Monday, April 1, 2019

8:00am – 8:30am – Registration

Location: Marcus Nanotechnology Building, Georgia Institute of Technology, USA

SSMR Speakers – Session 1

8:30am-9:15am – Jaydev P. Desai, Georgia Institute of Technology, USA
Flexible, 3D-printed Robotic Systems for Surgical Interventions

9:15am-10:00am – Aaron Young, Georgia Institute of Technology, USA
Control and human performance evaluation of lower limb wearable robotic systems

10:00am-10:45am – Jun Ueda, Georgia Institute of Technology, USA
Neuromodulations via Robotic Mechanical Stimulation and Paired Brain Stimulation

10:45pm – 11:15pm – Break, Refreshments, and Poster Session

SSMR Speakers – Session 2

11:15am-12:00pm – Dominic Papandria, Emory University, USA
Surgical Robotics – Oppurtunities and Challenges in General Surgery

12:00pm - 1:00pm – Lunch

SSMR Speakers – Session 3

1:00pm-1:45pm –Muralidhar Padala, Emory University, USA
Experimental platforms for development and validation of cardiovascular robotic systems

1:45pm-2:30pm – Zion Tse, University of Georgia, USA
MRI-guided Therapy for Prostate, Cardiovascular and Spinal Treatment

2:30pm-3:15pm – Simon DiMaio, Intuitive Surgical, Inc., USA
Medical Robots – From Bench to Bedside

3:15pm-3:45pm – Break, Refreshments, and Poster Session

SSMR Speakers – Session 4

3:45pm-4:30pm – Cameron Riviere, Carnegie Mellon University, USA
Active and passive compensation of physiological motion for accuracy enhancement in surgery

4:30pm-5:15pm – Ann Majewicz Fey, UT Dallas, USA
From Tool to Assistant: Developing Adaptive Surgical Robots for the Operating Room

5:15pm-6:00pm – Nabil Simaan, Vanderbilt University, USA
*Towards Continuum Robots with Surgical Situational Awareness: Modeling and Control
Challenges with Applications*

Tuesday, April 2, 2019

8:000am – 8:30am – Registration

Location: Marcus Nanotechnology Building, Georgia Institute of Technology, USA

SSMR Speakers – Session 5

8:30am-9:15am – Tamas Ungi, Queen's University, Canada
Perk Tutor: An Open-Source Platform for Ultrasound Guided Intervention Training

9:15am-10:00am – Mahdi Tavakoli, University of Alberta, Canada
Robotics Learning and Imitation of Physical Therapy

10:00am-10:45am – Nabil Zemiti, Université de Montpellier, France
Some recent translational research activities on augmented reality and robot assisted surgery gesture guidance

10:45pm – 11:15pm – Break, Refreshments, and Poster Session

SSMR Speakers – Session 6

11:15am-12:00pm – Antoine Ferreira, INSA Centre Val de Loire, France
Recent Progress in Magnetically Actuated Microrobotics for Endovascular Therapies

12:00pm - 1:00pm – Lunch

SSMR Speakers – Session 7

1:00pm-1:45pm – Pretesh Patel, Emory University, USA
Anti-Cancer Brachytherapy – Challenges and Opportunities

1:45pm-2:30pm – Paolo Fiorini, University of Verona, Italy
Automation and Autonomy in Robotic Surgery

2:30pm-3:15pm – Russell H. Taylor, Johns Hopkins University, USA
A Thirty Year Perspective on Medical Robotics: Yesterday, Today, and Tomorrow

3:15pm-3:45pm – Break, Refreshments, and Poster Session

SSMR Speakers – Session 8

3:45pm-4:30pm – Zachary Bercu, Emory University, USA
Minimally Invasive Image-Guided Procedures (MIIP's): A Primer for Medical Robotics Specialists

4:30pm-5:15pm – Arianna Menciassi, Scuola Superiore Sant`Anna, Italy
Robotics for wireless surgery and targeted therapy

5:15pm-6:00pm – Elena De Momi, Politecnico di Milano, Italy
Smart assistance for surgical training and surgical practice

Wednesday, April 3, 2019

8:00am – 8:30am – Registration

Workshops for 2019 SSMR and 2019 ISMR

Title: Convergence of IP, Tech Transfer, and Translation, for Medical Robotics Research
Organizers:
Yash Chitalia, Georgia Institute of Technology, USA
Matt Harrow, Stryker, USA
Hussein Akhavannik, Baker Law, Washington D.C., USA
Half-day (8:30am – 12:00pm); Break and Refreshments: 10:00am – 10:30am
Location: Marcus 1118

Title: Improving the Utility and Adoption of Human Augmentation Devices
Organizer: Frank L. Hammond III, Georgia Institute of Technology, USA
Half-day (8:30am – 12:00pm); Break and Refreshments: 10:00am – 10:30am
Location: Marcus 1117

Title: Robot-assisted eye surgery: steps toward operating room
Organizers:
Iulian Iordachita, Johns Hopkins University, USA
Emmanuel Vander Poorten, KU Leuven, Belgium
Ali Nasseri, Technical University of Munich, Germany
Half-day (8:30am – 12:00pm); Break and Refreshments: 10:00am – 10:30am
Location: Whitaker 3115

Title: Open Platforms for Medical Robotics Research
Organizers:
Peter Kazanzides, Johns Hopkins University, USA
Blake Hannaford, University of Washington, USA
Gregory S. Fischer, Worcester Polytechnic Institute, USA
Full-day (8:30am – 5:00pm); Break and Refreshments: 10:00am – 10:30am / 3:00pm – 3:30pm
Location: 1128 Suddath Room, Institute for Bioengineering and Bioscience (IBB)

12:00pm – 1:30pm – Lunch

Title: Building Software System for Image-Guided Robot-Assisted Interventions
Organizers:
Junichi Tokuda, Brigham and Women's Hospital and Harvard Medical School, USA
Tamas Ungi, Queen's University, Canada
Axel Krieger, University of Maryland, USA
Simon Leonard, Johns Hopkins University, USA
Half-day (1:30pm – 5:00pm); Break and Refreshments: 3:00am – 3:30pm
Location: Marcus 1118

Title: Sensorimotor Augmentation in NeuroRehabilitation Robotic and Prosthetic Technologies
Organizers:
S. Farokh Atashzar, Imperial College London, UK
Mahdi Tavakoli, University of Alberta, Canada
Dario Farina, Imperial College, London, UK
Rajni V. Patel, Western University, Canada
Half-day (1:30pm – 5:00pm); Break and Refreshments: 3:00am – 3:30pm
Location: Marcus 1117

5:30pm - 7:00pm – 2019 SSMR and 2019 ISMR Reception

7:30pm – 10:00pm – 2019 SSMR and 2019 ISMR Dinner (By Invitation only)

Thursday, April 4, 2019

8:00am – 8:30am – Registration

Welcome and Opening Remarks (8:30am – 9:00am)

8:30am - 8:45am - Jaydev P. Desai, Director, Georgia Center for Medical Robotics, Georgia Institute of Technology, USA

8:45am - 9:00am – Chaouki Abdallah, Executive VP Research, Georgia Institute of Technology, USA

09:00am – 9:45am – KEYNOTE

Rajni Patel, Ph.D., Western University, Canada – Teleoperation, Haptics and Control Issues in Medical Robotic Applications

9:45am - 10:00am - Rapid Fire Poster Presentations (2 mins each)

Session Chair: Jaydev P. Desai, Georgia Center for Medical Robotics, Georgia Institute of Technology, USA

- Marzieh Ershad, Robert Rege, Ann Majewicz Fey. *Surgical Robotic Training using Real-Time Force Feedback Based on Stylistic Behavior*

- Yi Zheng, Ann Majewicz Fey. *Effect of Stressors on Surgical Training Performance*

- Ziheng Wang, Ann Majewicz Fey. *Operative Difficulty Assessment in Robot-assisted Teleoperation with Domain Adaptation*

- Daniel Naftalovich, Annie Yang, Yuman Fong, Joel Burdick, Yanghee Woo. *Comparison of semantic and lower-level segmentations of robotic-assisted gastrectomies*

- Keshav Bimbraw, Elizabeth Fox, Frank L. Hammond III, Gil Weinberg. *Sonomyography based real-time hand grasp configuration identification via supervised learning to control a soft robotic gripper*

- Zhaoshuo Li, Mahya Shahbazi, Niravkumar Patel, Eimear O' Sullivan, Preetham Chalasani, Haojie Zhang, Khushi Vyas, Anton Deuget, Peter L. Gehlbach, Iulian Iordachita, Guang-Zhong Yang, Russell H. Taylor. *An Image-Based Control Framework for Teleoperated Semi-Autonomous Retina Endomicroscopy Scanning*

- Siobhan Rigby, Daniel Buckland. *Challenges of Autonomous IV insertion*

10:00am – 10:30am – Break, Refreshments, and Poster Session

10:30am - 12:30pm - Oral Presentations – Session 1 (15mins/paper: 13 mins presentation + 2 mins Q&A)

Session Chair: Aaron Young, Georgia Institute of Technology, USA

- *Renz Ocampo and Mahdi Tavakoli.* Visual-Haptic Colocation in Robotic Rehabilitation Exercises Using a 2D Augmented-Reality Display

- *Nafiseh Ebrahimi, Gautham Muthukumaran and Amir Jafari.* Reduction in The Metabolic Cost of Human Walking Gaits Using Quasi-Passive Upper Body Exoskeleton

- *Shrey Pareek, Hemanth Manjunath, Ehsan Esfahani and Thenkurussi Kesavadas.* MyoTrack: Tracking Subject Participation in Robotic Rehabilitation using sEMG and IMU

- *Veena Jayasree-Krishnan, Dhruv Gamdha, Brian Goldberg, Shramana Ghosh, Preeti Raghavan and Vikram Kapila.* A Novel Task-Specific Upper-Extremity Rehabilitation System with Interactive Game-Based Interface for Stroke Patients

- *Vijeth Rai, Abhishek Sharma and Eric Rombokas.* Mode-free Control of Prosthetic Lower Limbs

- *Rui Li, Christopher Modlesky and Zion Tse.* Smartphone-enabled Trackers for Lower-body Monitoring

- *Bahareh Abbasi, Mehdi Sharifzadeh, Ehsan Noohi, Sina Parastegari and Milos Zefran.* Grasp Taxonomy for Robot Assistants Inferred from Finger Pressure and Flexion

- *Waiman Meinhold and Jun Ueda.* Tendon Tapping Location Detection Through Impact Modeling

12:30pm – 1:30pm – Lunch

1:30pm – 3:00pm - Oral Presentations – Session 2 (15mins/paper: 13 mins presentation + 2 mins Q&A)

Session Chair: Mahdi Tavakoli, University of Alberta, Canada

- *Yun-Hsuan Su, Kevin Huang and Blake Hannaford.* Multicamera 3D Reconstruction of Dynamic Surgical Cavities: Camera Grouping and Pair Sequencing

- *Di Wu, Gang Li, Niravkumar Patel, Jiawen Yan, Reza Monfaredi, Kevin Cleary and Iulian Iordachita*. Remotely Actuated Needle Driving Device for MRI-guided Percutaneous Interventions

- *Shahriar Sefati, Rachel Hegeman, Farshid Alambeigi, Iulian Iordachita and Mehran Armand*. FBG-Based Position Estimation of Highly Deformable Continuum Manipulators: Model-Dependent vs. Data-Driven Approaches

- *Ali Ebrahimi, Changyan He, Niravkumar Patel, Marin Kobilarov, Peter Gehlbach and Iulian Iordachita*. Sclera Force Control in Robot-assisted Eye Surgery: Adaptive Force Control vs. Auditory Feedback

- *Xuefeng Wang, Phillip Tran, Sarah Callahan, Steven Wolf and Jaydev Desai*. Towards the development of a voice-controlled exoskeleton system for restoring hand function

- *Brooks McKinney, Will McKinney, Shivanand Pattanshetti and Seok Chang Ryu*. Feasibility Study of In Vivo Robotic Plasma Medicine Devices

3:00pm – 3:15pm - Rapid Fire Poster Presentations (2 mins each)

Session Chair: Jaydev P. Desai, Georgia Center for Medical Robotics, Georgia Institute of Technology, USA

- Austin J. Taylor, Sheng Xu, Bradford J. Wood, Zion T. H. Tse. *Rapid Prototyping of Patient Specific CT Markers*

- Zhuo Zhao, Rui Li, Sheng Xu, Bradford J. Wood, Zion Tsz Ho Tse. *Angular Tracking Device for Assisting Image-guided Needle Placement*

- Rui Li, Sheng Xu, Bradford Wood, Zion Tsz Ho Tse. *3D-printed Template for Assisting MRI-guided Needle Biopsy*

- Rui Li, Kate Schutz, Zion Tsz Ho Tse. *Studying Lunge Movement for Fencing Injury Rehabilitation*

- Lingbo Cheng, Mahdi Tavakoli. *Neural network-based physiological organ motion prediction and robot impedance control for teleoperated beating-heart surgery*

- Xiaolong Liu, Jindong Tan. *A Generic In Vivo In Situ Camera Cleaning Module for Laparoscopic Surgery*

- Nahian Rahman, Nancy Deaton, Jun Sheng, Jaydev P. Desai. *A Novel Bending Sensor for Measuring the Deflections of a Continuum Robot*

3:15pm – 3:45pm – Break, Refreshments, and Poster Session

3:45pm – 4:15pm – Semi-Plenary Talk

Nabil Zemiti, Ph.D., University of Montpellier, France – Some recent translational research activities on augmented reality and robot assisted surgical gesture guidance

4:15pm – 4:45pm – Semi-Plenary Talk

Zachary Bercu, MD, Emory University Hospital Midtown, USA – Medical Robotics in Endovascular Procedures - Challenges and Opportunities

4:45pm – 5:30pm - Oral Presentations – Session 3 (15mins/paper: 13 mins presentation + 2 mins Q&A)

Session Chair: Jun Ueda, Georgia Institute of Technology, USA

- *Mohammad Yasar, David Evans and Homa Alemzadeh*. Context-aware Monitoring in Robotic Surgery

- *Ada Zhang, Liheng Guo and Anthony Jarc*. Prediction of task-based, surgeon efficiency metrics during robotic-assisted minimally invasive surgery

- *Christopher Schlenk, Andrea Schwier, Michael Heiss, Thomas Bahls and Alin Albu-Schäffer*. Design of a robotic instrument for minimally invasive waterjet surgery

5:30pm – 7:30pm – 2019 ISMR Networking Social

7:30pm – 9:30pm – 2019 ISMR Banquet

Friday, April 5, 2019

8:00am – 8:30am – Registration

8:30am – 9:00am – Semi-Plenary Talk

Cameron Riviere, Ph.D., Carnegie Mellon University, USA – Handheld robotics for microsurgery in the eye and brain

9:00am - 10:30am - Oral Presentations – Session 4 (15mins/paper: 13 mins presentation + 2 mins Q&A)

Session Chair: Blake Hannaford, University of Washington, Seattle, USA

- *Dogancan Temel, Melvin Mathew, Ghassan Alregib and Yousuf Khalifa*. Automated Pupillary Light Reflex Test on a Portable Platform

- *Niveditha Kalavakonda and Blake Hannaford*. Augmented Reality Application for Aiding Tumor Resection in Skull-Base Surgery

- *Shivanand Pattanshetti and Seok Chang Ryu*. On the Kinematic Model of Continuum Robots with Spatially Varying Nonlinear Stiffness

- *Ruipeng Chen, David Folio and Antoine Ferreira*. Study of robotized electromagnetic actuation system for magnetic microrobots devoted to minimally invasive ophthalmic surgery

- *Brijen Thananjeyan, Ajay Tanwani, Jessica Ji, Danyal Fer, Vatsal Patel, Sanjay Krishnan and Ken Goldberg*. Optimizing Robot-Assisted Surgery Suture Plans to Avoid Joint Limits and Singularities

- *Francesco Piqué, Mohamed Nassim Boushaki, Margherita Brancadoro, Elena De Momi and Arianna Menciassi*. Dynamic Modeling of the Da Vinci Research Kit Arm for the Estimation of Interaction Wrench

10:30am – 11:00am – Break, Refreshments, and Poster Session

11:00am – 11:45am – KEYNOTE

Lee M. Akst, MD, Johns Hopkins University, USA – *Robotic Microlaryngeal Surgery – Where We Are and Where We're Going*

11:45am - 12:30pm - Oral Presentations – Session 5 (15mins/paper: 13 mins presentation + 2 mins Q&A)

Session Chair: Riccardo Muradore, University of Verona, Italy

- *Giovanni Menegozzo, Diego Dall'Alba, Chiara Zandonà and Paolo Fiorini*. Surgical Gesture Recognition with Time Delay Neural Network based on kinematic data

- *Francesco Setti, Elettra Oleari, Alice Leporini, Diana Trojanello, Alberto Sanna, Umberto Capitanio, Francesco Montorsi, Andrea Salonia and Riccardo Muradore*. A Multirobots Teleoperated Platform for Artificial Intelligence Training Data Collection in Minimally Invasive Surgery

- *Jay Carriere, Jason Fong, Tyler Meyer, Ron Sloboda, Siraj Husain, Nawaid Usmani and Mahdi Tavakoli*. An Admittance-Controlled Robotic Assistant for Semi-Autonomous Breast Ultrasound Scanning

12:30pm – 1:30pm – Lunch

1:30pm – 2:15pm – KEYNOTE

Stanley Duke Herrell, MD, Vanderbilt University, USA – *Engineering the future of Urology and MIS: The role of the Surgical Innovator*

2:15pm - 3:15pm - Oral Presentations – Session 6 (15mins/paper: 13 mins presentation + 2 mins Q&A)

Session Chair: Ravikiran B. Singapogu, Clemson University, USA

- *Zhuo Zhao and Zion Tsz Ho Tse*. A Smartphone and Permanent Magnet-based Needle Guidance System

- *Mahdieh Babaiasl, Fan Yang, Yao Chen, Jow-Lian Ding and John Swensen*. Predicting Depth of Cut of Water-jet in Soft Tissue Simulants based on Finite Element Analysis with the Application to Fracture-directed Water-jet Steerable Needles

- *Kihan Park, Phillip Tran, Nancy Deaton and Jaydev Desai*. Multi-walled Carbon Nanotube (MWCNT)/PDMS-based Flexible Sensor for Medical Applications

- *Irfan Kil, Ravikiran B. Singapogu and Richard E. Groff*. Needle Entry Angle & Force: Vision-enabled Force-based Metrics to Assess Surgical Suturing Skill

3:15pm – 3:45pm – Break, Refreshments, and Poster Session

3:45pm – 5:15pm - Oral Presentations – Session 7 (15mins/paper: 13 mins presentation + 2 mins Q&A)

Session Chair: Sang-Eun Song, University of Central Florida, USA

- *Arpita Routray, Robert MacLachlan, Joseph Martel and Cameron Riviere.* Real-Time Incremental Estimation of Retinal Surface Using Laser Aiming Beam

- *Eric Wilde, Sumit Dan, Nathan A. Wood, Michael J. Passineau, M. Scott Halbreiner, Marco A. Zenati and Cameron Riviere.* Parallel Position/Force Control of Epicardial Wire Robot Based on Ellipsoid Geodesy

- *Jianxin Gao, Irfan Kil, Richard E. Groff and Ravikiran B. Singapogu.* Automatic Detection of Needle Puncture in a Simulated Cannulation Task

- *Sakura Sikander, Pradipta Biswas, Pankaj Kulkarni, Christopher Harrington, Neil Chang and Sang-Eun Song.* Concept Development of Fixed Geometry Tactile Display using Granular Jamming

- *Yingqiao Yang, Kai-Leung Yung and Robert Tin Wai Hung.* Surface Model Extraction from Indentation Curves of Hyperelastic Simulation for Abnormality Detection

- *Adolfo Perrusquia and Wen Yu.* Task space human-robot interaction using angular velocity Jacobian

5:15pm – 5:30pm – Closing Remarks