

# Can we screen 40k children per year using DigiScope?

Miguel Coimbra

*Instituto de Telecomunicações, Faculdade de Ciências da Universidade do Porto, Portugal  
mcoimbra@fc.up.pt*

## Abstract

Ever since the invention of the stethoscope in 1816, auscultation has been an essential component of a patient's clinical examination. It is a powerful screening tool, considered the most cost-effective [1], and the most widely used method for screening heart disease [2]. It is also a hard skill to master, due to several factors associated with the nature of the collected sounds and our human ability to hear them. Relevant pathological activity is often soft, short-lived and occurs in proximity to loud, normal activity: a typical murmur is 1000 times softer than normal heart sounds and can last for as little as thirty milliseconds [3]. What if we have the ability to digitally record auscultation sounds? Could we create richer electronic health records for future reference? Would we make better diagnostics if we could ask an expert opinion from a remote specialist or from a local clinical decision support system? Could we radically improve the way we train our clinicians in the art of auscultation? This is the essential vision of the DigiScope research line: combining electronic stethoscopes with the power of modern portable computing technology to create interactive auscultation systems for telemedicine, assisted decision and teaching [4].

A ten-year long partnership has been established between the University of Porto (Instituto de Telecomunicações, CINTESIS - Faculdade de Medicina da Universidade do Porto) with the largest hospital in northeast Brazil, Real Hospital Português located in the city of Recife, Pernambuco. Throughout these years, relevant interactive auscultation technologies have been researched, developed, tested and some of them successfully transferred to the market via spin-off processes. During this talk, a summary of the most remarkable events of this partnership will be given, culminating in the empowerment of the state of Paraíba with the technological ability to screen the nearly 40k children that are born per year here.

Will the digital revolution propel one of the oldest arts in medicine for 200 more years of clinical practice? Join us in this discussion.

**Keywords:** Biomedical Signal Processing, Human-Computer Interaction, Auscultation, Telemedicine.

## References

- [1] Cardiac auscultation: A cost-effective diagnostic skill. *Current Problems in Cardiology* 20, 447-530, 1995.
- [2] R. Bonow et al. ACC/AHA guidelines for the management of patients with valvular heart disease. *J. Am. Coll. Cardiol.* 32, 1486-1582, 1998.
- [3] D. Pereira, A. Castro, P. Gomes, J. Areias, Z. Reis, R. Correia, M. Coimbra. Digital Auscultation - Challenges and Perspectives. *Encyclopedia of E-Health and Telemedicine*, IGI Global, 910-927, 2016. (DOI: 10.4018/978-1-4666-9978-6.ch070).
- [4] D. Pereira, F. Hedayioglu, R. Correia, T. Silva, I. Dutra, F. Almeida, S. S. Mattos, M. Coimbra. DigiScope - Unobtrusive Collection and Annotating of Auscultations in Real Hospital Environments. *Proc. IEEE EMBC*, Boston, USA, 2011.