A. Koulaouzidis
Lecture Title: Would active capsule endoscopy be a “nice solution” in 2020?

Capsule endoscopy (CE) is a major breakthrough and an invaluable supplement to conventional endoscopy. However, it will require further development as major drawback of current, commercially-available CE models, is their passive locomotion [1,2]. In the near future, we will continue to see novel steering and actuation techniques, and further development of existing soft-tethered capsules [1,3]. Magnetic locomotion seems to be the favorable method for untethered control of CE actuation [1,4]. Furthermore, optical enhancing techniques, such as improved image resolution, contrast and tissue penetration and provision of biochemical and molecular information could lead to -in situ- optical (instead of mechanical) biopsy [1,5]. Power consumption continues to be a relevant challenge, which is limited by the size of the capsule [1]. Volume/size compression can be achieved, as the technological frenzy of our days will eventually lead to the production of remarkable small parts and this might allow the production of dissolvable capsules, including the use of nontoxic batteries [6]. The mainstream small bowel endoscopy in the third decade of the new millennium should be provided by an enhanced, next-generation capsule-based platform, such as the one proposed by Iakovidis et al [5]. Furthermore, computational methods that can be implemented in software can enhance the diagnostic yield of CE both in terms of efficiency and diagnostic accuracy [7]. However, in an ‘remote’ environment like the small-bowel, the attention should focus on how to utilize the existing carrier shape and size, but with miniaturized components such as microscopic batteries, that will leave internal space and provide enough power for internal lens rotation, space for microscopic labs (lab-in-a-pill) and other sensing capacities and -hopefully- deliver powder medication for bleeding [2].

Dr. Anastasios (a.k.a Tassos) Koulaouzidis is Associate Specialist in the Centre of Liver and Digestive Disorders at the Royal Infirmary of Edinburgh, clinical lead of the capsule endoscopy service, and Honorary Clinical Fellow of School of Clinical Sciences, the University of Edinburgh, Scotland, UK. He obtained his MD from the Medical School of the Aristotle University of Thessaloniki (Greece) in 1995 and his Doctorate in Medicine from the University of Edinburgh (2014) with the title "Optimising the use of capsule endoscopy in the detection of small-bowel pathology". He is currently working towards his Doctorate in Philosophy (on innovative aspects of capsule endoscopy) at the university of Lund, Sweden. Dr Koulaouzidis became a Member of the Royal College of Physicians of Edinburgh (UK) in 2004 and a Fellow of the same College in 2013. He is also a Fellow of the European Board of Gastroenterology (2009), the Royal Society for Public Health (2013) and the American College of Gastroenterology (2015). He is the co-author of three book chapters and more than 100 PubMed articles, out of which at least 40 are on capsule endoscopy. His research interests include clinical applications of capsule endoscopy, quality improvement and software diagnostics as well as hardware and concept development in capsule endoscopy. Other specialty interests include colonoscopy, microscopic colitis, and conventional (as well as minimally-invasive) small-bowel endoscopy. He is member of the editorial and/or advisory board of several specialty journals and associate editor or Editor-in-Chief of three Gastroenterology/Hepatology journals. Dr Koulaouzidis was awarded the Given®Imaging-ESGE Research Grant 2011, a University of Edinburgh Innovation Initiative Grant in 2011 and one of the ESGE Postgraduate Visiting Fellow Grants (2010). His full profile is available via the following site: www.drkoulaouzidis.com.

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