

# Systems Design for Remote Healthcare

## Overview

The prevalence of ageing population and chronic diseases worldwide has put the conventional model of healthcare delivery under serious strain. Productivity loss coupled with serious degradation of the quality of life has resulted in a significant socio-economic challenge to the society. This leads to radically changing the care delivery model from the conventional “reactive healthcare” to “proactive healthcare” where disease prevention through patient-centric management, monitoring and episode prediction plays the central role instead of treating a patient when the disease is fully manifested. Despite the availability of a range of advanced technologies, development of such a next-generation remote healthcare system is a massively complex task owing to the requirements of integrating heterogeneous technologies into an integrated service delivery framework. This calls for radical new thinking where knowledge from a multitude of subject areas, starting from biology and clinical science to different facets of ICT needs to be brought together to form an optimal service structure that can operate seamlessly in a mobile environment. From a purely scientific point of view, this creates a multidisciplinary field where innovation, adaptation and application run hands-in-hands.

This course is organized in two modules that should be taken together. The topics in Module A will expose the participants to the fundamentals of remote healthcare like fundamentals of digital signal processing, machine learning, computer architecture, low-power VLSI design and vital sign monitoring technology. In Module B, the design of remote healthcare system is emphasized. The topics in the module include application of signal processing and machine learning and their implementation strategy for remote healthcare, patient health record (PHR) system, system integration, a business perspective and case studies based on EU funded research projects CHIRON (Cardiovascular monitoring system), StrokeBack (remote Stroke rehabilitation system) and MICHELANGELO (remote rehabilitation system for cognitively impaired Autistic children).

Course participants will learn these topics through lectures and hands-on experiments. Also case studies and assignments will be shared to stimulate research motivation of participants.

<b>Modules</b>	<b>A: Fundamentals Of Remote Healthcare : December 18 - December 22, 2017</b> <b>B: Design Of Remote Healthcare Systems : December 26 - December 29, 2017</b> <b>Number of participants for the course will be limited to fifty.</b>
<b>You Should Attend If...</b>	<ul style="list-style-type: none"> <li>▪ you are an electronics engineer or research scientist interested in designing of remote healthcare system.</li> <li>▪ you are a researcher interested to gain confidence and capability in the system design of remote healthcare and mapping the technologies and in application space of remote healthcare framework.</li> <li>▪ you are a student or faculty from academic institution interested in learning how to do research on remote healthcare system and gain practical insight from the experience of European Union sponsored project .</li> </ul>
<b>Fees</b>	The participation fees for taking the course is as follows: <b>Participants from abroad : US \$500</b> <b>Industry/ Research Organizations: Rs. 20000(any one module) Rs. 30000 (all modules)</b> <b>Academic Institutions: Rs. 20000 (all modules)</b> The above fee include all instructional materials, tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.

## The Faculty



**Prof. Koushik Maharatna** is a Chair in Signal Processing Systems Design in the Department of Electronics and Computer Science (ECS), University of Southampton, UK. He leads the next-generation remote healthcare system design research in the ECS. He has developed several remote healthcare systems in the area of monitoring Cardiovascular diseases, Stroke rehabilitation and cognitive impairment in young children. These systems were successfully trialed in four major European hospitals. His research interests include signal processing algorithm design, machine learning and ULSI circuit design.



**Dr. Sudipta Mukhopadhyay** is Associate Professor of Electronics & Electrical Communication Engineering of IIT Kharagpur, India. His research interests include Medical Image and Signal Processing, Content based Medical Image Retrieval, Continuous Authentication and Video Processing. He has joined academics after 11 years in industry. Last two companies he has served are GE Global Research, Bangalore and Philips Medical Systems, Bangalore.

**Prof. Goutam Saha** is a Professor of Indian Institute of Technology, Kharagpur. His research interest is audio and biomedical signal processing.

**Dr. Mrigank Sharad** is an Assistant Professor of Indian Institute of Technology, Kharagpur. His research interest is mixed signal design, low power VLSI, biomedical circuits and systems, and application specific signal processing..

## Course Co-ordinator

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