

NOKIA SENSING XCHALLENGE®

Making Sense of Your Health

TEAM SHEET

The Nokia Sensing XCHALLENGE form the foundations of what will probably be one of the most exciting technological revolutions of all times. In the future to come, intelligent sensors will become ubiquitous and, thanks to these technologies, the processing of information will happen almost instantly, with no extra resources nor costs required for the user."

- Dr. Esther Rodriguez-Villegas



GUES

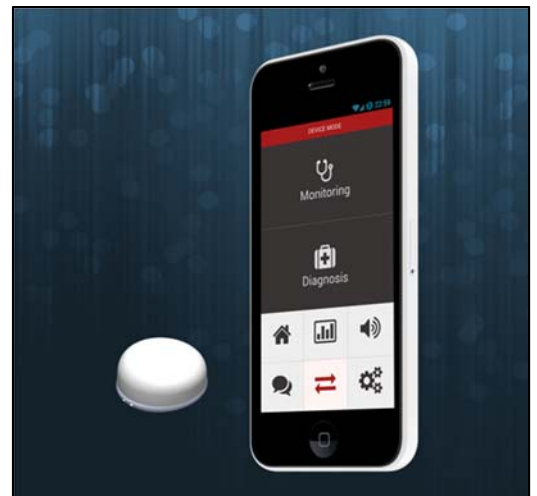
HEADQUARTERS: London, United Kingdom

TEAM WEBSITE: www.acupebble.com

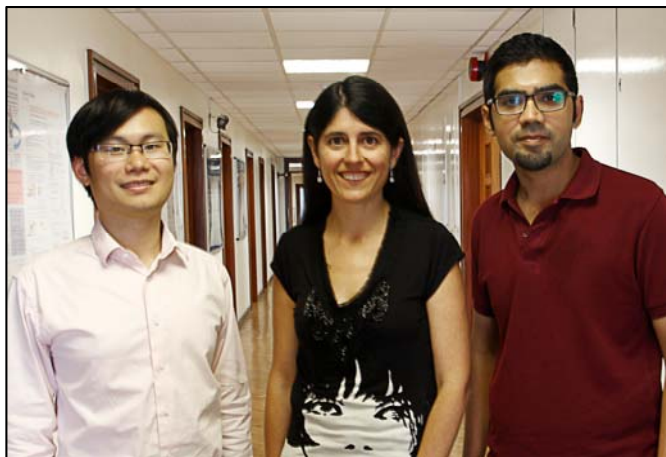
TEAM LEADER: Dr. Esther Rodriguez-Villegas

TECHNICAL INNOVATION

Our innovation is a novel wearable sensing technology, the AcuPebble, which is able to detect breathing as well as cardiac sounds, and automatically extract breathing and cardiac related parameters which are useful for the assessment of a wide range of breathing and cardiac related conditions. The AcuPebble can be used by the doctor or directly by the patient; for remote or automatic diagnosis and monitoring; and for disease management. The fundamental physical principle behind the AcuPebble wearable sensing technology is that the mechanisms of respiration and cardiac function generate acoustic signals in the respiratory tract that can be detected externally with a very small acoustic sensor. From this acoustic signal, a variety of physiological and disease related parameters can be obtained.



TEAM STORY



The story of our technology started almost 10 years ago. The then medical director of the UK National Society for Epilepsy convinced Dr. Esther Rodriguez-Villegas to use her unique insight into low power microelectronic design to develop an apnea monitoring technology that prevented sudden unexpected death in epilepsy. The problem was not just detecting apnea, but doing so with a device that was very small, unobtrusive, had the ability to monitor for long periods, and was extremely accurate, since

missing an apnea could be fatal, and false alarms would discourage its use. Existing sensing modalities and signal processing algorithms did not meet these criteria. Novel sensing, hardware and software engineering techniques were devised to overcome these challenges. With time, Dr. Rodriguez-Villegas realized that this technology would however have much wider applications, including sleep apnea screening and the continuous remote monitoring of a variety of respiratory and cardiac conditions. Work on the different applications has resulted on the AcuPebble.

ABOUT OUR TEAM LEADER

Dr. Esther Rodriguez-Villegas, obtained her M.S. in Physics in 1996 and her PhD in 2002, both from the University of Seville. Since 2002, she has been a faculty member, currently an Associate Professor, in the Department of Electrical and Electronic Engineering, Imperial College London, where she specializes in ultra-low-power electronic circuits and systems for wearable medical devices. She is the author of more than 100 peer-reviewed papers and a book on low power circuit design, published by the IET. Dr. Rodriguez-Villegas is a Senior Member of the IEEE, and has been a member of technical committees in many international IEEE conferences. In 2010, she won a €1.8m Starting Grant from the European Research Council. This award is the most prestigious one given in Europe since it aims to identify and support future leaders of research.

THE NOKIA SENSING XCHALLENGE

The \$2.25 million global competition to accelerate the development of sensors and sensing technology that is smaller, lighter and able to capture true clinical data on a personalized scale. Making sense of your health.

sensing.xprize.org