

The Hamlyn Symposium

On Medical Robotics

01-02 July 2012, London UK

www.hamlyn-robotics.org

Hamlyn Symposium 2012

Sunday 1st July 2012

The Royal Geographical Society, 1 Kensington Gore, London, SW7 2AR

<http://www.rgs.org/HomePage.htm>

09:00 - 09:30

Registration and Coffee

09:30 - 09:45

Welcome and Introduction - Professor Ara Darzi, Co-Director of The Hamlyn Centre for Robotic Surgery

Session 1: Trainign and Clinical Outcomes

09:45 - 10:15

**Invited Lecture – Robotics and Urology
Dr. Vipul Patel**

Medical Director of the Global Robotics Institute at Celebration Health and Medical Director of the Urologic Oncology Program for the Florida Hospital Cancer Institute

10:15 - 10:30

The Impact Of Trainees On Surgical Outcomes Following Robotic Assisted Radical Prostatectomy (RARP)

LS Lee, GL Shaw, DE Neal, N Shah

Department of Urology, Addenbrookes Hospital, Cambridge, UK

10:30 - 10:45

Short And Long Term Complications Of Robotic Abdominal Surgery In Children

N Gattas¹, C Smith², N Alizai², C Van-Wyk², J Sellors², S Whiteley², A Najmaldin²

¹School of Medicine, University of Queensland, Australia

²Paediatric Surgery, Leeds Teaching Hospitals NHS Trust, United Kingdom

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10.45-11.00

A New Global Ratings Scale For Assessing Virtual Reality Arthroscopy Simulator Performance Results Of A Pilot Study

Kash Akhtar^{1,2}, Sofia Bayona³, Alex Dodds¹, David Shier¹, Chinmay Gupte¹, Fernando Bello¹, Roger Emery¹, Justin Cobb¹

¹Department of Surgery & Cancer, Imperial College London

²School of Surgery, London Deanery

³Department of Computer Architecture and Technology, Computing Sciences, and Artificial Intelligence, Universidad Rey Juan Carlos, Madrid

11.00-11.15

Retrograde Versus Antegrade Nerve-Sparing During Robot-Assisted Radical Prostatectomy: Which Is Better For Early Functional Outcomes?

Ananthakrishnan Sivaraman, Young Hwii Ko, Rafael F. Coelho, Sanket Chauhan, Oscar Schatloff, Srinivas Samavedi, Camilo Giedelman, Kenneth Palmer and Vipul R. Patel

Global Robotics Institute, University of Central Florida, School of Medicine, Orlando, USA

11:15-11.45

Coffee Break and Poster Presentations

11.45-12.45

Poster Teasers Session 1 (3 minute presentations)

P1. Functional Outcomes Following Transoral Robotic Surgery For Obstructive Sleep Apnoea

A.Arora¹, B.Kotecha², A.Hassaan³, Z.Awad¹, J.Budge¹, A.Darzi³, N.Tolley¹

¹ENT Department, St Mary's Hospital, Imperial College Healthcare NHS Trust, London

²Royal National Throat Nose and Ear Hospital, London

³Department of Biosurgery and Surgical Technology, St Mary's Hospital, Imperial College London

P2. Patient-Specific 3D Surgical Planning To Perform Cutting Edge Robotic Surgery

Carbone M.¹, Cappelli C.², Ferrari V.¹, Signori S.³, De Lio N.³, Perrone V.³, Mosca F.1, Boggi U.³

¹EndoCAS – University Hospital of Pisa,

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² Division of Diagnostic and Interventional Radiology - University Hospital of Pisa,

³Division of General and Transplant Surgery in Uremic and Diabetic Patients - University Hospital of Pisa.

P3. Robotic-Assisted Laparoscopic Pyeloplasty In Children: A Single Institution Learning Curve

N Gattas¹, A White², S Whiteley² and A Najmaldin²

¹School of Medicine, University of Queensland, Australia

²Paediatric Surgery, Leeds Teaching Hospitals NHS Trust, United Kingdom

P4. Can Biometric Measures Predict Feasibility In Transoral Robotic Surgery (TORS)?

A.Arora¹, A.Acharya², S.Khemani³, J.Kotecha¹, A.Darzi², B.Kotecha⁴
N.Tolley¹

¹Dept. Of Otolaryngology, Imperial College Healthcare NHS Trust

²Division of Surgery, Imperial College London

³Dept. Of Otolaryngology, Surrey and Sussex NHS Trust

⁴Royal National Throat Nose and Ear Hospital, London

P5. Optimizing Oncological And Functional Outcomes With Robot Assisted Radical Prostatectomy(RALP) In Preoperatively High Risk Prostate Cancer Patients

Ananthakrishnan Sivaraman, Rafael F. Coelho, Sanket Chauhan, Oscar Schatloff, Srinivas Samavedi, Camilo Giedelman Kenneth Palmer and Vipul R. Patel

Global Robotics Institute, University of Central Florida, School of Medicine, Orlando, USA

P6. From Bench To Bedside: The Novel Use Of 3D MRI For Image-Guided Robotic Prostatectomy

D.C.Cohen¹, A.N.Sridhar¹, P Pratt², B Khoubehi³, J Vale³, G-Z Yang¹, A Darzi^{1,2}, E.K.Mayer¹, P Edwards¹

¹Division of Surgery, Imperial College London

²Hamlyn Centre for Robotic Surgery, Imperial College London

³Department of Urology, Imperial College Healthcare Trust

P7. Bespoke Fixtures For Robotic Thyroidectomy

A. Arora¹, Z. Awad¹, N. Tolley¹, V. Luzzato², J. Ahn², F. Ostovari², M.

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Oldfield², F. Rodriguez y Baena²

¹ Department of Otolaryngology, St Mary's Hospital, Imperial College Healthcare NHS Trust, London, UK

²Department of Mechanical Engineering, Imperial College London, UK

P8. A Study Of Executive Control During Intracorporeal Minimally Invasive Suturing Using Functional Near Infrared Spectroscopy (fNIRS)

K. Shetty^{1,2}, D.R. Leff^{1,2}, F. Orihuela-Espina¹, A.W Darzi^{1,2}, G-Z. Yang¹

¹Hamlyn Centre for Robotic Surgery, Imperial College, London

²Department of Surgery and Cancer

P9. A Healthcare Mobile Robot With Natural Human-Robot Interaction

J. Liu, J. Correa, S. McKeague, E. Johns, C. Wong, A. Vicente, G.-Z. Yang

The Hamlyn Centre, Imperial College London

P10. Robotic NOTES: System Concept And Architecture

R. Kojcev¹, E. Wilson¹, K. Davenport¹, H. Luo¹, K. Gary², S. Oonk³, K. Cleary¹

¹Sheikh Zayed Institute for Pediatric Surgical Innovation, Children's National Medical Center, Washington, DC, USA

²Department of Engineering, Arizona State University, Phoenix, Arizona, USA

³American GNC Corporation, Simi Valley, California, USA

P11. Navigated Endoscopy: Prototype System For Robotically Assisted Ureteroscopy

C.A. Peters¹, A. Burns¹, E. Wilson¹, H. Luo¹, K. LeRoy², J. Goldie²,

B. LaBrecque², K. Cleary¹

¹Sheikh Zayed Institute for Pediatric Surgical Innovation, Children's National Medical Center, Washington, DC, USA

²Infoscitex Corporation, Boston, Massachusetts, USA

P12. Preliminary Adhesion Control Of A Miniature Intra-Abdominal Robot For Laparoscopic Surgery

A. Montellano López¹, R. Richardson¹, A. Dehghani¹, R. Roshan¹, D. Jayne², A. Neville¹

¹School of Mechanical Engineering, University of Leeds, Leeds, United Kingdom

²Academic Surgical Unit, St. James's Hospital, University of Leeds, Leeds, United Kingdom

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P13. A Feasibility Study On The Use Of Concentric Tube Continuum Robots For Endonasal Skull Base Tumor Removal

Hunter B. Gilbert^{1*}, Philip J. Swaney^{1*}, Jessica Burgner¹, Kyle D. Weaver²
Paul T. Russell III², and Robert J. Webster III^{1,2}

¹Mechanical Engineering, Vanderbilt University

²Vanderbilt University Medical Center

*Shared First Authorship

P14. An MRI Compatible Optical Multi-Axis Force/Torque Sensors Robotic Surgery

Ramon Sargeant, Hongbin Liu, Kaspar Althoefer
King's College London, UK

P15. 2-DOF MR-Compatible Cardiac Catheter Steering Mechanism

A. Ataollahi, Y. L. Ma, T. Schaeffer, K. Rhode, R. Razavi, L. Seneviratne,
and K. Althoefer

Engineering Department, King's College London,
Rayne Institute, King's College London

P16. Closed-Loop Position Control Of An MRI-Powered Biopsy Robot

Panagiotis Vartholomeos¹, Christos Bergeles¹, Lei Qin² and Pierre E.
Dupont¹

¹Childrens Hospital Boston, Harvard Medical School, Boston, MA USA

²Dana Farber Cancer Institute, Harvard Medical School, Boston, MA USA

P17. Clinical Study Of Prostate Tumour Identification Using A Rolling Indentor Robot

Jichun Li¹, Hongbin Liu¹, Jelizaveta Zirjakova¹, Benjamin Challacombe²,
Prokar Dasgupta², Lakmal D Seneviratne¹, Kaspar Althoefer¹

¹Centre for Robotics Research, King's College London,

²Departments of Urology and Histopathology, Guys and St Thomas
Hospital,

³MRC Centre for Transplantation, NIHR Biomedical Research Centre, Guy's
Hospital

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P18. Development Of A Hybrid Haptic Actuator Using Part-Locking Programmable Brakes

A.I. Skinner¹, K. Hohenberg¹, A. Pereira¹, S. Bowyer¹, Y. Tenzer²,
F. Rodriguez y Baena¹

¹Department of Mechanical Engineering, Imperial College London,

P19. Extending The Reach And Stability Of Manually Steerable Neuroendoscopes Through Robotics

Pierre E. Dupont¹, Szymon Chawarski², Evan J. Butler², Robert Hammond-Oakley², Andrew H. Gosline¹, Patrick Codd¹, Tomer Anor¹, Joseph R. Madsen¹ and Jesse Lock²

¹Children's Hospital Boston, Harvard Medical School, Boston, MA USA,

²Sterling Point Research, Winchester, MA USA

12.45-14.30

Lunch Break and Poster Presentations

Session 2: Image Guidance in Robotic Surgery

14.30-15.00

**Invited Lecture- Robots for cardiac intervention
Professor Pierre Dupont**

Professor in the Departments of Mechanical Engineering and Biomedical Engineering Boston University and Chief of Paediatric Cardiac Bioengineering at Boston Children's Hospital.

15.00-15.15

Target Tracking In 3D Ultrasound Volumes By Direct Visual Servoing

C. Nadeau¹, H. Ren^{2,3}, A. Krupa¹, P. Dupont²

¹IRISA, Inria Rennes-Bretagne Atlantique, France,

²Children's Hospital Boston and Harvard Medical School, Boston, MA, USA

³Department of Bioengineering, National University of Singapore, Singapore

15.15-15.30

Active Stabilization Of Ultrasound Image For Robotically-Assisted Medical Procedures

C. Nadeau¹, A. Krupa¹, P. Moreira², N. Zemiti², P. Poignet², J. Gangloff³

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¹IRISA, Inria Rennes-Bretagne Atlantique, France,

²LIRMM, UMR 5506, CNRS Université de Montpellier 2, 34095 Montpellier, France

³LSIIT, UMR 7005 CNRS-Université de Strasbourg I, 67400 Illkirch, France

15.30-15.45

Left Atrium Surface Flattening For Assisting Guidance In Catheter Ablation Procedures

Rashed Karim¹, Ying-Liang Ma¹, James Housden¹, Aruna Arujuna², C. A. Rinaldi^{1,2}, Mark O'Neill^{1,2}, Reza Razavi^{1,2}, Tobias Schaeffter¹ and Kawal Rhode¹

¹Division of Imaging Sciences and Biomedical Engineering, Kings College London, UK

²Guy's and St. Thomas' Hospitals NHS Foundation Trust, London, UK

15.45-16.00

Image-Guided Transoral Robotic Surgery For The Treatment Of Oropharyngeal Cancer

Philip Pratt¹, Eddie Edwards², Asit Arora², Neil Tolley², Ara Darzi², Guang-Zhong Yang¹

¹Hamlyn Centre for Robotic Surgery, Imperial College London

²Department of Surgery and Cancer, Imperial College London

16.00-16.30

Coffee Break and Poster Presentations

Session 3: Platform design and control

16.30-17.00

Key Note Speaker: Creative design of robotic mechanisms

Professor Shigeo Hirose

Professor at the Tokyo Institute of Technology, Department of Mechanical and Aerospace Engineering

17.00-17.15

Raven II™: Open Platform For Surgical Robotics Research

H. Hawkeye King^{1†}, Lei Cheng¹, Philip Roan¹, Diana Friedman¹, Sina Nia Kosari¹, Ji Ma², Daniel Gluzman², Jacob Rosen², Blake Hannaford¹

¹University of Washington, Seattle, WA, USA

²University of California, Santa Cruz, CA, USA

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17.15-17.30

Robotic Control Of A Traditional Flexible Endoscope

J.G. Ruiter^{1,2}, G.M. Bonnema¹, M.C. van der Voort¹, I.A.M.J Broeders^{1,3}

¹ University of Twente, Enschede,

² DEMCON advanced mechatronics, Oldenzaal

³ Meander Medical Centre, Amersfoort

17.30-17.45

Micro Medical Robot with Magnetic Remote Control in 3D Space

M Yasui¹, M Ikeuchi², K Ikuta²

¹Graduate School of Frontier Biosciences, Osaka University,

²Research Center for Advanced Science and Technology, The University of

Tokyo

17.45-18.00

Lessons Learned Using The Insertable Robotic Effector Platform (IREP) For Single Port Access Surgery

N.Simaan^{1,2}, A. Bajo^{1,2}, A. Reiter³, P. Allen³, D. Fowler⁴

¹A.R.M.A. Laboratory, Dept. of Mechanical Engineering, Vanderbilt University,

² Vanderbilt Initiative for Surgery and Engineering (VISE)

³Dept. of Computer Science, Columbia University

⁴Dept. of Surgery, Columbia University

Dinner for Programme Committee Members

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09:00 - 09:30

Registration and Coffee

Session 4: New Clinical Approaches and Pilot Studies

9.30-9.45

Totally Endoscopic Robotic Parathyroidectomy Through A Lateral Cervical Approach

S. Van Slycke^{1,2}, H. Maes¹, H. Vermeersch², N. Brusselsaers³

¹OLV Clinic Aalst, Belgium, Department of General and Endocrine Surgery

²Department of Head and Neck Surgery, University Hospital Ghent, Belgium

³Department of Internal and General Medicine, University Hospital Ghent, Belgium

9.45-10.00

A Pilot Ex-Vivo Evaluation Of A Telerobotic System For Transurethral Intervention And Surveillance

A. Bajo^{1,3}, R. B. Pickens², S. D. Herrell^{2,3}, N. Simaan^{1,3}

¹A.R.M.A. Laboratory, Dept. of Mechanical Engineering, Vanderbilt University,

²Dept. of Urologic Surgery, Vanderbilt University Medical Center

³Vanderbilt Initiative for Surgery and Engineering (WISE)

10.00-10.15

Initial Experience With Robotic Partial Nephrectomy (RPN): A Collaborative Approach Drawing On Different Backgrounds

A. Patel¹, C. Oliver¹, M. Billia¹, G. Kooiman², P. Dasgupta¹, T.S. O'Brien¹, B. Challacombe¹.

¹Urology Centre, Guy's and St Thomas' NHS Foundation Trust, London.

²Department of Urology, King's College Hospital, London.

10.15-10.30

Robotic Tele-Manipulating Devices For Laparoscopy Improve Surgical

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Performance In Simulated Porcine Laparoscopic Cholecystectomies On The ELITE Simulator When Compared To Surgical Assistants

K Sriskandarajah¹, S Gillen², A Di Marco¹, M Sodergren¹, DRC James¹, J Clark¹, HD Feussner², A Darzi¹, GZ Yang¹

¹Hamlyn Centre for Robotic Surgery & Global Health Innovation, Imperial College London

²Department of Surgery, Klinikum rechts der Isar, Technische Universität der TUM, Munich

10.30-11.00

Coffee Break and Poster Presentations

11.00-11.45

Poster Teasers Session 2 (3 minute presentations)

P20. New Evaluation Metrics Applied To Robotic Anastomosis

Abdelaziz Farhat³, Mohammed Al-Haddad⁴, Georges Younes^{1,2}, Tarek El-Ghazaly^{3,5}, Julien Abi-Nahed¹, Abdulla Al-Ansari^{1,5}, George Turkiyyah²

¹Qatar Robotic Surgery Centre

²American University of Beirut

³Weill Cornell Medical College in Qatar

⁴Carnegie Mellon University in Qatar

⁵Hamad Medical Corporation

P21. Skill Assessment With Proximal Force Sensing For Endovascular Catheterisation

H. Raffii-Tari¹, C.J. Payne¹, C. Riga², C. Bicknell², S.L. Lee¹, G.Z. Yang¹

¹The Hamlyn Centre for Robotic Surgery, Imperial College London, UK

²Academic Division of Surgery, Imperial College London, UK

P22. Surgtrak: Synchronized Performance Data Capture For The Da Vinci Surgical Robot

L. W. White¹, T. M. Kowalewski², B. H. Hannaford², T.S. Lendvay³

¹BioEngineering Department, University of Washington, USA

²Electrical Engineering Department, University of Washington, USA

³Department of Urology, University of Washington, USA

P23. Minimally Invasive Surgical Skill Assessment By Video-Motion Analysis

Seung-kook Jun¹, Madusudanan Sathia Narayanan¹, Abeer Eddib MD²,

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Pankaj Singhal MD², Sudha Garimella MD¹, Venkat Krovi PhD¹

¹University at Buffalo, SUNY, Buffalo NY 14260

²Kaleida Health System, Buffalo, NY 14221 USA

P24 Eye-Tracked Vergence Response During Active-Stereo Display

A. T. Duchowski¹, B. Pelfrey¹, D. H. House¹, R. Wang¹

¹School of Computing, Clemson University

P25. Intraoperative Analysis Of Locations For 3D Ultrasound-Guided Capture Of Foreign Bodies From A Beating Heart

Paul Thienphrapa^{1,2}, Bharat Ramachandran², Haytham Elhawary², Aleksandra Popovic², Russell H. Taylor¹

¹ERC CISST/LCSR, Johns Hopkins University

²Philips Research North America

P26. Fusion Of Visual And Inertial Measurements For 3D Tissue Reconstruction In Minimally Invasive Surgery

Stamatia Giannarou, Zhiqiang Zhang and Guang-Zhong Yang
Hamlyn Centre for Robotic Surgery, Imperial College London

P27. A Snapshot Endoscopic Polarisation Imaging System

N.T. Clancy^{1,2} and D. S. Elson^{1,2}

¹Hamlyn Centre for Robotic Surgery, Imperial College London, UK

²Department of Surgery and Cancer, Imperial College London, UK

P28. Quantitative Tissue Measurements In Transoral Robotic Surgery

D. Stoyanov¹, P. Pratt², E. Edwards², G.-Z. Yang², A. Arora³, A. Darzi^{2,3}, N. Tolley³

¹Center for Medical Image Computing, University College London

²Hamlyn Centre for Robotic Surgery, Imperial College London

³St. Mary's Hospital, Imperial College Healthcare NHS Trust

11.45-13.45

Lunch Break and Poster Presentations

Session 5: Planning and Navigation

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13.45-14.15

Invited Lecture- Snake robots and motion planning framework

Professor Howie Choset

Professor of Robotics at Carnegie Mellon University

14.15-14.30

Improved Visualisation With Shape Instantiation For Robot Assisted Catheter Navigation

Su-Lin Lee¹, Ka-Wai Kwok¹, Celia Riga², Colin Bicknell²,
and Guang-Zhong Yang¹

¹Hamlyn Centre for Robotic Surgery, Imperial College London, UK,

²Academic Division of Surgery, Imperial College London, UK

14.30-14.45

Investigation Of A CT Compatible Robot For Robot-Assisted Surgical Reductions Of Joint Fractures

Hinitt A¹, Sobhani M¹, Dogramadzi S¹, Raabe D², Atkins R³

¹Bristol Robotics Laboratory, University of the West of England, UK

²Berufsakademie Sachsen, University of Cooperative Education, Germany

³Bristol Royal Infirmary, University Hospitals Bristol, UK

14.45-15.00

Laser Ablation System For Remained Brain Tumor Based On Protoporphyrin Fluorescence Spectrum

Takehiro Ando¹, Junki Koike¹, Kousuke Mizumura¹, Etsuko Kobayashi¹,
Hongen Liao¹, Takashi Maruyama², Yoshihiro Muragaki², Hiroshi Iseki² and
Ichiro Sakuma¹

¹Graduate School of Engineering, The University of Tokyo

²Faculty of Advanced Techno-Surgery, Tokyo Women's Medical University

15.00-15.15

Toward Intraoperative Image-Guided Transoral Robotic Surgery

W. P. Liu¹, S. Reaugamornrat¹, A. Deguet¹, J. M. Sorger⁴, J. H. Siewerdsen^{1,3}, J. Richmon², R. H. Taylor^{1,3}

Departments of ¹Computer Science, ²Otolaryngology-Head and Neck Surgery, ³Biomedical Engineering, Johns Hopkins University, Baltimore, USA

⁴Intuitive Surgical Inc., Sunnyvale, USA

15.15-15.45

Coffee Break and Poster Presentations

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Session 6: Haptics and Perceptual Feedback

15.45-16.00 **Introduction to the Inaugural Karl Storz Harold Hopkins Lecture- Kelvin Hopkins MP**

16.00-16.30 **Inaugural Karl Storz Harold Hopkins lecture: Developing next generation robots**

Professor Richard Satava

Professor of Surgery at the University of Washington Medical Centre and Senior Science Advisor at the US Army Medical Research and Materiel Command in Ft. Detrick, MD

16.30-16.45 **The Role Of Haptics In Robotics-Assisted Mitral Valve Annuloplasty**
Maria E. Currie, MD^{1,3}, Ali Talasaz, PhD^{2,3}, Ana Luisa Trejos, MASC^{2,3}, Reiza Rayman, MD, PhD¹, Michael W.A. Chu, MD, MEd^{1,4}, Bob Kiaii, MD^{1,3,4}, Terry Peters, PhD⁵, Rajni Patel, PhD^{2,3,4}

¹Division of Cardiac Surgery, Department of Surgery, London Health Sciences Centre, London, Ontario, Canada

²Dept. of Elect. & Comp. Engineering, Western University, London, Ontario, Canada

³Canadian Surgical Technologies & Advanced Robotics, Lawson Health Research Institute, London, Ontario

⁴Dept. of Surgery, Schulich School of Medicine & Dentistry, Western University, Canada

⁵Medical Imaging Laboratory, Robarts Research Institute, Western University, Canada

16.45-17.00 **Vibrotactile Perception For Haptics In Virtual Reality Surgical Training**

T. Martin, C. W. Schwingshackl, M. J. Oldfield, F. Rodriguez y Baena
Department of Mechanical Engineering, Imperial College London, UK

17.00-17.15 **Surgical Instrument Vibrations Are A Construct-Valid Measure Of Technical Skill In Robotic Peg Transfer And Suturing Tasks**

Karlin Bark, Ernest D. Gomez, Charlotte Rivera, William McMahan, Austin C. Remington, Kenric M. Murayama, David I. Lee, Kristoffel R. Dumon, Noel N. Williams, and Katherine J. Kuchenbecker

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University of Pennsylvania, Philadelphia, Pennsylvania, USA

17.15-17.30

Air-Float Stiffness Probe For Tissue Abnormality Identification In Soft Tissue Palpation

I.B. Wanninayake, K. Althoefer, L.D. Seneviratne
Centre for Robotic Research, Kings College London

17.30-18.00

Closing Remarks and Awards

18.00

Drinks reception