

# Me Too

Department of Mechanical Engineering  
Laboratory for Computational Sensing and Robotics  
Johns Hopkins University  
xxx Hackerman Hall, 3400 N Charles Street, Baltimore, MD 21218  
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EDUCATION	<b>Ph.D., Mechanical Engineering</b> Johns Hopkins University Dissertation: Characterization of Human Perception Using Haptic Systems and Implications for Upper-Limb Prosthetics Advisor: Dr. xxx Thesis Committee Members: Dr. xxx (Mechanical Engineering) Dr. xxx (Mechanical Engineering) Dr. xxx (Neuroscience) Dr. xxx (Psychological and Brain Sciences)	2010
	<b>M.S., Mechanical Engineering</b> Johns Hopkins University Specialization: Robotics, Controls	2007
	<b>B.S.E., Mechanical Engineering, <i>Cum Laude Society</i></b> University of Pennsylvania Thesis: Determination of Human Dynamics in a Pivot Turn Advisors: Dr. xxx (Neuroscience) Dr. xxx (Mechanical Engineering)	2004
POSITIONS HELD	Postdoctoral Fellow Johns Hopkins University Advisor: Dr. xxx	2010 - Present
	Research Assistant Johns Hopkins University Advisor: Dr. xxx	2004 - 2010
RESEARCH INTEREST	My research interest is to take an interdisciplinary approach, combining theoretical robotic analysis and design with human modeling and neuroscience, to improve robotic systems that will either assist humans or improve our understanding of how humans sense.	
AWARDS AND HONORS	NSF Graduate Research Fellowship Dean's Fellowship, JHU Whiting School of Engineering Jacob M. Abel Undergraduate Summer Research Internship, UPenn John & Lillian Neff Scholarship, UPenn	2006 - 2010 2004 - 2009 2003 2000 - 2004

RESEARCH  
EXPERIENCE

**Characterization of Stiffness Perception**

2009 - Present

Johns Hopkins University, *Haptics Laboratory*

Proposed a mechanism for how humans create an internal model of the external world when interacting with springs. The model describes human stiffness perception as a combination of force and position sensing capabilities, and it was shown to be a plausible mechanism for how stiffness perception occurs.

**Proprioceptive Feedback for Prosthetics**

2006 - Present

Johns Hopkins University, *Haptics Laboratory*

Created a robotic system and conducted human subjects studies to investigate the role of visual motion and proprioceptive motion cues during motion control and spring discrimination tasks. Results showed proprioceptive motion improves success rate during a targeting task and is perceived as more useful than visual motion feedback during a spring discrimination task. Then investigated ability of skin stretch device to artificially relay proprioceptive information. Testing showed that relaying proprioceptive information artificially using a skin stretch device gives comparable performance to using natural proprioceptive motion cues and visual motion cues in a spring discrimination task.

**Vibratory Feedback to the Foot for Prosthetics**

2006 - 2009

Johns Hopkins University, *Haptics Laboratory*

Designed an experimental setup and ran a human subjects study to investigate the possibility of providing upper-limb prosthesis users tactile feedback, by displaying vibrations to the foot. Results indicate that vibration feedback to the foot enables environment discrimination comparable to that of the fingertip.

**Human Performance in a Knob-Turning Task**

2004 - 2007

Johns Hopkins University, *Haptics Laboratory*

Created a robotic system and designed a human subject study to investigate user strategies in a knob-turning task. Results from this study indicate that humans change their turning strategy depending on the knob-turning difficulty, and apply forces and torques in directions that are not conducive to the task.

**Analysis of Human Movement**

2003 - 2004

University of Pennsylvania, *Vestibular Ocular Motor Research Laboratory*

Revised a human turning model to be more mathematically and anatomically accurate, did biomechanical testing, and created a simulation that supported my hypothesized turning model.

**Determination of Flow Patterns in Uterine Model**

2002

Tel Aviv University, *Biofluids Lab*

Performed biofluid study to analyze flow patterns in a uterine model upon injection of a dye.

PUBLICATIONS

**Journal**

[J1] **N. Gurari**, K. J. Kuchenbecker, and A. M. Okamura, *Discrimination of Springs with Visual and Proprioceptive Motion Cues*. [In Preparation for Nov 2010 Submission]

[J2] **N. Gurari**, J. Wheeler, A. Shelton, and A. M. Okamura, *Discrimination of Springs with Natural and Artificial Position and Motion Cues*. [In Preparation for Dec 2010 Submission]

[J3] **N. Gurari**, K. J. Kuchenbecker, A. Shelton, S. Hsiao, and A. M. Okamura, *Characterization of Position, Force, and Stiffness Perception Using Psychophysics Testing and a Novel Perception Model*. [In Preparation for Jan 2011 Submission]

[J4] A. Wu, **N. Gurari**, C. Montojo, and A. M. Okamura, *Novel Haptic Skin Slip Feedback Mechanism to Toe*. [In Preparation for Jan 2011 Submission]

### Refereed Conference

[R1] **N. Gurari**, K. Smith, M. Madhav, and A. M. Okamura, *Environment Discrimination with Vibration Feedback to the Foot, Arm, and Fingertip*. Proceedings of the 11th International Conference on Rehabilitation Robotics (ICORR), pp. 343-348, 2009.

[R2] **N. Gurari**, K. J. Kuchenbecker, and A. M. Okamura, *Stiffness Discrimination with Visual and Proprioceptive Cues*. Proceedings of the Third Joint Eurohaptics Conference and Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems (World Haptics), pp. 121-126, 2009.

[R3] J. Tapson, **N. Gurari**, J. Diaz, E. Chicca, D. Sander, P. Pouliquen, and R. Etienne-Cummings, *The Feeling of Color: A Haptic Feedback Device for the Visually Disabled*. Proceedings of the Biomedical Circuits and Systems Conference (BiOCAS), pp. 381-384, 2008.

[R4] K. J. Kuchenbecker, **N. Gurari**, and A. M. Okamura, *Effects of Visual and Proprioceptive Motion Feedback on Human Control of Targeted Motion*. Proceedings of the 10th International Conference on Rehabilitation Robotics (ICORR), pp. 513-524, 2007.

[R5] **N. Gurari** and A. M. Okamura, *Human Performance in a Knob-Turning Task*. Proceedings of the Second Joint Eurohaptics Conference and Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems (World Haptics), pp. 96-101, 2007.

### Short Refereed Conference

[S1] K. J. Kuchenbecker, **N. Gurari**, and A. M. Okamura, *Quantifying the Value of Visual and Haptic Position Feedback During Force-Based Motion Control*. Proceedings of the Second Joint Eurohaptics Conference and Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems (World Haptics), pp. 561-562, 2007.

### Dissertation/Thesis

[D1] **N. Gurari**, *Characterization of Human Perception Using Haptic Systems and Implications for Upper-Limb Prosthetics*. Doctoral Dissertation, Department of Mechanical Engineering, Johns Hopkins University, 2010.

[D2] **N. Gurari**, *Locomotion and Vestibular Ocular Motor Control*. Bachelor of Science in Engineering Thesis, Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, 2003.

### PRESENTATIONS

#### Technical Talks

*Characterization of Human Perception Using Haptic Systems and Implications for Upper-Limb Prosthetics*. Dissertation Defense, Department of Mechanical Engineering, Johns Hopkins University, Maryland, USA, Oct 15, 2010.

*Characterization of Human Sensing Capabilities for Improved Upper-Limb Prosthesis Use.* One of two JHU graduate students selected to give a high-level presentation of the PhD research to the general JHU community, Lattman Graduate Student Community Lecture Series, Maryland, USA, Apr 14, 2010.

*Human Performance in a Knob-Turning Task.* Paper Presentation, Second Joint Eurohaptics Conference and Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems (World Haptics), Tsukuba, Japan, Mar 22, 2007.

### **Educational Outreach Talks**

*Leading Labs: Engineering.* Lecture to incoming graduate students, JHU Teaching Assistant Orientation, Johns Hopkins University, Maryland, USA, Sep 3, 2008.

*Get a Grip!* Break Out Session Leader – presentation to primarily middle school females, Computer Mania Day, University of Maryland, Maryland, USA, Apr 9, 2005.

### **Hands-On Demonstrations**

*Comparing visual and haptic position feedback.* K. J. Kuchenbecker, **N. Gurari**, and A. M. Okamura, hands-on demonstration presented at IEEE World Haptics Conference, Tsukuba, Japan, Mar 23, 2007.

*Get a Grip!* **N. Gurari**, P. Marayong, and S. Saha, hands-on demonstration of the Impulse Engine 2000 and Phantom Omni presented at Computer Mania Day, Maryland, USA, Apr 9, 2005.

### TEACHING EXPERIENCE

**Teaching Assistant**, JHU, Electronics & Instrumentation 2008

Level of Course: Sophomore Undergraduate

Primary Instructor: Dr. xxx

Student Evaluations:

Effectiveness in helping students learn course material: 4.67/5

Genuine interest in students' progress in the course: 4.67/5

Organization of laboratory sessions: 4.78/5

Thoroughness of answers to student questions: 4.75/5

Clear and understandable voice: 4.89/5

Role: Instructed weekly lab sessions, graded lab reports, held office hours, and lectured three classes.

**Teaching Assistant**, JHU, Design and Analysis of Dynamic Systems 2006

Level of Course: Junior Undergraduate

Primary Instructor: Dr. xxx

Student Evaluations:

Effectiveness in helping students learn course material: 4.2/5

Genuine interest in students' progress in the course: 4.25/5

Thoroughness of answers to student questions: 4.5/5

Role: Held office hours, conducted problem solving sessions, graded homework, wrote homework solutions, and lectured one class.

**Academic Tutor** 2002 - 2003

University of Pennsylvania

Topics: Calculus I, II, and Hebrew

MENTORING  
EXPERIENCE

**Undergraduate Student Research Mentor**

Haptic Feedback through Toe Stimulation, JHU 2008 - Present  
Mentoring undergraduate student, **xxx**, in completing the design of an experimental set up, running a human subject study, analyzing the results, and publishing the findings.

Vibratory Feedback to the Foot for Prosthetics, JHU 2008 - 2009  
Mentored undergraduate students, **xxx**, in completing the design of an experimental set up, running a human subject study, analyzing the results, and publishing the findings.

Vibratory Feedback to the Foot for Prosthetics, JHU 2007 - 2008  
Mentored undergraduate student, **xxx**, in designing an experimental set up and human subject study.

Skin Stretch Feedback to the Forearm for Prosthetics, JHU 2007  
Mentored undergraduate student, **xxx**, in the design of a skin stretch feedback device for artificially relaying proprioceptive information to upper-limb prosthesis users.

**High School Student Research Mentor** 2006

Haptic Museum Display, JHU  
Mentored two high school students consecutively in designing and building an educational haptic device to be displayed in a museum.

SPECIALTY  
EXTENDED  
WORKSHOPS  
/SCHOOLS  
/COURSES  
ATTENDED

**Telluride Neuromorphic Cognition Engineering Workshop** 2008  
3-week complete immersion workshop focused on neuromorphic engineering. Researchers from academia, industry, and national laboratories worked together on neurobiological and engineering aspects of sensory systems and sensory-motor integration.

**JHU Teaching Assistant Training Workshops** 2006  
Lectures and panels on a broad range of topics offered throughout the semester.

**Surgery For Engineers** 2005  
Semester long course that teaches fundamental skills and operative procedures for general surgery through lectures and laboratory sessions. Exposure to both traditional and innovative operating room environments, as well as basic surgical procedure techniques.

PROFESSIONAL  
ACTIVITIES

**Leadership Activities**

LCSR Graduate Student Committee, JHU, *Haptics Lab Representative* 2007 - 2010  
Women of Whiting, JHU, *Panel Chair* 2007 - 2009  
Women of Whiting, JHU, *Peer Advisor* 2006 - 2009  
Haptics Laboratory, JHU, *Manager of Human Subjects Protocols* 2006 - 2009  
Women of Whiting, JHU, *Social Chair* 2006  
Haptics Laboratory, JHU, *Demonstration Coordinator* 2005 - 2006  
Haptics Laboratory, JHU, *Web Master* 2004 - 2005  
Society of Bioengineering, UPenn, *Sophomore Class Representative* 2001 - 2002

### Outreach Events

Science-Engineering-Technology Congressional Visits Days	2010
Engineers Without Borders, <i>JHU South Africa Team Volunteer</i>	2010
JHU Teaching Assistant Orientation, <i>Panel Member</i>	2008
Women of Whiting, <i>WISE Panel Speaker</i>	2006
Ready, Set, Design!, <i>Volunteer</i>	2006
Surgical Lego Competition, <i>Volunteer</i>	2005
New Bike's Works, <i>Volunteer</i>	2001 - 2002

### Technical Reviews

Haptics Symposium	2010
World Haptics (w/ Peer)	2009
IEEE International Conference on Robotics & Automation (w/ Advisor)	2009
IEEE Transactions on Systems, Man, & Cybernetics (w/ Advisor)	2008
IEEE International Conference on Robotics & Automation (w/ Advisor)	2007
Eurohaptics (w/ Advisor)	2006

### Professional Memberships

Society for Neuroscience	2008 - Present
Technical Committee on Haptics	2007 - Present
Institute of Electrical and Electronics Engineers	2006 - Present
Pi Tau Sigma, Mechanical Engineering Honor Society	2004 - Present
Engineers Without Borders – USA	2009 - 2011
Women of Whiting, JHU Engineering School Women's Support Group	2005 - 2009
CISSRS Student Computer Integrated Surgery Society, JHU	2004 - 2005
Society of Bioengineering, UPenn Undergraduate BE Society	2001 - 2002

### EXTRACURRICULAR ACTIVITIES

Outdoors Activities and Traveling Enthusiast	
Capoeirista, <i>Responsibilities included Instructor and Group Leader</i>	2002 - Present
Marathon Training, <i>2002 Columbus Marathon</i>	2002
Varsity Gymnastics Team, <i>UPenn Team Member</i>	2000 - 2001
9th Pan American Maccabi Games, <i>USA Gymnastics Team Member</i>	1999

### PERSONAL

Date of Birth: xxx  
Place of Birth: xxx  
Citizenships: xxx  
Languages:  
- Fluency: English (Native Language), Hebrew  
- Proficiency: Russian, Spanish  
- Working Knowledge: Polish, Portuguese