing process has demonstrated that, up to now, the scientific work related to the IoT in healthcare has been focused on a mix of technologically-driven issues, but the potential to reform the health and social care systems is still underexploited. This can be seen as a positive sign, as the scientific world first wants to understand and prove the potential of the IoT before widely implementing it within the healthcare system. Accepted contributions reflect the scientific work on the impact of the IoT and the societal dimensions of the IoT in the sessions related to the transformation of healthcare, while the sessions on ontologies, decision support, clinical information systems, and data reuse complete the programme. To enrich the scientific sessions, the conference also offers tutorials, workshops, posters, short communications, demonstrations and a plenary panel.

From Sunday 17th to Tuesday 19th April 2016, Paris will not only be the city of light, but also the centre for world-citizens involved in the changing of traditional health care. It is with respect for the history of French medicine that the LIMICS chose the "*Ecole de médecine*" (created in 1794), as the historic, almost sacred, venue for STC 2016 to discuss the future of healthcare.

On behalf of the Scientific Program Committee

Jacob Hofdijk

SPC team
Brigitte Séroussi, Christian Lovis, Floor Sieverink, Frédéric Ehrler and Adrien Ugon

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