Gregory S. Lee, Ph.D.

Assistant Professor

Case Western Reserve University
Department of Electrical Engineering & Computer Science
10900 Euclid Ave
Cleveland, OH 44106
216.368.4079
leegs@case.edu

EDUCATION

Doctor of Philosophy, Electrical Engineering — June, 2004
University of Washington — Seattle, WA
"Low power haptic devices: ramification on perception and device design"
Advisor:Blake Hannaford, Ph.D.

Certificate, Technology Entrepreneurship — June, 2004
University of Washington — Seattle, WA

Master of Science, Electrical Engineering — June, 1999
University of Washington — Seattle, WA

Bachelor of Arts, Physics — May, 1996
Whitman College — Walla Walla, WA

RESEARCH POSITIONS

Assistant Professor — 2012–Present
Department of Electrical Engineering & Computer Science, Case Western Reserve University — Cleveland, OH

- Development of terrain classification technology for use by robotic wheelchairs
- Development of optical methods for object identification coupled with simplified manipulation for objects in semi-structured environments for use in an inventory retrieval robot
- Development of security enhancement to the Interoperable Telesurgery Protocol (SITP) in collaboration with the University of Washington with applications in general teleoperated robotic systems
- Development of a UAV robot for hallway exploration
- Research the viability of a hybrid distributed generation plant for small residential microgrids

Research Assistant Professor — 2010–2012
Department of Electrical Engineering & Computer Science, Case Western Reserve University — Cleveland, OH

- Development of optically based method to simplify the identification of objects for robotic manipulation in structured environments
- Development of packaging for simplified manipulation in unstructured environments
- Development of security enhancement to the Interoperable Telesurgery Protocol (SITP) in collaboration with the University of Washington
- Development of security for teleoperation in UAV based mobile robot (an example of the SITP)
- Development of a UAV robot for hallway exploration
- Research the influence of mismatched haptic display and visual display scaling on task performance for human computer interaction
- Research the viability of a hybrid distributed generation plant for small residential microgrids

Visiting Assistant Professor 2009–2010
Department of Mechanical Engineering, The University of Texas at Dallas Richardson, TX

- Development of security enhancement to the Interoperable Telesurgery Protocol (SITP) in collaboration with the University of Washington
- Research the influence of mismatched haptic display and visual display scaling on task performance for human computer interaction

Research Associate *(Postdoctoral Research)* 2007–2009
Department of Computer Science, The University of Texas at Dallas Richardson, TX

- Research the influence of mismatched haptic display and visual display scaling on task performance for human computer interaction
- Development of security enhancement to the Interoperable Telesurgery Protocol in collaboration with the University of Washington

Senior Fellow *(Postdoctoral Research)* 2005–2007
Department of Biomedical Engineering, University of Washington Seattle, WA

- Design and implementation of motion correction for a 3D biomedical imaging instrument by coordinating image acquisition from multiple cameras
- Design and fabrication of a pressure chamber that measures, controls and records pressure applied to residual limbs of people with amputations for biomedical research
- Design and implementation of custom electronic measurement instruments and interfaces

Senior Fellow *(Postdoctoral Research)* 2004–2005
Department of Bioengineering, University of Washington Seattle, WA

- Designed and fabricated handheld prototype used for close proximity, non-contact detection of fluorescence-tagged biological and chemical agents

Research Assistant 2002–2004
Department of Electrical Engineering, University of Washington Seattle, WA

- Researched low power haptics and human perception of weak haptic effects
- Investigated the enhancement of use interaction with electronic devices using embedded haptic interfaces (e.g., cell phones)
- Designed and fabricated custom hardware and for haptic devices
- Wrote low level custom drivers for USB haptic interface
- Supervised and assisted undergraduate and new graduate laboratory researchers

TEACHING POSITIONS

Assistant Professor
2012–Present

Department of Electrical Engineering & Computer Science,
Case Western Reserve University
Cleveland, OH

- Graduated three (3) Masters students
- Committee member for twleve (12) Masters students and two (2) doctoral students
- Development of an active learning format engineering core course (ENGR 210, Introduction to Circuits and Instrumentation)
- Co-developed and taught a composition course which leveraged the similarities between basic circuits & programming to develop logic for written arguments
- Co-taught Special Topics on Haptics and Robotic Manipulation course
- Developed and taught a new version of the Advanced Manipulators (EECS 589) graduate level course that leveraged the community outreach portion of the DARPA ARM-S program
- Supervised seven (7) senior capstone projects and other independent student projects.

Research Assistant Professor
2010–2012

Department of Electrical Engineering & Computer Science,
Case Western Reserve University
Cleveland, OH

- Co-taught Special Topics on Haptics and Robotic Manipulation course
- Developed and taught a new version of the Advanced Manipulators (EECS 589) graduate level course that leveraged the community outreach portion of the DARPA ARM-S program
- Supervised one (1) senior project and other independent student projects

Visiting Assistant Professor
2009–2010

Department of Mechanical Engineering, The University of Texas at Dallas
Richardson, TX

- Developed and taught Introduction to Engineering (MECH 1108)
- Developed and taught Introduction to Mechanical Engineering (MECH 1208)
- Developed the Peer Lead Team Learning (PLTL) student learning and study group for MECH 1108 and MECH 1208
- Participated in the developed of Mechanical Engineering curriculum for new department
- Faculty advisor for student chapter of the American Society of Mechanical Engineers (ASME)

Research Associate *(Postdoctoral Research)*
2007–2009

Department of Computer Science, The University of Texas at Dallas
Richardson, TX

- Developed and taught Introduction to Engineering (MECH 1108)
- Developed and taught Introduction to Mechanical Engineering (MECH 1208)
- Faculty advisor for student chapter of the American Society of Mechanical Engineers

Research Assistant
2002–2004

Department of Electrical Engineering, University of Washington
Seattle, WA

- Robotic Manipulators (EE 543), Embedded Systems (EE 492), Consumer Electronics (EE 498), and Fundamentals of Electrical Engineering (EE 215)
- Assisted with course instruction and curriculum planning
- Conducted lab and quiz sections and lectured on course topics
- Graded laboratory reports, quizzes and homework

EXTERNAL FUNDIN

II-New: Infrastructure for Research on Collaborative Intelligent Robotic Systems in Dynamic, Complex, and Uncertain Environments
Pending

NSF $750,000

This proposal requested institutional research infrastructure to support new research directions and enhance existing research activities at Case Western Reserve University in the broader robotics area. Specifically, the requested infrastructure will support four primary research thrusts on: i) cloud robotics for dynamic, complex, and uncertain environments; ii) human-robot and robot-robot collaborative manipulation; iii) safety and reliability of robotic cyber-physical systems; and, iv) security of tele-operated and autonomous robotic systems.

Role: Collaborator (PI Prof. Cenk Çavuşoğlu) 07/01/2015–06/30/2017

Biological and Behavioral Markers of Persistent Speech Sound Disorders
Current

NIH/NIDCD $2,500,000

The major goal of this project is to determine genetic, hormonal and behavioral predictors of persistent speech sound disorders at middle childhood.

Role: Collaborator (PI Prof. Barbara Lewis) 09/01/2014–08/31/2019

Autonomous Kitting for Flexible Manufacturing
Declined

Walmart U.S. manufacturing Innovation Fund $1,171,724

Development of a robot to retrieve and deliver products and materials in a warehouse and/or factory environment without incurring a substantial cost of infrastructure improvements during implementation.

Role: Co-Principal Investigator (PI Prof. Roger Quinn) 10/01/2014–09/30/2017

NRI-Small: A Robotic Factory Assistant for Kitting, Transport and Delivery
Declined

National Science Foundation (NSF) $1,035,492

The development of a mobile manipulation robot for kitting operations was proposed. The developed robot would be able to autonomously navigate a factory environment populated with humans. The robot would retrieve multiple parts from through out a factory to assemble a kit on a tray for delivery where needed. The robot would be programmable by factory personnel.

Role: Co-Principal Investigator 08/01/2012–08/01/2016

NRI-Small: A Factory Co-Robot for Kitting Operations
Declined

National Science Foundation (NSF) $1,092,025

The development of a mobile manipulation robot for kitting operations was proposed. The developed robot would be able to autonomously navigate a factory environment populated with humans. The robot would retrieve multiple parts from through out a factory to assemble a kit on a tray for delivery where needed. The robot would be programmable by factory personnel.

Role: Co-Principal Investigator (PI Prof. Wyatt Newman) 07/01/2013–06/30/2017

Track A: An Autonomous Service Robot
Declined

DARPA $3,998,355

We proposed to develop an Autonomous Service Robot (ASR) that can explore, investigate, repair and service facilities designed for human workmen with limited operator interaction. Our robot will locomote through environments designed for humans, over rubble and through wreckage after damage to structures.

Role: Co-Principal Investigator (PI Prof. Roger Quinn) 10/01/2012–10/01/2015

CHS:Medium:Smart Wheelchair Technology and Platform for Increasing the Self-Sufficiency of People with Disabilities — Declined

National Science Foundation (NSF) — $1,199,014

Development of Smart Wheelchair technology to allow people that require the use of wheelchairs, but are not able to control them precisely, to navigate safely

Role: Principal Investigator (Co-PIs Prof. Wyatt Newman and Prof. Elizabeth Madigan) — 07/01/2014–07/01/2018

Ford URP: A Mobile manipulator for kitting operations — Declined

Ford Motor Company — $120,000

Development of a mobile manipulator robot for performing kitting operations in an automotive plant.

Role: Co-Principal Investigator (PI Prof. Wyatt Newman) — 01/01/2012–01/01/2015

Robotic Manipulator — Accepted

ABB Inc. — $80,000

An ABB IRB-120 was requested from ABB Inc. (Zurich, Switzerland) for use in developing a mobile manipulator for factory kitting operations.

Role: Co-Principal Investigator (PI Prof. Wyatt Newman) — Awarded

Treatment for Severe Dysarthria in Children — Current

The Hartwell Foundation — $300,000

The development of target-based visual feedback training for speech treatment for children with severe dysarthria. This technology will enable both the child and the clinician to visualize the movements of the child's tongue relative to an idealized target for the treated speech sound in real-time.

Role: Collaborator (PI Prof. Jennell Vick) — 04/01/2012–03/31/2015

AFRL Student Challenge: Autonomous Airborne Monitoring System — Complete

Air Force Research Laboratory (AFRL) — $4,632

Advisor for senior capstone project funded by the AFRL Student Challenge program. Students developed a UAV robot for indoor hallway exploration.

Role: Principal Investigator — 03/01/2011–06/01/2011

SDCI SEC: Framework for Secure Teleoperation — Declined

National Science Foundation (NSF) — $310,227

Development of a secuity protocol package for teleoperation.

Role: Principal Investigator — 07/01/2011–06/30/2014

Autonomous Airborne Inspection Vehicles for Rounded Vertical Cement Structures — Declined

NineSigma — $70,000

Development of a UAV solution to the inspection of rounded cement structures.

Role: Principal Investigator — 09/01/2011 – 09/01/2012

CPS:Medium:Collaborative Research:Cyberphysical System Security for Robotic Telesurgery Systems — Declined

National Science Foundation (NSF) — $499,901

The development of a cyberphysical systems security protocol designed for robotic telesurgery.

Role: Lead Principal Investigator (Co-PIs Prof. Cenk Çavuşoğlu; Prof. Ehab al-Shaer, PI @ UNCC; Prof. Kevin Hamlin, PI @ UTD) — 07/01/2011–06/30/2014

Fluid Mechanics Project for MECH 1208, Introduction to Mechanical Engineering Awarded

GEMS/NSF STEP Faculty Innovation Grant $4,575

A set of experiments in fluid dynamics were designed for the introduction to mechanical engineering course at the University of Texas at Dallas. (This award was not transferable to Case Western Reserve University.)

Role: Principal Investigator Awarded but not executed

CPS: Medium: Collaborative Research:Secure and Dependable Telesurgical Cyber-Physical Robotic Systems Declined

National Science Foundation (NSF) $500,000

Development of a security protocol for a telesurgery cyberphysical system.

Role: Co-Principle Investigator The University of Texas at Dallas, Richardson, TX 75080

AWARDS, ACHIEVEMENTS AND HONORS

UCITE: Learning Fellowship 2011

University Center for Innovation in Teaching and Education (UCITE), Case Western Reserve University

Faculty Teaching Award 2012

Department of Electrical Engineering & Computer Science, Case Western Reserve University

Active Learning Fellowship 2014

Active Learning Fellows Professional Development Program

Engineering Leadership & Professional Practice Award 2014

Case School of Engineering, Case Western Reserve University

GRADUATE STUDENTS

ADVISOR

[1] **Nolan Shreiber**, M.S. Academic Advisor, Expected Fall 2015, *Topic: Filtering of Speech Kinematic Data with High Jerk Impact Characteristics*

[2] **Edward Venator**, M.S. Advisor, Summer 2013, *A Low-cost Mobile Manipulator for Industrial and Research Applications*

[3] **Steven Hecht**, M.S. Advisor, Spring 2013, *Driving by Speaking: Natural Language Control of Robotic Wheelchairs*

[4] **Stephanie Cockrell**, M.S. Advisor, Fall 2012, *Using the XBOX KINECT to Detect Features of the Floor Surface*

COMMITTEE MEMBER

[1] **Russell Jackson**, Ph.D. Committee, Candidate, *Topic: Automated Needle Driving in Surgical Robotics*

[2] **Der Lin Chow**, Ph.D. Committee, Candidate, *Topic: Automated Suturing in Surgical Robotics*

[3] **Yifan Guo**, M.S. Committee, Fall 2014, *The Analysis of Noise Reduction Algorithms on Detectability of Aortic Hematoma*

[4] **Jeffrey Meunier**, M.S. Project Committee, Spring 2014, *Design Techniques for a Robotic Seismic-Aqusition System to Reduce Size, Cost, and Improve Performance*

[5] **Charles Hart**, M.S. Committee, Fall 2013, *A Low-cost Omni-directional Visual Bearing Only Localization System*

[6] **Nathan McKinley**, M.S. Committee, Fall 2013, *A Decision Theoretic Approach to Natural Language Generation*

[7] **Aaron Franczyk**, M.S. Project Committee, Spring 2013, *Automation of Power Curve Measurement System*

[8] **Eric Perko**, M.S. Committee, Fall 2012, *Precision Navigation for Indoor Mobile Robots*

[9] **Andrew Smith**, M.S. Project Committee, Fall 2012, *The Design, Dynamic Modeling, and Control of a Stirling Duplex System*

[10] **Jesse Fish**, M.S. Committee, Summer 2012, *Robotic Tour Guide Platform*

[11] **William Kulp**, M.S. Committee, Summer 2012, *Robotic Person-following in Cluttered Environments*

[12] **Anthony (Tony) Yanick**, M.S. Committee, Spring 2012, *Driving By Speaking: Capabilities and Requirements of a Vocal Joystick*

[13] **Chad Rockey**, M.S. Committee, Spring 2012, *Low-cost Sensor Package for Smart Wheelchair Obstacle Avoidance*

[14] **Aaron Deal**, M.S. Committee, Fall 2011, *Hybrid Natural Admittance Control for Laparoscopic Surgery*

UNDERGRADUATE STUDENTS

ADVISING FIRST YEAR STUDENTS 2013

- Andersen, Kayla
- Armstrong, William
- Breitfeller, Quinn
- Clevenger, Jessica
- Espinoza, Armando
- Fada, Justin
- Fagerholm, Cara
- Frey, Taylor
- Gibbs, Benjamin
- Hwang, Andrew
- Janice, Zachary
- Jayachandran, Prithvi
- Kelly, Bryan
- Knapp, Gregory
- Ludwig, Emily
- Miller, Steven
- Menjivar, Wendy
- Momberger, Carlisle
- Nash, Kevin
- Neustadt, Leah
- Porras, Martin
- Rose, Ryan
- Sharer, Nathaniel
- Starling, Michael
- Tacastacas, Erlein
- Tillinger, Joshua
- Towslee, Jenna
- Varkey, David
- Wang, Kevin
- Watkins, Timothy
- Weaver, Valerie
- Weisberg, Matthew
- Williams, Sherice

ADVISING FIRST YEAR STUDENTS 2012

- Adams, Dylan
- Agrawal, Nikita
- Belew, Devon
- Blanco, Monica
- Cross, Avery
- Dallman, Zachary
- Dawedeit, Connor
- DeFranco, Adam
- Everett, Christopher
- Hitomi, Kei
- Illing, Cyprian
- Kayyali, Sari
- Klein, Skyler
- Plecha, Matthew
- Tasker, Gabriel
- Thomas, Daniel
- Wright, James
- Zheng, Yuxi

SENIOR PROJECTS

Charging Station for Open Source Robot Platform Summer 2014

Horace Wang, Michael Bending, Ikenna Olelewe, Chendi Jin

Development of a charging station for an open source robot platform.

Internet Connected Thermostat Spring 2014

Derrick Tilsner, Garret Burd, Mark Finnegan, Yaxin Luan

Development of an open source network attached thermostat which displays weather data from the National Weather Service.

Open Source Hobbyist Robot Platform Spring 2014
Chendi Jin, Zhexin Qui, Chris Herbst, Colin Chin

Development of an open source robot platform with comparable specifications to commercial platforms that costs 1/10th the price.

DRC Driving Simulator Spring 2014
Neal Aungst, Devin Schwab, John Clark

Development of driving simulator to facilitate the development of driving skills for the ATLAS robot used in the DARPA Robotics Challenge

Workout Sensor Fall 2013
Sparsh Agrawal, Nemanja Raduka, Shehab Hasan, Li Shao

Development of sensor for use in punching bags to measure workout statistics

UAV for Crowd Counting Fall 2012
Will Lounsbury, Harry Labrie, Brian Widman, Rob Gura

Development of a UAV platform for counting people. This project was motivated by the need to easily count the number of people in refugee camps.

Combined Heat and Power for Small Communities Spring 2012
Tyler Allen

Development of a business plan for an installation of combined heat and power for use in a small townhome/condominium community

Indoor UAV Exploration Spring 2011
A.J. Ferrick, Ed Venator, Pat Feeley, Tim Denton

Development of a UAV platform based on parts for radio controlled hobby aircraft to explore an indoor environment. This projects was supported by external funds from the Air Force Research Laboratory Student Challenge program.

TEACHING

ENGR 210: Introduction to Circuits and Instrumentation (Active Learning Format) Fall 2014, Spring 2015
Case Western Reserve University

Modeling and circuit analysis of analog and digital circuits. Fundamental concepts in circuit analysis: voltage and current sources, Kirchhoff's Laws, Thevenin, and Norton equivalent circuits, inductors capacitors, and transformers. Modeling sensors and amplifiers and measuring DC device characteristics. Characterization and measurement of time dependent waveforms. Transient behavior of circuits. Frequency dependent behavior of devices and amplifiers, frequency measurements. AC power and power measurements. Electronic devices as switches.

EECS 376/476: Mobile Robotics Spring 2014, Spring 2015 (Co-Instructor)
Case Western Reserve University

Design of software systems for mobile robot control, including: motion control; sensory processing; localization and mapping; mobile-robot planning and navigation; and implementation of goal-directed behaviors. The course has a heavy lab component involving a sequence of design challenges and competitions performed in teams.

FSNA 137: Volts, Amps, Bits & Bytes (Course Co-Developer) Fall 2012, Fall 2013

Case Western Reserve University

The electrical grid, the computer, biomedical devices, electric vehicles, interactive art, and smart homes are a few examples of the pervasiveness of electronics and computer technology. This discussion-based seminar will introduce the engineering design process, and present the basics of electricity, electronic circuits, measurement, sensors, and microcomputers, and how to use them to design and build useful devices. Students will reverse-engineer products, learn electrical and mechanical prototyping and fabrication techniques, and apply them in a variety of hands-on labs. The seminar will conclude with students proposing, designing, and prototyping projects. These activities will form the foundation of writing and oral presentation assignments designed to build the studentsâĂŹ persuasive argument skills. The seminar will make extensive use of the Sears Design Lab and Think[box] and is writing intensive. Prior experience with electronics is not required for this seminar (but an interest to learn about electronics is essential).

USNA 287B: Electrical and Electronic Devices in Our Lives (Course Developer) Spring 2013

Case Western Reserve University

Electrical circuits and embedded microprocessors control a great many aspects of our daily life including the power grid, medical devices, consumer electronics and infrastructure. This seminar will introduce students to electricity, electrical circuits, measurement, the Arduino microprocessor development platform, the engineering design process and how the above devices work. Laboratory time will allow students to create circuits and programs to interact with and control some aspect of the environment. As part of the course, students will examine how simple errors encountered during laboratory work compare to the errors and oversights which have caused disasters. A project will ask students to design a simple device to address a problem or need and will provide the foundation for writing assignments at the end of the course. Students will make use of the Sears Design Laboratory and the Think[Box] facility.

EECS 600: Special Topics in Haptics and Manipulation Spring 2012 (Co-Instructor)

Case Western Reserve University

Survey of research in haptics and robotic manipulation.

EECS 589: Robotics II Spring 2011, Fall 2011

Case Western Reserve University

Survey of research issues in robotics. Force control, visual servoing, robot autonomy, on-line planning, high-speed control, man/machine interfaces, robot learning, sensory processing for real-time control. Primarily a project-based lab course in which students design real-time software executing on multi-processors to control an industrial robot.

MECH 1208: Introduction to Mechanical Engineering (Course Developer) Spring 2009, Spring 2010

The University of Texas at Dallas

The purpose of this course is to give students a general understanding of the broad range of applications specific to the mechanical engineering profession. Course exercises include team-oriented competitions, lectures by various external mechanical engineering experts, and introductory materials associated with the discipline. Performance of a competitive team design project will occur during the semester.

MECH 1108: Introduction to Engineering (Course Developer) Fall 2008, Spring 2009, Fall 2009

The University of Texas at Dallas

The student will learn what it means to be an engineer. This will include how engineers examine topics, how they learn and how they communicate that information to others. The student will also be exposed to traditional problem and engineering solution integration. Such solution integration will be tied to fundamental sciences (Natural Science and Mathematics), Social Behavioral Science and Aesthetic Arts. At the end of the course, the student will have a beginning understanding of ideas, ideals and processes that will be needed to become an effective engineer.

PROFESSIONAL MEMBERSHIPS

Institute of Electrical and Electronics Engineers (IEEE), *Senior Member* 2014–Present
Institute of Electrical and Electronics Engineers (IEEE), *Member* 2003–2014
American Society of Mechanical Engineers (ASME), *Member* 2008–Present

REFEREED JOURNAL PAPERS

[1] G. Lee and B. Thuraisingham, "Cyberphysical systems security applied to telesurgical robotics," *Computer Standards & Interfaces*, vol. 34, no. 1, pp. 225–229, January 2012.

[2] J. Sanders and G. Lee, "A means to accommodate residual limb movement during optical scanning: A technical note," *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, vol. 16, no. 5, pp. 505–509, October 2008.

[3] J. Sanders, E. Rogers, E. Sorenson, G. Lee, and D. Abrahamson, "CAD/CAM transtibial prosthetic sockets from central fabrication facilities: How accurate are they?" *Journal of Rehabilitation Research and Development*, vol. 44, no. 3, p. 395, 2007.

REFEREED CONFERENCE PAPERS

[1] E. Venator, G. Lee, and W. Newman, "Hardware and software architecture of ABBY: An industrial mobile manipulator," in *Proc. of the IEEE International Conference on Automation Science and Engineering (CASE)*, August 2013.

[2] S. Cockrell, G. Lee, and W. Newman, "Determining navigability of terrain using point cloud data," in *Proc. of the IEEE International Conference on Rehabilitation Robotics (ICORR)*, June 2013.

[3] A. Smith, G. Lee, and W. Newman, "Analysis of hybrid fuel-cell/Stirling-engine systems for domestic combined heat and power," in *Proc. of the IEEE EnergyTech Conference (EnergyTech)*, May 2012.

[4] A. Ferrick, E. Venator, and G. Lee, "Bitmap based algorithms for UAV aviation," in *Proc. of the IEEE International Conference on Technologies for Practical Robot Applications (TePRA)*, April 2012.

[5] J. Vick, G. Lee, and T. Campbell, "Characteristics of 3D EMA tongue shapes for five consonants," Presented at American Speech-Language Hearing Association Annual Convention, November 2012.

[6] G. Lee and B. Thuraisingham, "Differences in Fitts' law task performance based on environment scaling," in *Proceedings Haptics: Perception, Devices and Scenarios (EuroHaptics)*, vol. 5024, 2008, pp. 295–300.

[7] G. Lee and B. Hannaford, "Anisotropies of touch in haptic icon exploration," in *Proceedings Intelligent Robots and Systems (IROS)*, vol. 3, 2003, pp. 2713–2717.

[8] G. Lee and B. Hannaford, "Preliminary two dimensional haptic thresholds and task performance enhancements," in *Proc. of the Haptic Interfaces for Virtual Environment and Teleoperator Systems Symposium (Haptics Symposium)*, 2003, pp. 85–90.

[9] J. Dosher, G. Lee, and B. Hannaford, "How low can you go? detection thresholds for small haptic effects," in *Proc. of the USC Workshop on Haptic Interactions: Touch in Virtual Environments*, 2001.

BOOK CHAPTERS

[1] J. Dosher, G. Lee, and B. Hannaford, "Detection thresholds for small haptic effects," in *Touch in Virtual Environments: Haptics and the Design of Interactive Systems*. Prentice Hall PTR, 2001.

PRESENTATIONS

[1] J. Vick and G. Lee, "Lingual kinematics: Developmental and consonantal differences in 10-15 year old children," Presented at Motor Speech Conference, February 2014.

[2] J. Vick, M. Foye, N. Schreiber, R. Mental, and G. Lee, "Lingual kinematics during consonant production in older children with persistent speech disorders," Presented at the Annual Convention of the American Speech Language Hearing Association, November 2014.

[3] J. Vick, M. Foye, N. Schreiber, and G. Lee, "Tongue motion characteristics during vowel production in older children and adults," Poster presented at the 168th Meeting of The Acoustical Society of America, October 2014.

PATENTS

[1] J. Sanders, E. Sorenson, J. Levine, J. Fergason, G. Lee, Z. Santosh, Y. Wang, and P. Yager, "Assessment of tissue response to stress," U.S. Patent Application 12/510,115, July 27, 2009.

INVITED TALKS

Robotic Operation in Structured Environments in Health Care — April, 2014
Case Western Reserve, School of Nursing — Cleveland, OH

Security and Scene Scaling in Surgical Robots — May, 2010
Case Western Reserve University, Department of Electrical Engineering — Cleveland, OH

Secure ITP: Securing Surgical Robots as Cyberphysical Systems — June, 2009
Workshop of Future Directions of Cyber-Physical Systems — Newark, NJ