

The Future of Wearables in Health

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Abstract—Personalized medicine and prevention approaches, aided by new wearable sensing, analytics, language technologies, visualization tools and interface methods, have the potential to transform health from reactive treatments based on deviations from population-level data to one in which interventions and prevention are tailored to individual characteristics. To make this happen will require a range of new fundamental scientific advances across computing, engineering and the behavioral and social sciences in concert with the biomedical research community. These partnerships are needed because the solutions to complex health problems and processes must effectively satisfy a multitude of constraints arising from the sparsity and heterogeneity of data, limitations of current cyber-physical systems, language and cultural factors, network limits, and barriers to patient, provider and caregiver behavioral change. This talk explores the opportunities and challenges in developing a smarter and more connected health ecosystem using wearable technology and highlights promising new areas of research.

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Wendy Nilsen, Ph.D. is the Acting Deputy Division Director in the Industrial Innovation and Partnerships Division

of National Science Foundation, USA. She is a Program Director for the Smart and Connected Health Program in the Directorate for Computer Information Science Engineering at the National Science Foundation. Her work focuses on the intersection of computing and health. This includes a wide range of methods for data collection, data analytics and turning data to knowledge. Her interests span the areas of sensing, analytics, cyber-physical systems, information systems, big data and robotics, as they relate to health. More specifically, her efforts include: serving as co-chair of the Health Information Technology Research and Development community of practice of the Networking and Information Technology Research and Development Program; the lead for the NSF/NIH Smart and Connected Health announcement; convening workshops to address methodology in mobile technology research; serving on numerous federal technology initiatives; and, leading training institutes. Prior to joining NSF, Wendy was at the National Institutes of Health.