

# HOW EMBEDDED SYSTEMS CAN AUGMENT HUMAN INTELLIGENCE IN MEDICINE



## Gastvortrag: Prof. Dr. Oliver Amft, Lehrstuhl für Digital Health Friedrich-Alexander Universität Erlangen-Nürnberg

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In this talk, I will provide an overview on Digital Health and discuss the tight links between embedded technology, artificial intelligence, and precision medicine. To illustrate the technology benefit of Digital Health, I will show examples of our recent device developments, e.g. smart eyeglasses for dietary monitoring and smart garments for bowel sound analysis. The system design considerations for embedded medical devices will be discussed, in particular the balance between resource use and pattern analysis performance. Furthermore, examples of methods and application studies will be addressed, including extracting health-related behaviour and digital biomarkers for dietary behaviour, cardiorespiratory performance, for sleep and circadian rhythm, and for rehabilitation of motor function. In the second part, I will introduce our approach to personalised systems modelling and multidomain co-design. More specifically, we attempt to combine mechanical, electronic, and software design aspects in the medical device development and replace physical prototyping with simulations. Examples employing our approach will be discussed, including sensor data synthesis and pattern analysis algorithm performance estimation. The talk will conclude by looking at the broad opportunities in future personal health system design and using digital twins to further augment medical decision support.



Oliver Amft is the founding director of the Chair of Digital Health at the Friedrich Alexander University Erlangen-Nuremberg (FAU). He received the Dipl.-Ing. (M.Sc.) from Chemnitz Technical University in 1999 and the Dr. sc. ETH (Ph.D.) from ETH Zurich in 2008, both in Electrical Engineering and Information Technology. Oliver obtained the university teaching qualification from TU Eindhoven in 2011. Until 2004, he was a R&D project manager with ABB, Inc. Since 2009, Oliver held academic appointments at ETH Zurich, TU Eindhoven, was appointed full professor at University of Passau, and is currently a full professor at FAU Erlangen-Nuremberg. Oliver has co-authored more than 150 refereed archival research publications in field of context recognition, biomedical sensor technology, wearable computing, digital health, and embedded systems. (web: [www.cdh.med.fau.de](http://www.cdh.med.fau.de))

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