香港大學 機械工程系
Department of Mechanical Engineering
THE UNIVERSITY OF HONG KONG

SEMINAR

The Road to Autonomous Endoluminal Surgery

Date: 8 July, 2026 (Wednesday)
Time: 3:00 p.m.
Venue: Room 7-34, Haking Wong Building, HKU

Speaker: Professor Emmanuel B. Vander Poorten
Faculty of Engineering Technology
Department of Mechanical Engineering
KU Leuven, Belgium

Abstract:
Minimally invasive interventions are increasingly being performed through natural openings or small access points that follow existing anatomical lumens, such as the trachea, ear canal, gastrointestinal tract, and vasculature. These approaches reduce patient trauma, shorten recovery times, and expand access to previously difficult-to-reach targets. However, the anatomy encountered along these pathways is often fragile, narrow, and highly tortuous. As a result, clinicians rely on flexible instruments capable of navigating complex environments safely and effectively. Achieving precise and reliable control of such instruments remains a significant technical and clinical challenge. Successful manipulation requires substantial expertise, experience, and continuous situational awareness. The number of skilled experts is simply too low for some interventions. This talk presents recent developments in flexible surgical robotics, sensing technologies, and clinician-assistance methods designed to improve usability and procedural confidence. Particular attention is given to approaches that enhance awareness of instrument–tissue interactions and support more intuitive control. By tightly integrating sensing, modelling, and bridging this to control, these systems can increasingly compensate for procedural complexity and operator burden. This talk summarizes the speaker's vision towards progressively embedding of autonomy in support of future endoluminal interventions to achieve enhancements in terms of safety, precision, and ultimately clinical outcome.

Biography:
Emmanuel B. Vander Poorten received a BS/MS in Mechanical Engineering in 2000 from KU Leuven. From 2000 to 2001 he worked as research assistant at KU Leuven. In October 2001 he joined the mechatronics laboratory of Kyoto University, Japan, where he obtained a PhD in Engineering in 2007. Currently he is professor at the Faculty of Engineering Technology, Department of Mechanical Engineering of KU Leuven. He is teaching courses on Machine Design, Drive Systems Technology, Robotics and Advanced Instrumentation. He is a regular teacher at international schools on medical or soft robotics (SSSR – Summer School on Surgical Robotics, LIRRM, Montpellier, France; SSMR – Spring School on Medical Robotics – Georgia Tech, Atlanta, US; Soft Robotics Summerschool, TU Delft, The Netherlands). Dr. Vander Poorten heads the Robot-Assisted Surgery group (RAS) at KU Leuven. His research interests are in robotic micro-surgery, robotic catheterization, intra-operative sensing, autonomous robotic surgery. He has a long track recording in coordinating EU-funded projects on surgical robotics (SCATh, CASCADE, EurEyeCase, ATLAS, ARTERY, PROMPT) and is also keen on translating robotics to the clinic (with several first human trials on robot-assisted vein cannulation, robot-assisted subretinal injection, robotic spine reconstruction, real-time distributed shape-sensing). His team and students were awarded among others the Leuven da Vince Award (25kEUR), the 2025 KUKA Innovation Award Medical Robotics (20kEUR), Honorable Mention 2021 RA-L, Best 2021 PhD Award at BNCTAM, National James Dyson Award, 2020.

ALL INTERESTED ARE WELCOME
For further information, please contact Professor Z.L. Jiang at 3910 2658.