MRC SYMPOSIUM

Multi-Scale Medical Robotics Center (MRC) Symposium 2025

May 29-31, 2025 · Hong Kong

e-Programme Book

Main Symposium - Charles K. Kao Auditorium, Hong Kong Science Park
Hands-on Workshop - G01-03, Building 20E, Hong Kong Science Park

INNOHK

MULTI-SCALE MEDICAL ROBOTICS CENTER

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Organizing Committee

Symposium Co-Chairs

Prof. Wai Yan Philip CHIU
Faculty of Medicine
The Chinese University of Hong Kong
Hong Kong SAR

Prof. Kwok Wai Samuel AU
Department of Mechanical and Automation Engineering
The Chinese University of Hong Kong
Hong Kong SAR

Steering Committee

Prof. Lord Ara DARZI
Faculty of Medicine
Imperial College London
United Kingdom

Prof. Ferdinando RODRIGUEZ Y BAENA
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Imperial College London
United Kingdom

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Department of Computer Science
Johns Hopkins University
USA

Prof. Bradley NELSON
The Institute of Robotics and Intelligent Systems
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Prof. Nassir NAVAB
Department of Laboratories for Computer Aided Medical Procedures
Technical University of Munich
Germany

Prof. Danail STOYANOV
Faculty of Engineering Sciences
University College London
United Kingdom

Organizing Committee

Prof. Wai Yan Philip CHIU *(The Chinese University of Hong Kong)*
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Prof. Siu Man Simon NG *(The Chinese University of Hong Kong)*
Prof. Chi Fai NG *(The Chinese University of Hong Kong)*
Prof. Tat Ming Danny CHAN *(The Chinese University of Hong Kong)*
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Prof. Hon Chi YIP *(The Chinese University of Hong Kong)*
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Prof. Qi DOU *(The Chinese University of Hong Kong)*
Prof. Shing Shin Bernard CHENG *(The Chinese University of Hong Kong)*
Dr. Kar Kei Steffi YUEN *(Prince of Wales Hospital)*

Symposium Information

Symposium & Workshop Venue

Main Symposium Venue: Charles K. Kao Auditorium, Hong Kong Science Park, Pak Shek Kok, New Territories, Hong Kong

Hands-on Workshop Venue: G01-03, Building 20E, Hong Kong Science Park, Pak Shek Kok, New Territories, Hong Kong

Shuttle Service

Scheduled coach transfer will be provided for speakers and guests who are residing at Hyatt Regency Shatin to attend the Hands-on Workshop and Symposium from May 29 to 31, 2025. A staff holding a sign of "Symposium logo" will be stationed at the coach pick-up point.

From	To	Pick-up Time				
May 29, 2025 (Thursday)						
Hyatt Regency	MRC R&D Lab	08:45	13:30	16:45		
MRC R&D Lab	University MTR Station	19:00	19:15	19:30	19:45	20:00
MRC R&D Lab	Dinner hosted by MRC Directors @HK Jockey Club	19:00				
HK Jockey Club	Hyatt Regency	21:30				
May 30, 2025 (Friday)						
Hyatt Regency	Charles K. Kao Auditorium	08:15	08:30			
Charles K. Kao Auditorium	Hyatt Regency	18:00	18:10			
May 31, 2025 (Saturday)						
Hyatt Regency	Charles K. Kao Auditorium	08:15	08:30			
Charles K. Kao Auditorium	Hyatt Regency	17:45				

Lobby Floor, Hyatt Regency Shatin

University MTR Station

MRC R&D Lab
G/F Lobby, 20E, Hong Kong Science Park

Charles K. Kao Auditorium, Hong Kong Science Park

Symposium Information

Registration and Information Desk

	Date	Opening Hours	Location
Workshop	May 29, 2025	09:00 – 17:00	Foyer of MRC R&D Lab G01-03, Building 20E, Hong Kong Science Park
Main Symposium	May 30-31, 2025	08:30 – 17:00	Pre-function Hall, Charles K. Kao Auditorium, Building 10W, Hong Kong Science Park

Wifi Access

Free Wi-fi is available at the venue.

Network: MRC_symposium_2025

Password: mrcsym2025 (case sensitive)

Main Symposium

Opening ceremony, keynote presentations, invited presentations, case studies, panel discussion and the closing ceremony will be held at Charles K. Kao Auditorium, Hong Kong Science Park.

Poster Presentation, Exhibition, Refreshment Breaks

The poster presentations, exhibition and refreshment breaks will be held at Atrium Link, Hong Kong Science Park on May 30 & 31, 2025 at designated times.

Lunch

Lunch boxes will be arranged at Conference Hall 4-7, 2/F, Building 10W, Hong Kong Science Park.

Cocktail Reception

(For the invited guests only)

Date:	May 29, 2025 (Thursday)
Time:	17:00 – 20:00
Venue:	MRC R&D Lab, 20E, Hong Kong Science Park

MRC Symposium 2025 VIP Dinner

(For the invited guests only)

Date:	May 30, 2025 (Friday)
Time:	18:30 – 20:30
Venue:	Ballroom I, Hyatt Regency Shatin 18 Chak Cheuk Street, Shatin, Hong Kong

Badge Identification

Each participant will receive a name badge upon registration. All participants are requested to wear their name badges throughout the Symposium. Only badge holders will be admitted to the symposium venues.

Symposium Information

CME Accreditation

(May 31, Urology Session, 09:00 AM – 12:00 NOON)

- The Hong Kong College of Family Physicians
- Hong Kong College of Physicians
- The College of Surgeons of Hong Kong

Language

English is the official language of the Symposium.

Certificate of Attendance

E-certificate of attendance will be sent to those attended the Symposium within 2 weeks after the Symposium.

Personal Property

Please take good care of your personal belongings. Do not leave them unattended. The Organizers and the Secretariat will not be responsible for any loss or damage of your personal properties.

Liability

The Organizers and the Symposium Secretariat will not be liable for personal accidents, or any loss or damage of private property during the Symposium. Participants should make their own arrangements with respect to personal insurance.

Disclaimer

Whilst every attempt will be made to ensure that all aspects of the Symposium announced will take place as scheduled, the Organizers reserve the right to make last minute changes should the need arise.

Programme-at-a-Glance

Venue: Science Park East Avenue, Hong Kong Science Park, Hong Kong

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The scientific programme and workshops are subject to change without prior notice.

Detailed Programme

Venue: Charles K. Kao Auditorium, Hong Kong Science Park, Hong Kong

May 30, 2025 (Friday)

Time	Programme
	AM Session Moderators: Prof. Wai Yan Philip CHIU, Prof. Kwok Wai Samuel AU
08:30-09:00	Registration
09:00-09:30	Opening Ceremony
09:30-09:55	**Keynote Presentation** **Prof. Lord Ara DARZI** *Imperial College London*
09:55-10:10	**Keynote Presentation** **Ms. Clara CHAN** *Hong Kong Investment Corporation Limited*
10:10-11:00	**Case Studies of Surgical Technology Translation in Hong Kong** **1. Cornerstone Robotics** **Prof. Siu Man Simon NG** *Chair of Department of Surgery, Faculty of Medicine,* *The Chinese University of Hong Kong* **2. Agilis Robotics** **Prof. Chi Fai NG** *Professor of Urology, Faculty of Medicine,* *The Chinese University of Hong Kong* **3. Olympus AI System** **Prof. Wai Yan Philip CHIU** *Dean of Faculty of Medicine,* *The Chinese University of Hong Kong* **Panel Discussion** Moderator: Prof. Kwok Wai Samuel AU Panelists: Prof. Siu Man Simon NG, Prof. Ka Fung Peter CHIU, Prof. Wai Yan Philip CHIU, Mr. William HU (Qiming Venture Partners), Dr. Jerry WANG (Cornerstone Robotics)
11:00-11:35	Coffee Break
11:35-12:00	**Keynote Presentation** Human-Machine Partnerships in Computer-Integrated Interventional Medicine **Prof. Russell TAYLOR** *Johns Hopkins University*
12:00-12:15	**Q&A Section for Keynote Presentation** Moderator: Prof. Li ZHANG
12:15-13:30	Lunch Break

Detailed Programme

Time	Programme
	PM Session - Specialty: *Gastrointestinal Surgery* Moderators: Prof. Hon Chi YIP and Prof. Ming Yee Trevor YEUNG
13:30-13:55	**Keynote Presentation** The Current State of Robot-assisted Minimally Invasive Esophagectomy (RAMIE): Trends and Outcomes from the Upper GI International Robotic Association (UGIRA) Esophageal Registry **Prof. Richard van HILLEGERSBERG** *Chairman of the Upper GI International Robotic Association (UGIRA), Utrecht Medical Center*
13:55-14:20	**Keynote Presentation** Robotic Magnetic Navigation: Transforming Minimally Invasive Procedures **Dr. Quentin BOEHLER** *Senior Researcher of the Multi-Scale Robotics Lab, ETH Zurich*
14:20-14:35	**Invited Presentation** From Image-guided Surgery to Information-guided Surgery **Prof. Woojin HYUNG** *Department of Surgery, College of Medicine, Yonsei University*
14:35-14:50	**Invited Presentation** Humanoid Robots and the Future of Robot-Assisted Surgery **Prof. Michael YIP** *Electrical and Computer Engineering, University of California San Diego*
14:50-15:05	**Invited Presentation** Robotic Surgery with Grasping Force Feedback **Prof. Masanori TOKUNAGA** *Chairman, Department of Gastrointestinal Surgery, Institute of Science Tokyo*
15:05-15:20	**Invited Presentation** Holistic Autonomy in Robotic Surgery **Prof. M. Ali NASSERI** *Founding director of the Medical Autonomy and Precision Surgery (MAPS) Laboratory, School of Medicine and Health, Technical University of Munich*
15:20-15:45	Poster Presentation & Coffee Break
15:45-16:10	**Keynote Presentation** Development of a Surgical Robot "ANSUR" based on New Concepts **Dr. Masaaki ITO** *Head, Department of Colorectal Surgery, National Cancer Center Hospital East*
16:10-16:25	**Invited Presentation** Reimagining Healthcare from Within: A Possible Future for Endoluminal Robotics at the Hamlyn Centre **Prof. Ferdinando RODRIGUEZ Y BAENA** *Co-Director of Hamlyn Centre, Imperial College London*

Detailed Programme

Time	Programme
16:25-16:40	**Invited Presentation** Flexible Robotic Platforms for Therapeutic GI Endoscopy **Prof. Kazuki SUMIYAMA** *Chair of Department of Endoscopy,* *The Jikei University School of Medicine*
16:40-16:55	**Invited Presentation** Endoscopic Multisensory Navigation with Soft Flexible Robotics **Prof. Hongliang REN** *Department of Electronic Engineering, Faculty of Engineering,* *The Chinese University of Hong Kong*
16:55-17:25	**Panel Discussion** Moderator: Prof. Qi DOU Panelists: Prof. Richard van HILLEGERSBURG, Dr. Quentin BOEHLER, Prof. Masaaki ITO
17:25-17:50	**Highlights of Hands-on Workshops** Moderator: Prof. Ka Wai KWOK
18:30-20:30	**MRC Symposium 2025 VIP Dinner** (By Invitation Only)

Detailed Programme

May 31, 2025 (Saturday)

Time	Programme
	AM Session - Specialty: *Urology*
	Moderators: Prof. Zheng LI, Dr. Eddie CHAN
08:30-09:00	Registration
09:00-09:25	**Keynote Presentation** The Virtuoso Robotic System for Transurethral Bladder Lesion Surgery and Rigid Endoscopic Interventions **Prof. Duke HERRELL** *Surgical Director, Vanderbilt Urologic Surgery Operating Rooms,* *Vanderbilt University*
09:25-09:40	**Invited Presentation** The Robotic Revolution: Different Platforms and What It Means for Robotic Surgical Training **Prof. Kenneth CHEN** *Senior Consultant Uro-oncologist,* *Singapore General Hospital*
09:40-09:55	**Invited Presentation** Robotic Waterjet Surgery for Prostatic Diseases: What Have We Learnt for the Past Decade? **Prof. Yuen Chun Jeremy TEOH** *Department of Surgery, Faculty of Medicine,* *The Chinese University of Hong Kong*
09:55-10:15	**Panel Discussion** Moderators: Prof. Zheng LI, Dr. Eddie CHAN Panelists: Prof. Duke HERRELL, Prof. Kenneth CHEN, Prof. Yuen Chun Jeremy TEOH
10:15-10:45	Poster Presentation & Coffee Break
	Moderators: Prof. Zheng LI, Dr. Samson CHAN
10:45-11:10	**Keynote Presentation** The Agilis Robotics Platform for Endoscopic Bladder Surgery **Prof. Ka Fung Peter CHIU** *Department of Surgery, Faculty of Medicine,* *The Chinese University of Hong Kong*
11:10-11:25	**Invited Presentation** Intelligent Magnetic Navigation System for PCNL with Real Time Ultrasound and CT Fusion **Dr. Abuduliaizezi HALIFU** *Medical Department,* *Carbon Shenzhen Medical Device Co. Ltd.*
11:25-11:40	**Invited Presentation** Robotic RIRS: Current Status and Future Directions **Dr. Kar Kei Steffi YUEN** *The Chinese University of Hong Kong* *New Territories East Cluster, Hong Kong Hospital Authority*
11:40-12:00	**Panel Discussion** Moderators: Prof. Zheng LI, Dr. Samson CHAN Panelists: Prof. Ka Fung Peter CHIU, Dr. Abuduliaizezi HALIFU, Dr. Kar Kei Steffi YUEN
12:00-13:30	Lunch Break

Detailed Programme

Time	Programme
	PM Session - Specialty: *Medical Device Engineering*
	Moderators: Prof. Hing Chiu Charles CHANG, Prof. Shing Shin Bernard CHENG
13:30-13:55	**Keynote Presentation** China's Neurosurgical Robots: Current Status and Future Outlook **Prof. Anchao YANG** *Beijing Tiantan Hospital*
13:55-14:20	**Keynote Presentation** From Intelligence Amplification to Artificial Intelligence: Shaping the Future of Computer-Assisted Surgery **Prof. Nassir NAVAB** *Chair for Computer Aided Medical Procedures & Augmented Reality, Faculty of Information Technical University of Munich*
14:20-14:30	**Q&A Section for Keynote Presentations**
14:30-14:48	**Invited Presentation** Surgical Diagnostics with Spectroscopic Optical Sensing and Imaging **Prof. Daniel ELSON** *Hamlyn Centre for Robotic Surgery, Department of Surgery and Cancer, Imperial College London*
14:48-15:06	**Invited Presentation** Magnetic Surgical Robots: A "Fantastic Voyage" Deep inside the Human Body **Prof. Pietro VALDASTRI** *Chair of Robotics and Autonomous Systems, University of Leeds*
15:06-15:24	**Invited Presentation** Milli-Spinner Thrombectomy: A Better Cure for Stroke **Prof. Renee ZHAO** *Department of Mechanical Engineering, Stanford University*
15:24-15:50	Poster Presentation & Coffee Break
	Moderators: Prof. Li ZHANG, Dr. Kai Fung Tony CHAN
15:50-16:08	**Invited Presentation** The Future of AI in Surgical Interventions **Prof. Sophia BANO** *UCL Hawkes Institute, Department of Computer Science, University College London*
16:08-16:26	**Invited Presentation** Continuum Robots for Flexible Gastrointestinal Endoscopy **Prof. Chaoyang SHI** *School of Mechanical Engineering, Tianjin University*
16:26-16:44	**Invited Presentation** Discovering Magnetoelasticity in Soft Matter for Bioelectronics **Prof. Jun CHEN** *Department of Bioengineering, University of California, Los Angeles*
16:44-17:02	**Invited Presentation** Augmented Sensing and Autonomous Control of Flexible Surgical Robots **Prof. Hao LIU** *University of Chinese Academy of Sciences*
17:02-17:32	Closing Remarks & Award Presentation

The scientific programme is subject to change without prior notice.

Hands-on Workshops

May 29, 2025 (Thursday)

Venue: MRC 20E Lab, Hong Kong Science Park

Time	Programme
09:00-09:30	Registration
09:30-12:30	**AM Workshop** (5 Parallel Sessions)
	W1. Telesurgery (live porcine / cadaver trial) Cornerstone Robotics **Prof. Hon Chi YIP** *Department of Surgery, Faculty of Medicine,* *The Chinese University of Hong Kong* **Prof. Kwok Wai Samuel AU** *Department of Mechanical and Automation Engineering, Faculty of Engineering,* *The Chinese University of Hong Kong* **W2. Urology: En bloc Resection of the Bladder Tumour (ERBT) (Phantom model)** Agilis Robotics **Dr. Po Ling Catherine CHAN** *Department of Otorhinolaryngology,Head and Neck Surgery,* *The Chinese University of Hong Kong* **Prof. Ka Wai KWOK** *Department of Mechanical and Automation Engineering,* *The Chinese University of Hong Kong* **W3. Magnetic Fluid-Driven Vine Robots (porcine cadaver trial)** Mag Vine Robot **Prof. Tat Ming Danny CHAN** *Department of Surgery, Faculty of Medicine,* *The Chinese University of Hong Kong* **Dr. Yuen Chung David CHAN** *Department of Surgery, Faculty of Medicine,* *The Chinese University of Hong Kong* **W4. Robotic Ultrasound Guided Needle Placement** **Dr. Zhongliang JIANG** *Computer Aided Medical Procedures & Augmented Reality, Faculty of Information,* *Technical University of Munich* **W5. Upper Extremity Robotic Trainer** Burt - Robotics Rehabilitation System **Mr. Lung Cho LAM** *Healthlink Holdings Limited*
12:30-14:00	Lunch Break

Hands-on Workshops

Time	Programme
14:00-17:00	**PM Workshop** (6 Parallel Sessions)
	W6. Endoluminal ESD Procedure (live porcine trial) EndoR Medical **Prof. Wai Yan Philip CHIU** *Dean of Faculty of Medicine,* *The Chinese University of Hong Kong* **Dr. Ka Chun LAU** *EndoR Medical* **W7. Computer Assisted Neurosurgery Navigation System SR1-3D** **Magnetic Resonance Monitoring Laser Interstitial Thermal Therapy Equipments LS1 (ex-vivo phantom model)** Sinovation **Prof. Tat Ming Danny CHAN** *Department of Surgery, Faculty of Medicine,* *The Chinese University of Hong Kong* **Dr. Wing Yan Michael LEE** *Pamela Youde Nethersole Eastern Hospital* **W8. Tele-operated endovascular procedure (ex-vivo phantom model)** Navion **Dr. Quentin BOEHLER** *ETH Zurich* **W9. Intelligent Virtual Sonographers a new paradigm in tele-medicine** **Prof. Nassir NAVAB** *Chair for Computer Aided Medical Procedures & Augmented Reality, Faculty of Information,* *Technical University of Munich* **W10. Upper Extremity Robotic Trainer** Burt – Robotics Rehabilitation System **Mr. Lung Cho LAM** *Healthlink Holdings Limited* **W11. Robotic Bone-Drilling of Cadaver Trial Procedures** MRC – Image-guided Robotic Platform for Minimally Invasive Orthopaedic Surgery **Prof. Yuxiong Richard SU** *Oral and Maxillofacial Surgery,* *The University of Hong Kong* **Dr. Jienan Jayson DING** *Multi-Scale Medical Robotics Center*
17:00-20:00	**Cocktail Reception** *(By Invitation Only)* *Outside MRC Lab, Building 20E, Hong Kong Science Park*

Faculty

Guest of Honour

Prof. Dong SUN, JP
Secretary for Innovation, Technology and Industry
Hong Kong SAR

Officiating Guests

Mr. Ivan LEE, JP
Commissioner for Innovation and Technology, Innovation and Technology Commission
Hong Kong SAR

Prof. Mai Har SHAM
Pro-Vice-Chancellor/Vice-President (Research), The Chinese University of Hong Kong
Hong Kong SAR

Speakers / Faculty Member

Prof. Kwok Wai Samuel AU
Department of Mechanical and Automation Engineering, The Chinese University of Hong Kong
Hong Kong SAR

Prof. Wai Yan Philip CHIU
Faculty of Medicine, The Chinese University of Hong Kong
Hong Kong SAR

Dr. Quentin BOEHLER
ETH Zurich
Switzerland

Ms. Clara CHAN
Hong Kong Investment Corporation Limited
Hong Kong SAR

Prof. Ka Fung Peter CHIU
Faculty of Medicine, The Chinese University of Hong Kong
Hong Kong SAR

Prof. Lord Ara DARZI
Faculty of Medicine, Imperial College London
United Kingdom

Prof. Duke HERRELL
Department of Urologic Surgery, Vanderbilt University
USA

Prof. Richard van HILLEGERSBERG
Chairman of the Upper GI International Robotic Association (UGIRA), Utrecht Medical Center
The Netherlands

Faculty

Dr. Masaaki ITO
Department of Colorectal Surgery, National Cancer Center Hospital East
Japan

Prof. Nassir NAVAB
TUM School of Computation, Information and Technology
Germany

Prof. Russell H. TAYLOR
Department of Computer Science, Johns Hopkins University
USA

Prof. Anchao YANG
Beijing Tiantan Hospital
China

Prof. Sophia BANO
UCL Hawkes Institute, Department of Computer Science, University College London
United Kingdom

Prof. Jun CHEN
Department of Bioengineering, University of California-Los Angeles
USA

Prof. Kenneth CHEN
Department of Urology, Singapore General Hospital
Singapore

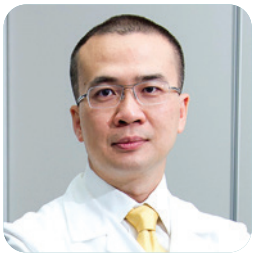
Prof. Daniel ELSON
Professor of Surgical Imaging and Biophotonics, Hamlyn Centre for Robotic Surgery, Department of Surgery and Cancer, Imperial College London
United Kingdom

Prof. Abuduliaizezi HALIFU
Medical Department, Carbon Shenzhen Medical Device Co. Ltd.
China

Prof. Woojin HYUNG
Yonsei University College of Medicine
South Korea

Prof. Hao LIU
Shenyang Institute of Automation, Chinese Academy of Sciences
China

Prof. M. Ali NASSERI
Professor at the School of Medicine and Health, Technical University of Munich
Germany



Prof. Chi Fai NG
Professor of Urology, Faculty of Medicine, The Chinese Univerity of Hong Kong
Hong Kong SAR

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United Kingdom

Faculty

Prof. Chaoyang SHI
School of Mechanical Engineering, Tianjin University
China

Prof. Kazuki SUMIYAMA
Department of Endoscopy, The Jikei University School of Medicine
Japan

Prof. Yuen Chun Jeremy TEOH
The Chinese University of Hong Kong
Hong Kong SAR

Prof. Masanori TOKUNAGA
Department of Gastric Surgery, Institute of Science Tokyo
Japan

Prof. Pietro VALDASTRI
Chair in Robotics & Autonomous Systems, University of Leeds
United Kingdom

Prof. Yusuke WATANABE
Associate Professor, Department of Advanced Robotic and Endoscopic Surgery, Fujita Health University
Japan

Prof. Michael YIP
University of California San Diego
USA

Dr. Kar Kei Steffi YUEN
The Chinese University of Hong Kong New Territories East Cluster, Hong Kong Hospital Authority
Hong Kong SAR

Prof. Renee ZHAO
Department of Mechanical Engineering, Stanford University
USA

Abstracts

Keynote Presentation May 30, 2025 (09:30-09:55)

Prof. Lord Ara DARZI
Imperial College London
United Kingdom

Professor Lord Ara Darzi of Denham is Co-Director of the Institute of Global Health Innovation at Imperial College London and holds the Paul Hamlyn Chair of Surgery. He serves as a Consultant Surgeon at Imperial College NHS Trust and the Royal Marsden NHS Foundation Trust. Professor Darzi also chairs the NHS Accelerated Access Collaborative and is Executive Chair of both the World Innovation Summit for Health and the Pre-emptive Health & Medicine Initiative at Flagship Pioneering. In his role as Executive Chair, Professor Darzi is spearheading The Fleming Initiative - a partnership between Imperial College Healthcare NHS Trust and Imperial College London - aimed at leading a global movement to combat antimicrobial resistance. Professor Darzi leads a diverse academic and policy research team, with over 1,500 peer-reviewed publications to his name. Most recently, he led the Independent Review of the NHS, commissioned by the Secretary of State for Health and Social Care. Professor Darzi was knighted in 2002 and introduced as Lord Darzi of Denham to the House of Lords in 2007, where he served as Minister for Health. He was appointed to His Majesty's Most Honourable Privy Council in 2009 and awarded the prestigious Order of Merit in 2016.

Abstracts

Keynote Presentation May 30, 2025 (09:55-10:10)

Ms. Clara CHAN
Hong Kong Investment Corporation Limited
Hong Kong SAR

Ms Chan was appointed as the inaugural Chief Executive Officer of the Hong Kong Investment Corporation Limited in October 2023. She is a barrister admitted by the High Court of Hong Kong. She was Executive Director (Monetary Management) of the Hong Kong Monetary Authority from 2020 to 2023, and Chief Investment Officer (Private Markets) of the Hong Kong Monetary Authority before then. She was an Administrative Officer in the Hong Kong SAR Government from 2004 to 2010, covering areas including home affairs, transport and financial services. Ms Chan is a Council member of Lingnan University and a Board member of Karen Leung Foundation dedicated to work relating to gynaecological cancers. She was also the Co-chair of the World Economic Forum Global Future Council on Responsible Investing from 2023 to 2024. Ms Chan received the Asia Industry Leadership Award of the 100 Women in Finance in 2016. She was on the global list of 40 under 40 named by the Private Equity International in 2020, and was featured in Forbes Asia's Power Businesswomen 2024. Ms Chan is an advocate for diversity and ESG awareness in the finance industry, and has been a frequent speaker on relevant topics.

Abstracts

Keynote Presentation May 30, 2025 (11:35-12:00)

Prof. Russell TAYLOR
Johns Hopkins University
USA

Russell H. Taylor has over 35 years' experience in medical robotics and over 50 in robotics research. He received his Ph.D. in Computer Science from Stanford in 1976. After spending 1976 to 1995 as a Research Staff Member and research manager at IBM Research, he moved to Johns Hopkins University in 1995, where he is the John C. Malone Professor of Computer Science with joint appointments in Mechanical Engineering, Radiology, Otolaryngology - Head and Neck Surgery, and Surgery. He is also the Director of the Laboratory for Computational Sensing and Robotics (LCSR). He is the author of over 600 peer-reviewed journal and conference publications and holds 98 patents. He has received numerous awards and honors, including (most recently) election to the US National Academy of Engineering.

Abstract

Human-Machine Partnerships in Computer-Integrated Interventional Medicine

Human-Machine Partnerships in Computer-Integrated Interventional Medicine: This talk will discuss insights gathered over 35 years of research on medical robotics and computer-integrated interventional medicine (CIIM), both at IBM and at Johns Hopkins University. The goal of this research has been the creation of a three-way partnership between physicians, technology, and information to improve treatment processes. CIIM systems combine innovative algorithms, robotic devices, imaging systems, sensors, and human-machine interfaces to work cooperatively with surgeons in the planning and execution of surgery and other interventional procedures. For individual patients, CIIM systems can enable less invasive, safer, and more cost-effective treatments. Since these systems have the ability to act as "flight data recorders" in the operating room, they can enable the use of statistical methods to improve treatment processes for future patients and to promote physician training. We will illustrate these themes with examples from our past and current work, with special attention to the human-machine partnership aspects, and will offer some thoughts about future research opportunities and system evolution.

Abstracts

Keynote Presentation **May 30, 2025 (13:30-13:55)**

Prof. Richard van HILLEGERSBERG
Utrecht
The Netherlands

Richard van Hillegersberg attended medical school in Rotterdam, the Netherlands. In 1993 he received his PhD with honor at the Department of Surgery, Erasmus MC in Rotterdam. From 1994-2000, he was trained in General Surgery in Rotterdam. From 2001-2002 he was fellow of Surgical Oncology in the Academic Medical Center and Antoni van Leeuwenhoek Netherlands Cancer Center Amsterdam. Since 2003 he is appointed as staff surgeon at the University Medical Center Utrecht. From 2009 he is a full professor of gastrointestinal oncology. His Research is focused on Upper GI minimally invasive and robotic surgery, surgical imaging and genetic profiling. He has authored over 15 chapters in textbooks concerning robotic forgut surgery and over 500 articles in international peer-reviewed journals. He is chairman of the Educational committee and executive board member of the European Society for Diseases for the Esophagus (ESDE) and board member of the International Society for Diseases for the Esophagus ISDE, he is associate editor of Diseases of the Esophagus and Digestive Surgery, founder and chairman of the Upper GI International Robotic Association (UGIRA).

Abstract

The Current State of Robot-assisted Minimally Invasive Esophagectomy (RAMIE): Trends and Outcomes from the Upper GI International Robotic Association (UGIRA) Esophageal Registry

Background and Aims: Over the last decade, robot-assisted minimally invasive esophagectomy (RAMIE) was introduced in expert centers worldwide. Their consecutive cases were included in the Upper GI International Robotic Association (UGIRA) prospective registry to compare surgical techniques and perioperative outcomes. This study aimed to evaluate the current state of RAMIE and to identify potential areas for improvement.

Study Design: This registry-based observational cohort study analyzed prospectively collected data from esophageal cancer patients (cT1-4N0-3M0) who underwent RAMIE in UGIRA centers that registered at least 20 cases. The primary endpoint was textbook outcome rate, defined as tumor-negative resection margins, ≥20 lymph nodes at pathology, no intraoperative complications, no complications Clavien-Dindo ≥III, no intensive or medium care unit (ICU/MCU) readmission, no readmission related to procedure, no anastomotic leakage, hospital stay <14 days, and no in-hospital mortality. Secondary endpoints included surgical techniques and perioperative outcomes over time. Patients undergoing RAMIE with intrathoracic (Ivor-Lewis) or cervical (McKeown) anastomosis were analyzed separately. The outcomes were descriptively analyzed in three time periods: 2016-2018, 2019-2020, and 2021-2023.

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To minimize potential bias due to learning curve effects, the initial 70 cases per center were excluded in a sensitivity analysis.

Results: In total, 24 UGIRA centers in Europe, Asia, North-America, and South-America performed 1729 Ivor-Lewis (64%) and 982 McKeown (36%) RAMIE-procedures. Stratified by time periods, for Ivor-Lewis 367, 560, and 802 patients, and for McKeown 275, 380, and 327 patients.
Over time, textbook outcome rates were 30%-33%-33% for Ivor-Lewis and 19%-45%-48% for McKeown procedures. The fully robotic approach, including both the thoracic and abdominal phase, was adopted in 65%-51%-58% of Ivor-Lewis and 53%-80%-77% of McKeown procedures. Performance of a more complete, high mediastinal lymphadenectomy was implemented in 65%-43%-37% of Ivor-Lewis and 70%-45%-47% of McKeown cases. Median lymph node yield was 27-30-30 nodes in Ivor-Lewis and 26-26-29 nodes in McKeown procedures. Circular stapling was used in 44%-65%-68% of Ivor-Lewis and 47%-76%-79% of McKeown procedures for establishing the esophagogastric anastomosis.
Anastomotic leakage rate was 22%-22%-17% in Ivor-Lewis and 14%-12%-13% in McKeown cases. After Ivor-Lewis procedures, median hospital stay was 13-14-13 days and ICU stay 2-2-2 days. After McKeown procedures, hospital stay and ICU-stay were 12-9-9 days and 2-1-1 days, respectively.
In the sensitivity analysis, evaluating 1388 patients (700 Ivor-Lewis, 688 McKeown) from 13 experienced centers (excluding the first 70 cases), textbook outcome rates were 18%-44%-37% in Ivor-Lewis and 7%-48%-51% in McKeown procedures. Anastomotic leakage rates were 28%-18%-15% in Ivor-Lewis and 13%-11%-10% in McKeown cases. Hospital stay in the Ivor-Lewis and the McKeown group was 11-12-12 days and 10-9-9 days, respectively.

Discussion: The results demonstrate a positive trend in achieving textbook outcome after RAMIE, with good outcomes during the most recent years. Areas for improvement include increased adoption of a fully robotic technique, further reduction of anastomotic leakage rates, and shortening of ICU/hospital stay.

Conclusion: This is the largest reported RAMIE cohort to date. The perioperative outcomes show that this technique has matured over the past years. The UGIRA initiative may contribute in optimizing the RAMIE technique by providing insight in the global status of this approach over time.

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Keynote Presentation May 30, 2025 (13:55-14:20)

Dr. Quentin BOEHLER
ETH Zurich
Switzerland

Quentin Boehler is a Senior Researcher at the Multi-Scale Robotics Lab, ETH Zurich since 2020. He received an engineer's degree in mechatronics from INSA Strasbourg, France, and an M.Sc. degree in robotics in 2013. He received a Ph.D. degree in robotics in 2016 from the University of Strasbourg, France, with a doctoral work focused on MRI-compatible robots. His current research focuses on magnetic actuation and continuum robots for medical robotics, including the development and analysis of electromagnetic navigation systems, and the simulation, control and localization of soft magnetic devices. He was awarded the Young Scientist Award from the iCANX Association in 2024 and is an IEEE Senior Member. He serves in the editorial board of the IEEE Robotics and Automation Letters as an Associate Editor since 2024.

Abstract

Robotic Magnetic Navigation: Transforming Minimally Invasive Procedures

Over the past decade, Robotic Magnetic Navigation (RMN) has emerged as a powerful approach for steering both soft and rigid robots across multiple scales. This technique uses electromagnetic systems to generate magnetic fields, enabling the remote application of forces and torques on magnetically responsive devices. With its potential to enhance safety, dexterity, and efficiency, RMN has the potential to transform the field of minimally invasive procedures. Our research centers on the development and evaluation of soft continuum robots for endoluminal and endovascular navigation. These robots are designed for a wide range of clinical applications, including neurovascular interventions, gastroenterology, and fetal surgery. Central to our work is Navion, a human-scale, clinically ready electromagnetic navigation system that serves as the foundation of our robotic research platform. RMN is particularly well-suited to teleoperation. In recent years, we have demonstrated long-distance robotic procedures, including in-vivo gastroscopies performed in Hong Kong using a Navion system remotely operated from Zurich—over 9,300 km away. This capability highlights the transformative potential of RMN to deliver advanced surgical care across geographical boundaries, particularly in regions lacking surgical expertise.

Abstracts

Invited Presentation **May 30, 2025 (14:20-14:35)**

Prof. Woojin HYUNG
Yonsei University College of Medicine
South Korea

Dr. Hyung is a Professor of the Department of Surgery at Yonsei University College of Medicine. As a gastric surgeon, he was the first to introduce robotic surgery for gastric cancer in Korea and now has the world's largest number of robotic gastric cancer surgery cases. He has numerous publications in authoritative academic journals on minimally invasive surgery through laparoscopic and robotic surgery. His main areas of research interest are surgical oncology, especially gastric cancer, image-guided surgery, and fluorescence use in minimally invasive surgery. In May 2017, he established a start-up company named "Hutom" which is developing a surgical navigation and surgery analytic platform using surgical data science with artificial intelligence.

Abstracts

Invited Presentation | **May 30, 2025 (14:35-14:50)**

Prof. Michael YIP
University of California San Diego
USA

Michael Yip is an Associate Professor of Electrical and Computer Engineering at UC San Diego and Director of the Advanced Robotics and Controls Laboratory (ARCLab). His group focuses on surgical robots and robot learning. His research has received several best paper awards and nominations at ICRA, IROS and RA-L, and he has been recognized by the NSF CAREER award, NIH Trailblazer award, and as a RAS Distinguished Lecturer. He is founder and advisor to several robotics startups, and in 2024 he was named the UCSD IGE Faculty Innovator of the Year, and elected into the US National Academy of Inventors. Previously, Dr. Yip was at Disney Research and Amazon Robotics. He received his degrees (B.S., M.S., PhD) from the University of Waterloo, University of British Columbia, and Stanford University, respectively.

Abstract

Humanoid Robots and the Future of Robot-Assisted Surgery

Humanoid Surgical Robots and the Future of Surgical Robotics Despite remarkable progress in surgical robotics over the past two decades, today's systems remain largely constrained: fixed-base, task-specific, and heavily reliant on human teleoperation. These platforms, while precise, are limited in adaptability and accessibility—they cannot move independently between operating suites, require significant setup time, and lack the general-purpose dexterity of the human body. At the same time, global demand for surgical care is growing, while access to expert surgeons remains uneven, especially in resource-limited or remote environments. To meet the evolving needs of modern healthcare, we are rethinking not just how robots assist surgery, but what kind of robots we build. Humanoid surgical robots present a radical but necessary departure from conventional design: mobile, human-like systems capable of leveraging existing surgical tools, operating in unstructured environments, and eventually collaborating as intelligent surgical partners. Their anthropomorphic design allows them to seamlessly integrate into the human-centered operating room ecosystem, while also leveraging the breadth of work in semi-autonomous assistance, learning from demonstration, and embodied intelligence that is being observed today in many non-surgical humanoid robot applications. This talk will introduce Surgie, the robot physician and our effort to take the first step towards this vision of humanoid robot surgeons.

Abstracts

Invited Presentation **May 30, 2025 (14:50-15:05)**

Prof. Masanori TOKUNAGA
Institute of Science Tokyo
Japan

Dr. Masanori Tokunaga graduated from the Faculty of Medicine, Kyushu University in 2000. He is an upper GI surgeon with a particular interest in perioperative chemotherapy and minimally invasive surgery, including robotic surgery, for gastric cancer. He is board certified by the Japanese Surgery Society, the Japanese Society of Gastroenterological Surgery, and the Japanese Society of Endoscopic Surgery. At Institute of Science Tokyo, he has been working as the chief of the department of Gastric Surgery since 2019, and has performed a total of more than 400 robotic gastrectomies. He was engaged to develop a novel surgical robot named Saroa with RiverField company, which has been already launched and is commercially available in Japan. Saroa is distinguished by its incorporation of a tactile force feedback system.

Abstract

Robotic Surgery with Grasping Force Feedback

The number of robotic gastrectomies has been increasing worldwide. The da Vinci surgical system is the most popular robotic system. It has many advantages over conventional laparoscopic surgery, including articulated devices, a magnified 3D view, a tremor-cancelling function, and better physical ergonomics. Recently, other robotic systems with different concept from da Vinci surgical system were launched and the advantages and disadvantages comparing to da Vinci surgical system have been reported. Saroa, short for surgical assist robot by air, is a newly launched surgical robot introduced by RiverField company. Saroa has three surgical arms and uses unique air-driven system with a grasping force feedback function. Although it is still under development and needs further improvement to be used for complicated procedures, we have already started clinical use of the system. In this presentation, surgical procedures with Saroa as well as those with da Vinci surgical system will be demonstrated with a review of the literature.

Abstracts

Invited Presentation **May 30, 2025 (15:05-14:20)**

Prof. M. Ali NASSERI
Technical University of Munich
Germany

M. Ali Nasseri is the Professor and founding director of the Medical Autonomy and Precision Surgery (MAPS) laboratory at the School of Medicine and Health of the Technical University of Munich and an adjunct Professor at the Department of Biomedical Engineering at the University of Alberta and guest Professor at the Zhongshan Ophthalmic Center (Key State Laboratory of Ophthalmology). Ali has more than 15 years of experience in medical and surgical robotics, with diverse experience in academia, industry, and clinics. His multidisciplinary knowledge in mechatronics, computer vision, machine intelligence, and medicine guided his recent interest in surgical autonomy. Besides leading several projects funded by the industry, Ali is coordinating the largest medical robotic project of the Bavarian Research Foundation. He is the co-founder of four medical robotic spinoffs.

Abstracts

Keynote Presentation **May 30, 2025 (15:45-16:10)**

Dr. Masaaki ITO
National Cancer Center Hospital East
Japan

Dr. Masaaki Ito is the Deputy Director and Head of Department of Colorectal Surgery as well as the head of Division of Surgical Technology at the Next Medical Device Innovation Center of the National Cancer Center Hospital East in Chiba, Japan. He received his MD from the Graduate School of Medicine, Chiba University in 1993 and PhD from Chiba University in 2001. He is widely recognized as one of the foremost surgeons who are highly skilled in intersphincteric resection for rectal cancer. Today, he is also engaged in the development of innovative surgical instruments and operative procedures with notable surgeons and engineering technologists all over the world.

Abstract

Development of a Surgical Robot "ANSUR" Based on New Concepts

The introduction of new technologies has significantly changed the landscape of surgical treatment. One of the biggest transformations in the field of surgery over the past 30 years has been the rise of endoscopic surgery. Endoscopic surgery has become widespread in Japan for many diseases, with reports of equivalent survival rates and good short-term outcomes compared to standard treatments. In recent years, surgical robots have entered the scene, with insurance coverage being granted for procedures in numerous disease areas in Japan. The number of cases applying robotic-assisted surgery has been on the rise. While the benefits of robotic surgery in terms of overwhelming operability are undeniable, comparative trials with endoscopic surgery have shown that the superiority of robotic-assisted surgery in terms of treatment outcomes is limited, and there is no evidence of added survival rates. In light of this, discussions from various perspectives are awaited regarding the future direction of robotic-assisted surgery and the development of robotic devices. Anticipating the development of "surgical support robots," we established the venture company A-traction Co., Ltd., focusing on medical devices, and became a certified venture company of the National Cancer Center, spearheading the creation of Japan's first innovative medical device with functions and concepts different from existing surgical robots, leading to the approval for medical device sales in 2023. The concept of the robot we developed involves the operator performing dissection operations at the bedside like regular endoscopic surgery, controlling the robot's 3 arms via interfaces on the right hand and right foot. This means that a single operator can intuitively control the endoscope and two forceps, achieving the performance of operating with one person. Since the implementation of the FIH in November 2023, it has been introduced in multiple medical facilities in Japan, with over 30 cases of colorectal cancer surgeries at our hospital, realizing one of the concepts we aim for - the automation of medical professionals.

Abstracts

Invited Presentation | **May 30, 2025 (16:10-16:25)**

Prof. Ferdinando RODRIGUEZ Y BAENA
Imperial College London
United Kingdom

Professor Ferdinando Rodriguez y Baena is a Professor of Medical Robotics at Imperial College London, where he leads the Mechatronics in Medicine Laboratory and co-directs the Hamlyn Centre for Medical Robotics. His research focuses on minimally invasive surgical technologies and image-guided interventions. He has authored over 200 publications and secured over £20 million in research funding to date. He is a recipient of the Leverhulme Prize in engineering and led the €8.3 million Horizon 2020 project EDEN2020 on robotic-assisted neurosurgical drug delivery, and the current UKRI THT ROBOGAST programme, which focus on soft robotics for lower gastrointestinal surgery. Prof Rodriguez y Baena is a founding member of Imperial's Robotics Forum and remains heavily involved in international societies and conferences.

Abstract

Reimagining Healthcare from Within: A Possible Future for Endoluminal Robotics at the Hamlyn Centre

At the Hamlyn Centre, our mission has always been to push the boundaries of medical robotics — not just in the lab, but in real clinical environments, where impact truly matters. In this keynote, I'll share some of the work we've been leading on endoluminal robotics, with a focus on two major initiatives: the UKRI-funded ROBOGAST project and our ongoing collaboration with the Multiscale Medical Robotics Centre (MRC) in Hong Kong. ROBOGAST is an ambitious programme aimed at transforming how we diagnose and treat upper GI disease. We're developing a new generation of soft, flexible, and intelligent robotic platforms capable of autonomously navigating the GI tract to perform diagnostics and interventions without the need for conventional scopes. It's an exciting multidisciplinary effort that combines soft continuum design, AI for real-time decision-making, and smart sensing — all geared toward making these procedures less invasive, more precise, and accessible in community settings. In parallel, our work within the MRC focuses on developing robotic systems that can operate at different scales — from centimetres down to sub-millimetres — to explore and treat deep, tortuous regions of the body. We're working on platforms with integrated sensing, high dexterity, and autonomous control, particularly targeting early detection and treatment of cancers in hard-to-reach areas. These tools are not just smaller — they are fundamentally smarter. Both projects reflect a broader ambition: to move from minimally invasive to truly non-invasive robotics, where machines work intelligently inside the body, with minimal human guidance. I'll discuss the technical and translational challenges we're tackling, and share a vision for what the next decade of endoluminal robotics might look like — and how close we really are to making it a clinical reality.

Abstracts

Invited Presentation **May 30, 2025 (16:25-16:40)**

Prof. Kazuki SUMIYAMA
The Jikei University School of Medicine
Japan

Dr. Sumiyama graduated The Jikei University School of Medicine in 1998. He received PhD degree from The Jikei University Graduate School of Medicine in 2003. Since Dec. 2003, he has been promoting a series of both basic and clinical research projects in the gastrointestinal endoscopy field as a primary investigator and a research associate of department of Endoscopy at The Jikei University since 2003. He was also a former post-doctoral fellow at Mayo Clinic College of Medicine (2005-7) and achieved a lot of internationally recognized developmental researches for novel endoscopic therapies including Confocal Endomicroscopy Submucosal Endoscopy, NOTES and Full thickness resection. He has published 381 papers (165 of them in English) and 585 abstracts.

Abstract

Flexible Robotic Platforms for Therapeutic GI Endoscopy

Flexible endoscopy, originally designed for diagnosis and tissue sampling, has evolved into a tool for therapeutic interventions, giving rise to natural orifice transluminal endoscopic surgery (NOTES) in the 2000s. To improve the precision and safety of NOTES, dual-arm flexible robotic platforms have been developed to allow for effective triangulation. Although interest in NOTES has declined over the past decade, its core concept of scarless surgery continues to influence complex endoluminal procedures like endoscopic submucosal dissection (ESD) and endoscopic full-thickness resection (EFTR). Robotic assistance in flexible endoscopy holds promise for standardizing these advanced procedures and promoting their wider global adoption. Several robotic platforms have been created and evaluated in both preclinical and clinical settings, showing encouraging results in terms of safety and efficacy. This article reviews recent publications on robotic technologies in therapeutic endoscopy, highlighting their benefits—such as enhanced precision and maneuverability—as well as the current challenges that need to be addressed for broader clinical implementation.

Abstracts

Invited Presentation | **May 30, 2025 (16:40-16:55)**

Prof. Hongliang REN
The Chinese University of Hong Kong
Hong Kong SAR

Professor Hongliang Ren received his Ph.D. in Electronic Engineering (Specialized in Biomedical Engineering) from The Chinese University of Hong Kong (CUHK) in 2008. He has been navigating his academic journey through Chinese University of Hong Kong, UC Berkeley, Johns Hopkins University, Children's Hospital Boston, Harvard Medical School, Children's National Medical Center, United States, and National University of Singapore. He has served as an Associate Editor for IEEE Transactions on Automation Science & Engineering (T-ASE) and Medical & Biological Engineering & Computing (MBEC). He has served as an active organizer and contributor on the committees of numerous robotics conferences, including a variety of roles in the flagship IEEE Conf. on Robotics and Automation (ICRA), IEEE Conf. on Intelligent Robots and Systems (IROS), as well as other domain conferences such as MICCAI/ROBIO/BIOROB/ICIA/CVPR. He frequently served as an expert reviewer/judge for international funding agencies (60+ proposal reviews) of 10+ countries/regions (including Switzerland, Belgium, UK, Kazakhstan, Poland, Hong Kong, Macau, Chilean, China, Singapore etc.) and manuscript peer-reviews 317+ times for journals, including Science Robotics, Nature Biomedical Engineering, Nature Communications among many other top-tier journals (Please refer to the Web of Science Reviewer Recognition for the service records).

Abstract

Endoscopic Multisensory Navigation With Soft Flexible Robotics

Intraluminal epithelial abnormalities, potential precursors to significant conditions like cancer, necessitate early detection for improved prognosis. We present a motor-free telerobotic optical coherence tomography (OCT) endoscope that offers high-resolution intraluminal imaging and overcomes the limitations of traditional systems in navigating curved lumens. This system incorporates a compact magnetic rotor with a rotatable diametrically magnetized cylinder permanent magnet (RDPM) and a reflector, effectively mitigating thermal and electrical risks by utilizing an external magnetic field. We also present pneumaOCT, the first pneumatic OCT endoscope, comprising a steerable catheter with a soft pneumatic actuator and an imaging probe with a miniature pneumatic turbine.

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Keynote Presentation May 31, 2025 (09:00-09:25)

Prof. Duke HERRELL
Vanderbilt University
USA

Dr. S. Duke Herrell is a Professor of Urology, Biomedical Engineering, and Mechanical Engineering at Vanderbilt University School of Medicine (VUMC) in Nashville, Tennessee. Dr. Herrell led the development of Vanderbilt's surgical robotics program and minimally invasive fellowship and has an active clinical practice in endourology and robotic surgery. Dr. Herrell is a funded investigator on multiple NIH grants and other awards developing advanced robotic surgery platforms and tools. He is a founder and steering committee member of the Vanderbilt Institute for Surgery and Engineering (VISE). Dr. Herrell is a founder and officer in two medical device startups that have emerged from VUMC, Virtuoso Surgical Inc. and Endotheia, Inc. He holds multiple patents. He is often asked to lecture on new medical devices and OR technologies.

Abstract

The Virtuoso Robotic System for Transurethral Bladder Lesion Surgery and Rigid Endoscopic Interventions

Dr. Herrell will discuss the background research and development path both from a research and clinical view of Virtuoso Surgical technology and his entrepreneurial journey as a clinician.

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Invited Presentation **May 31, 2025 (09:25-09:40)**

Prof. Kenneth CHEN
Singapore General Hospital
Singapore

Dr Kenneth Chen is a senior consultant Uro-oncologist with Singapore General Hospital. He obtained his medical degree (MBBS) from the National University of Singapore and obtained membership and fellowship to the Royal College of Surgeons (Edinburgh and Glasgow) and holds a Masters in Clinical Investigation. He has special interests in Robotic and Minimally Invasive Surgery for Genitourinary Oncology, having completed a fellowship at Sir Peter MacCallum Cancer Centre in Melbourne Australia, and chairs the robotic surgery committee at Singapore General Hospital. His academic interests include prostate cancer diagnostics, advanced prostate cancer management, and novel device development. He teaches at Duke-NUS Graduate Medical School as an associate professor and is a senior clinical lecturer with the National University of Singapore YLL School of Medicine.

Abstracts

Invited Presentation **May 31, 2025 (09:40-09:55)**

Prof. Yuen Chun Jeremy TEOH
The Chinese University of Hong Kong
Hong Kong SAR

Dr Jeremy Teoh is currently the Assistant Dean (External Affairs) and Associate Professor of the Faculty of Medicine, The Chinese University of Hong Kong (CUHK). He is also the Director of Urology Centre, and Director of Robotic Services, at the CUHK Medical Centre. In 2021, he was awarded the Ten Outstanding Young Persons Award (Hong Kong) and the SIU-Innovators Award. In 2023, he was appointed as an Adjunct Professor at the Medical University of Vienna. In 2024, he received the World Chinese Urological Society Rising Star Award. Jeremy has received numerous research grants with a total funding of more than 10 million USD. He has published more than 400 articles in peer-reviewed journals such as European Urology, European Urology Oncology, European Urology Focus and Nature Reviews Urology.

Abstracts

Keynote Presentation May 31, 2025 (10:45-11:10)

Prof. Ka Fung Peter CHIU
The Chinese University of Hong Kong
Hong Kong SAR

Dr. Peter Chiu graduated from the Faculty of Medicine of the Chinese University of Hong Kong (CUHK) and obtained the fellowship in Urology from the College of Surgeons of Edinburgh. He is currently Associate Professor in the CUHK Urology, President of the Hong Kong Urological Association (HKUA), and Associate Member of the European Association of Urology (EAU) Prostate cancer guidelines panel. His research focuses on precision diagnosis and therapy of urological cancers. He is also involved in the development of new robotic systems for prostate and bladder surgery.

Abstract

The Agilis Robotics Platform for Endoscopic Bladder Surgery

Bladder tumor diagnosed on cystoscopy is treated by transurethral resection of bladder tumor (TURBT). Conventional TURBT involves piecemeal resection of bladder tumors. Recent level 1 evidence supports the use of en-bloc TURBT by removing the bladder tumor in one piece to achieve lower tumor recurrence. However, en-bloc TURBT is more technically demanding when performed with conventional transurethral resectoscope. An endoscopic robotic approach with 2 active flexible arms provides an excellent platform to facilitate en-bloc TURBT. This talk will focus on the development and clinical validation of the Agilis robotic platform for the world's first series of in-human robotic en-bloc resection for bladder cancer.

Abstracts

Invited Presentation **May 31, 2025 (11:10-11:25)**

Dr. Abuduliaizezi HALIFU
Carbon Shenzhen Medical Device Co. Ltd.
China

Dr. Abuduliaizezi Halifu is a Medical doctor, Medical manager of Carbon (Shenzhen) Medical Device. Co. Ltd, and Former deputy chief physician of the Urology Department in Xinjiang Hotan District People's Hospital. He published 2 SCI papers as the first author and corresponding author, respectively, 5 papers in Chinese national journals. He is proficient in all kinds of minimally invasive surgical operations in adults and children, especially for ureteroscopy and percutaneous nephroscopy.

Abstract

Intelligent Magnetic Navigation System for PCNL with Real Time Ultrasound and CT Fusion

This symposium presentation by Dr. Abdulaziz Ghallp (CarbonMed) introduces an AI-enhanced magnetic navigation system for percutaneous nephrolithotomy (PCNL), integrating real-time ultrasound (US) and CT fusion to revolutionize renal access.

Clinical Challenge:

Conventional PCNL guidance—fluoroscopy (radiation exposure, poor calyceal visualization) and US alone (steep learning curve, limited residual stone detection)—compromises precision and safety.

Solution & Evolution:

- AI-Powered Fusion: CarbonMed's VENUS system (2020) combines intraoperative US with preoperative CT, enabling real-time 3D-2D registration.
- Key Milestones: Cognitive fusion (2012) → electromagnetic guidance (2014) → AI-driven fusion (2020).

Evidence-Based Advantages:

1. Superior Outcomes:
- 96.55% stone clearance vs. 87.5% (US alone; Zhang et al., 2024).
- 88.6% first-attempt puncture success vs. 68.2% (control; Meng et al., 2024).
- Reduced hemoglobin drop (16.4 g/L vs. 17.6 g/L; *P=0.013*).

2. Efficiency: Shorter puncture time (4.4±0.7 min vs. 4.8±0.8 min; *P=0.003*) and hospital stays.
3. Safety: Eliminates radiation; enhances adjacent organ visualizatio

Global Validation:

- 9,000+ procedures across 700+ hospitals in 16 countries (Thailand, Saudi Arabia, Mexico, China, etc.).
- Successful pediatric/local anesthesia cases.
- Expanded applications: Renal tumor biopsies, prostate fusion biopsies, and sacral neuromodulation.

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Guideline Alignment:
2025 EAU/2023 CUA guidelines endorse CT-US fusion for optimizing puncture accuracy and reducing complications.

VENUS System Capabilities:

- Precision: 1–2 mm targeting accuracy.
- Speed: 2-second image reconstruction.
- Usability: App-like interface with smart needle tracking.
- Versatility: Compatible with hepatic ablation, nerve blocks.

Conclusion:
AI-driven CT-US fusion establishes a new standard for PCNL, delivering unmatched precision, safety, and accessibility while eliminating radiation. Its multispecialty potential signals a paradigm shift in image-guided interventions.

Abstracts

Invited Presentation **May 31, 2025 (11:25-11:40)**

Dr. Kar Kei Steffi YUEN
The Chinese University of Hong Kong
New Territories East Cluster, Hong Kong Hospital Authority
Hong Kong SAR

Dr. Steffi Yuen graduated from The University of Hong Kong. Since joining the urology faculty team at The Chinese University of Hong Kong and New Territories East Cluster, Dr Yuen's main area of interest encompasses endourology and minimally invasive surgery. Her vast exposure gives her first-hand experience in the latest technologies, upcoming trends and skills in endoluminal endourology. She is excited to bring about this new era of endourology - the innovations of flexible ureteroscopes, next generation of flexible and navigable ureteral access sheaths (FANS), direct in scope suction (DISS) and laser technology, intrarenal pressure (IRP) and intrarenal temperature (IRT) monitoring flexible ureteroscopes and intelligent pressure regulating platforms, as well as the emerging robotic RIRS and PCNL platforms.

Abstract

Robotic RIRS: Current Status and Future Directions

Kidney stones affect millions globally, necessitating effective treatments to alleviate pain and prevent complications. Retrograde intrarenal surgery (RIRS) has emerged as a preferred minimally invasive approach, accessing stones via the natural urinary tract without incisions. Traditionally, RIRS employs a flexible ureteroscope navigated through the urethra, bladder, and ureter to the kidney, where lasers fragment stones. While effective, conventional manual RIRS demands high skillset, with challenges in maneuvering delicate anatomy and maintaining scope stability. Robotic RIRS integrates robotic precision into this procedure. Systems like the Zamenix, ILY, Avicenna, Monarch Robotic Platform allow surgeons to control a robotic arm manipulating the ureteroscope from an ergonomic console. The robot enables access and stability whilst maintaining ureteroscope position in complex calyces, which is often difficult or tiring if done manually. Tremor filtration and motion scaling enhance precision, critical for laser lithotripsy in confined spaces, potentially reducing tissue trauma and improving stone clearance. Key advantages of robotic RIRS include ergonomic benefits, reducing surgeon fatigue during lengthy procedures, and a shorter learning curve for intricate cases. Studies suggest robotic assistance may improve stone-free rates by enabling thorough stone targeting and retrieval, minimizing residuals. Additionally, reduced reliance on fluoroscopy lowers radiation exposure for patients and staff. Despite its promise, robotic RIRS faces barriers like high costs and limited availability. However, as technology evolves, broader adoption is anticipated, particularly for complex cases. Early clinical outcomes are encouraging, with research indicating comparable safety profiles to conventional RIRS but enhanced efficacy in stone fragmentation. With the recent interest in suction via Flexible and Navigable Suction Ureteral Access Sheaths (FANS), intrarenal pressure (IRP) and intrarenal temperature (IRT) and fluid management in RIRS, future direction may look into integration of such features in the robotic RIRS. In conclusion, robotic RIRS represents a significant leap in endourology, merging minimally invasive benefits with robotic precision. While not yet standard, its potential to improve surgical outcomes and ergonomics positions it as a transformative tool in kidney stone management, heralding a future where advanced robotics redefine urological care.

Abstracts

Keynote Presentation May 31, 2025 (13:30-13:55)

Prof. Anchao YANG
Beijing Tiantan Hospital
China

Prof. Yang holds a Doctor of Medicine, Chief Physician, Professor, currently works in the Department of Neurosurgery at Beijing Tiantan Hospital affiliated with Capital Medical University. He is the Deputy Director of Functional Neurosurgery and is engaged in basic and clinical research on epilepsy, Parkinson's disease, facial spasm, trigeminal neuralgia, and other diseases. He completed multiple national and provincial medical projects, and completed over 400 functional neurosurgery surgeries annually.

Abstracts

Keynote Presentation May 31, 2025 (13:55-14:20)

Prof. Nassir NAVAB
Technical University of Munich
Germany

Nassir, a Full Professor at TU Munich, is a Member of Academia Europaea and Fellow of ELLIS, IEEE, MICCAI, IAMBE, and AAIA. He received the MICCAI Enduring Impact Award (2021), IEEE ISMAR Career Impact Award (2024), SMIT Technology Innovation Award (2010), and Siemens Inventor of the Year Award (2001). He was named a Medical AR Pioneer in the AWE XR Hall of Fame. Nassir is known for pioneering work in digital surgical workflow modeling (since 2005) and robotic imaging (since 2012). He has authored hundreds of peer-reviewed papers and holds over 100 granted US and international patents. As of April 2025, his work has received 90,000 citations and his h-index is 128.

Abstract

From Intelligence Amplification to Artificial Intelligence: Shaping the Future of Computer-Assisted Surgery

Over the past decade, rapid advances in machine learning have transformed countless fields—none more critically than healthcare. In this keynote, we explore the evolving landscape of computer-assisted robotic surgery and examine the challenges and opportunities of integrating cutting-edge AI technologies into clinical practice. Central to this transformation is the concept of Intelligence Amplification (IA)—the strategic enhancement of human expertise through technology. Augmented Reality (AR) plays a vital role in this journey, enabling more intuitive and trustworthy human-machine collaboration in surgical environments. Drawing on pioneering research from the Chair of Computer-Aided Medical Procedures at TU Munich and Johns Hopkins University, I will present novel methods developed to meet the complex demands of minimally invasive surgery. These include innovations in robotic ultrasound imaging, multimodal data analysis, and semantic scene graphs for holistic surgical modeling. Through concrete applications of AR, computer vision, and multimodal imaging, we will explore how IA serves as a critical bridge toward the broader acceptance and integration of AI in clinical settings. By empowering clinicians with intelligent, automated systems, we move closer to redefining the future of surgery.

Abstracts

Invited Presentation **May 31, 2025 (14:30-14:48)**

Prof. Daniel ELSON
Imperial College London
United Kingdom

Daniel Elson is Professor of Surgical Imaging and Biophotonics in the Hamlyn Centre for Robotic Surgery, Department of Surgery and Cancer and the Institute of Global Health Innovation. His group develops and clinically translates photonics technology and new endoscopic techniques for surgical imaging applications, including multispectral, polarization-resolved and fluorescence imaging. This work has been funded by the ERC, EPSRC, MRC, TSB, CRUK, Wellcome Trust and the NIHR, and includes collaborations with industrial partners such as Karl Storz, Covidien, Cymtec, Stryker and Intuitive Surgical. He has published over 135 fully peer reviewed journal articles, one edited book, thirteen book chapters and has contributed to more than 375 conference presentations.

Abstract

Surgical Diagnostics with Spectroscopic Optical Sensing and Imaging

Strategies for the acquisition of spectrally- and polarization-resolved optical data in human studies will be discussed. This includes the use of wide-field multispectral imaging in a 47 patient neurosurgery study, as well as spectroscopic modalities such as diffuse reflection spectroscopy. While spectroscopy will be shown to provide high diagnostic accuracy, including in vivo, the ergonomic and visual limitations of these instruments will be shown as significant barriers to their use in surgery. The use of computer vision techniques for tracking of these devices and image-based contextualization will be presented as a potential solution. In addition, the use of commercial or custom-built surgical robotics systems can play a role in data acquisition and display.

Abstracts

Invited Presentation | **May 31, 2025 (14:48-15:06)**

Prof. Pietro VALDASTRI
University of Leeds
United Kingdom

Pietro Valdastri is Full Professor and Chair in Robotics and Autonomous Systems at the University of Leeds. He directs the Science and Technologies Of Robotics in Medicine (STORM) Lab, focusing on intelligent robots to fight cancer, the Institute of Robotics, Autonomous System and Sensing (IRASS), and the Robotics at Leeds network. He received his Laurea degree in Electronic Engineering from the University of Pisa in 2001 and his PhD in Biomedical Engineering from Scuola Superiore Sant'Anna in 2006. After the PhD, he became Assistant Professor in Biomedical Engineering at the BioRobotics Institute of Scuola Superiore Sant'Anna. In 2011, Prof Valdastri moved to Vanderbilt University as an Assistant Professor in Mechanical Engineering until 2016, when he relocated to Leeds. He has published more than 150 peer reviewed journal papers in the field of medical robotics and has been principal investigator on grants in excess of $24M supported by NSF, NIH, ERC, EU-H2020, Cancer Research UK, The Royal Society, EPSRC, ARIA, Innovate UK and industry. Prof. Valdastri is a Royal Society Wolfson Research Fellow, a Fellow of the Institute of Electrical and Electronics Engineers (IEEE), the Editor for Medical and Rehabilitation Robotics of the IEEE Robotics and Automation Letters, and a member of the steering committee of the International Society for Medical Innovation and Technology (iSMIT). STORM Lab's research has been featured by several news outlets, including the BBC, The Times, The Washington Post, The Financial Times, Bloomberg, New Scientist, The Spectator, WIRED, IEEE Spectrum, Medgadget, Daily Mail, The Engineer, Ingenia Magazine, Medical Design Technology Magazine, Medical Xpress, Newswise, NSF Science Now. Prof Valdastri also completed a successful entrepreneurial cycle with WinMedical s.r.l., a company he co-founded in 2009 and that was acquired by a larger enterprise in 2017. He recently started a new company, Atlas Endoscopy Limited, to bring his robotic colonoscopy platform to patients.

Abstract

Magnetic Surgical Robots: A "Fantastic Voyage" Deep Inside the Human Body

Magnetic fields offer the possibility of manipulating objects from a distance and are ideal for medical applications, as they penetrate human tissue without inflicting any harm on the patient. Magnetic fields can be harnessed to actuate surgical robots, enhancing the capabilities of surgeons in reaching deep into the human anatomy through complex winding pathways, thus providing minimally invasive access to organs that are out of reach with current technologies. In this talk, we will explore various robotic architectures based on magnetic control, specifically designed for lifesaving clinical applications. These architectures include a magnetic flexible endoscope for painless colonoscopy, soft magnetic tentacles personalized for reaching peripheral areas of the lung and navigating the pancreatic duct, magnetic vine robots for endoluminal exploration, and magnetic "fusilli" robots designed for collaborative bimanual tasks in a confined workspace. We will also discuss enabling technologies, intelligent control, potential levels of computer assistance, the path to first-in-human trials, and highlight the future challenges associated with this ongoing *Fantastic Voyage*.

Abstracts

Invited Presentation | **May 31, 2025 (15:06-15:24)**

Prof. Renee ZHAO
Stanford University
USA

Prof. Renee Zhao directs the soft intelligent materials lab in Mechanical Engineering at Stanford University, where she is also a Terman Faculty Fellow and Gabilan Faculty Fellow. She earned her Ph.D. in Solid Mechanics from Brown University and completed her postdoctoral training at MIT. Renee's research focuses on designing stimuli-responsive composites and shape-morphing mechanisms for multifunctional robotic systems. Renee is a recipient of the Presidential Early Career Award for Scientists and Engineers, NSF CAREER Award, AFOSR Young Investigator Program Award, and ARO Early Career Program Award. She is also recognized as a U.S. National Academy of Sciences Kavli Fellow and was named one of MIT Technology Review's 35 Innovators Under 35. Her work on medical devices has led to more than twenty patents and patent applications.

Abstract

Milli-Spinner Thrombectomy: A Better Cure for Stroke

Clot-induced blockage in arteries or veins can cause severe medical conditions. Mechanical thrombectomy (MT) is a minimally invasive technique used to treat ischemic stroke, myocardial infarction, pulmonary embolism, and peripheral vascular disease by removing clots through aspiration, stent retriever, or cutting mechanisms. However, current MT methods fail to remove clots in 10-30% of patients, especially in the case of large, fibrin-rich clots. These methods can also rupture and fragment clots, causing distal emboli and poor outcomes. To overcome these challenges, we develop the milli-spinner thrombectomy, which uses a simple yet innovative mechanics concept to modify the clot's microstructure, facilitating its removal. The milli-spinner works by mechanically densifying the clot's fibrin network and releasing red blood cells (RBCs) through spinning-induced compression and shear forces. It can shrink the clot volume by 95% for easy and fast removal. In vitro tests in pulmonary and cerebral artery flow models and in vivo experiments in swine models demonstrate that the milli-spinner achieves ultrafast clot debulking and high-fidelity revascularization, outperforming aspiration thrombectomy. The milli-spinner thrombectomy is the first technology to directly modify the clot microstructure to facilitate clot removal, which demonstrates improving MT success rates compared to current methods that rely on clot rupture or cutting. This innovative approach offers a promising new direction for MT devices, especially for treating ischemic stroke, pulmonary embolism, and peripheral thrombosis.

Abstracts

Invited Presentation **May 31, 2025 (15:06-16:08)**

Prof. Sophia BANO
University College London
United Kingdom

Sophia Bano is an Assistant Professor in Robotics and Artificial Intelligence at the UCL Department of Computer Science and also part of the Surgical Robot Vision (SRV) Group at UCL Hawkes Institute and UCL Robotics Institute at University College London (UCL). Her work focuses on developing computer vision and AI techniques for context awareness, machine consciousness and navigation in minimally invasive and robot-assisted surgery. Dr. Bano earned her PhD in Interactive and Cognitive Environments through the Erasmus Mundus Fellowship. With over 80 peer-reviewed publications and multiple research grants and awards, she is recognized for her contributions to biomedical imaging and surgical robotics. She is an active member of the MICCAI society and has co-organized the Endoscopic Vision Challenges at MICCAI since 2020. Additionally, she is serving as the Program Chair for IPCAI2025-2026.

Abstract

The Future of AI in Surgical Interventions

Recent advancements in Artificial Intelligence (AI) and surgical data science are driving a new era of AI-assisted robotic surgery, offering promising innovations in imaging, surgical navigation, and robotic intervention. These cutting-edge technologies have the potential to enhance surgical precision, stability, and decision support, ultimately reducing cognitive load on surgeons and optimizing procedural efficiency. This talk will explore AI applications across various surgical procedures, focusing on field-of-view expansion in endoscopic surgery, 3D reconstruction in endoluminal procedures, and surgical context interpretation. Emphasizing both technical advancements and clinical translation, this talk will highlight the progress toward next-generation surgical interventions.

Abstracts

Invited Presentation | **May 31, 2025 (16:08-16:26)**

Prof. Chaoyang SHI
Tianjin University
China

Chaoyang Shi received the Ph.D. degree from the Department of Micro-Nano Systems Engineering, Nagoya University, Nagoya, Japan, in 2013. He was a Postdoctoral Research Fellow with Imperial College London, U.K., and the University of Toronto, Toronto, ON, Canada. Since 2019, he has been a Full Professor at the School of Mechanical Engineering, Tianjin University. His research interests include continuum robots for flexible endoscopy, parallel robots for microsurgery and orthopedics, trans-catheter intravascular robotics, PZT-based micro-scaled automation, optical fiber-based tactile sensing techniques, and sensor fusion.

Abstract

Continuum Robots for Flexible Gastrointestinal Endoscopy

In view of the problems of the wide variety of endoscopic instruments for treating gastrointestinal cancers, this talk attempts to classify the robotic design into three groups according to the physiological structure characteristics of the gastrointestinal tract and the requirements of surgical operations. Efforts have been endeavored to explore and design continuum joint structures and surgical instruments that adapt to the characteristics of various types of cavities and form three continuum robot systems accordingly. The related multiple technical modules have been formed and presented, summarizing the common problems in designing continuum endoscopic surgical robot mechanisms to support the construction of a gastrointestinal endoscopic surgical robot system with strong scalability and excellent compatibility.

Abstracts

Invited Presentation **May 31, 2025 (16:26-16:44)**

Prof. Jun CHEN
University of California, Los Angeles
USA

Dr. Jun Chen is currently an associate professor with tenure in the Department of Bioengineering at the University of California, Los Angeles (UCLA). His research focuses on soft matter innovation for healthcare and energy. He has published two books and 380 journal articles, with 280 of them being corresponding authors in Nature Review Bioengineering (1), Nature Materials (3), Nature Electronics (10), Nature Biotechnology (2), Nature Chemical Engineering (2) , Nature Biomedical Engineering (1), Nature Communications (10), Science Advances (6), Chemical Reviews (2), Chemical Society Reviews (2), Joule (3), Matter (20) , among others. He also filed 18 US patents, including one licensed. With a current h-index of 125, Dr. Chen was identified to be one of the world's most influential researchers in the field of Materials Science on the Web of Science. Among his many accolades are the V. M. Watanabe Excellence in Research Award (1 faculty per year in UCLA Samueli School of Engineering), Shu Chien Early Career Award, MRS Outstanding Early Career Investigator Award, Hisako Terasaki Young Innovator Award and etc. Beyond his research activities, Dr. Chen serves as the Executive Editor-in-Chief of Med-X, and an associate editor for Biosensors and Bioelectronics, MRS Communications, FlexMat, Soft Science, cMat, and Textiles. Additionally, he is a member of the advisory and editorial boards of over 15 journals, including Matter, Materials Today, Materials Today Energy, Cell Reports Physical Science, The Innovation, Nano Trends, Biomedical Technology, among others.

Abstract

Discovering Magnetoelasticity in Soft Matter for Bioelectronics

The magnetoelastic effect, also named as Villari effect and discovered in 1865 by Italian experimental physicist Emilio Villari, is the variation of the magnetic field of a material under mechanical stress. This effect is usually observed in rigid metal and metal alloys with an externally applied magnetic field and has been ignored in the field of soft bioelectronics for the following three reasons: the magnetization variation in the biomechanical stress range is limited; the requirement of the external magnetic field induces structural complexity and bulky structure, and there exists a gigantic mismatch of mechanical modulus up to six orders of magnitude difference between the rigid magnetoelastic materials and the soft human tissues. In 2021, we discovered the giant magnetoelastic effect in a soft solid polymer system, later in a liquid permanent fluidic magnet, which paves a fundamentally new way to build up intrinsically waterproof and biocompatible soft bioelectronics for diagnostics, therapeutics, and energy applications. Our group at UCLA is currently pioneering this research effort of harnessing the giant magnetoelastic effect in soft systems for personalized healthcare and sustainable energy.

Abstracts

Invited Presentation | **May 31, 2025 (16:44-17:02)**

Prof. Hao LIU
Shenyang Institute of Automation, Chinese Academy of Sciences
China

Professor Hao Liu received his B.S., M.S. and Ph.D in Mechanical Engineering from Harbin Institute of Technology, China in 2004, 2006 and 2010 respectively. From 2014 to 2015, he visited the LCSR Laboratory of Johns Hopkins University in the United States. His research interest focuses on the mechanism design, sensing, navigation and autonomous control of endoscopic surgical robots, applying in human lumen like the digestive tract, blood vessels, abdominal cavity etc.. He published more than 100 academic papers, including IJRR, IEEE/ASME TMech, IEEE TIE etc. He has won 3 best international conference paper awards. He was also authorized 45 patents. He won the National Innovation Award of China and his achievement was elected to be Top Ten Scientific and Technological Progress of China's Intelligent Manufacturing in 2021.

Abstract

Augmented Sensing and Autonomous Control of Flexible Surgical Robots

The human lumens are tortuous and confined spaces, serving as both common sites for serious and difficult diseases, and critical access for diagnostic and therapeutic procedures. Flexible surgical robots, with their exceptional environmental adaptability and dexterous manipulation capabilities, have emerged as an enabling technology for intraluminal interventions. They attract extensive global research and some of them have already been preliminary clinically used. However, current technologies still face significant challenges when addressing complex surgical tasks within lumens. Moreover, the future of surgical robotics inevitably trends toward intelligent systems, aiming to provide surgeons with safer and user-friendly surgical solutions. This report will review the current status of flexible surgical robots and present the speaker's research on the sensing and control of flexible surgical robots.

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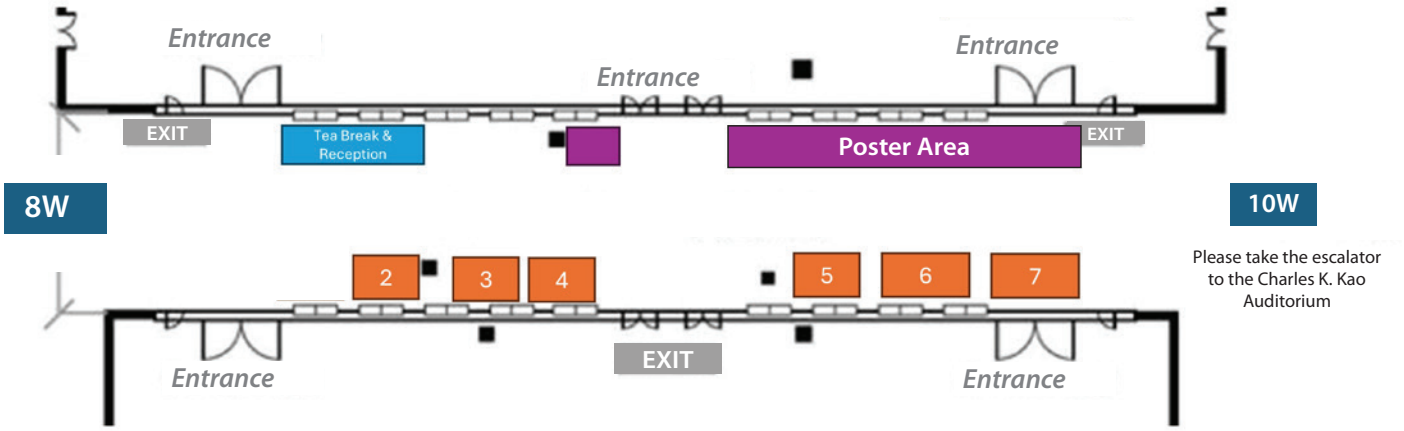
45	P28	**PneumaOCT: Pneumatic Optical Coherence Tomography Endoscopy for Targeted Distortion-Free Imaging in Tortuous and Narrow Internal Lumens** **Mr. Tinghua Zhang**[1], Mr. Sishen Yuan[1], Dr. Chao Xu[1], Prof. Hing-Chiu Chang[1], Prof. Sze Hang Calvin Ng[1], Prof. Hongliang Ren[1], Prof. Wu Yuan[1] [1]The Chinese University of Hong Kong, Hong Kong SAR
46	P36	**ETSM: Automating Dissection Trajectory Suggestion and Confidence Map-Based Safety Margin Prediction for Robot-Assisted Endoscopic Submucosal Dissection** **Dr. Mengya Xu**[1], Mr. Wenjin Mo[2], Mr. Guankun Wang[1], Prof Huxin Gao[1], Mr. An Wang[1], Mr. Long Bai[1], Mr. Chaoyang Lyu[3], Ms. Xiaoxiao Yang[3], Ms. Zhen Li[3], Prof Hongliang Ren[1] [1]The Chinese University of Hong Kong, Hong Kong SAR, [2]Sun Yat-sen University, Guangzhou, China, [3]Qilu Hospital of Shandong University, Jinan, China

Exhibition

Venue: Atrium Link, Hong Kong Science Park, Hong Kong



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Acknowledgement

The Organizing Committee would like to extend their sincere thanks to the following Sponsors for unfailing support and generous contribution towards the success of the Multi-Scale Medical Robotics Center (MRC) Symposium 2025.

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