Netta Gurari

gurari@vt.edu

Curriculum vitae last updated on June 13, 2024

Research Interest

I direct the Robotics and Sensorimotor Control Laboratory at Virginia Tech, which investigates how humans perceive somatosensory signals at their upper limbs. This research is executed through behavioral studies and achieved by integrating tools from the areas of robotics, cognitive neuroscience, electrophysiology, neuroimaging, and clinical care. The overarching mission of my research is to translate my basic science findings to the clinical setting to improve the assessment and rehabilitation of sensorimotor impairments in individuals post brain injury. Aligned with this aim, I am first investigating possible reasons for sensorimotor impairments. Following, I intend to develop therapies with the goal of improving an individual's sensorimotor function. Areas of interest/expertise in my group include:

Populations:	stroke, cerebral palsy, upper-limb amputees
Impairments:	sensory, perceptual, and motor as relevant to movement
Techniques:	robotics, psychophysics, sensory substitution, electrophysiology (e.g., EMG, EEG), biophysical signal processing, neuroimaging (e.g., DTI)

Education

Ph.D., Mechanical Engineering — Dec 2010
Johns Hopkins University
Dissertation: Characterization of Human Perception Using Haptic Systems and Implications for Upper-Limb Prosthetics
Advisor:
- Dr. Allison Okamura (Mechanical Engineer)

Committee Members:
- Dr. Allison Okamura (Mechanical Engineer)
- Dr. Steven Hsiao (Neurophysiologist)
- Dr. Amy Shelton (Cognitive Psychologist/Cognitive Neuroscientist)
- Dr. Katherine Kuchenbecker (Mechanical Engineer)

M.S.E., Mechanical Engineering — May 2007
Johns Hopkins University
Specialization: Robotics, Controls

B.S.E., Mechanical Engineering and Applied Mechanics — May 2004
Cum Laude Society
University of Pennsylvania
Thesis: Determination of Human Dynamics in a Pivot Turn
Advisors:
- Dr. David Solomon (Neurobiologist)
- Dr. Vijay Kumar (Mechanical Engineer)

Positions Held

Assistant Professor — Blacksburg, USA — Aug 2022 - Present
Virginia Polytechnic Institute and State University
Department of Biomedical Engineering and Mechanics

Adjunct Assistant Professor — Chicago, USA — Aug 2022 - Present
Northwestern University
Department of Physical Therapy and Human Movement Sciences

Research Assistant Professor Chicago, USA Jun 2020 - Aug 2022
Northwestern University
Department of Mechanical Engineering (Courtesy Appointment)

Research Assistant Professor Chicago, USA Apr 2017 - Aug 2022
Northwestern University
Department of Physical Therapy and Human Movement Sciences

Research Associate Chicago, USA Oct 2014 - Mar 2017
Northwestern University
Department of Physical Therapy and Human Movement Sciences
Advisor: Dr. Julius Dewald (Neurophysiologist/Biophysicist/
Physical Therapist)

Postdoctoral Research Associate Genoa, Italy Mar 2012 - Mar 2014
Istituto Italiano di Tecnologia
Department of Robotics, Brain, and Cognitive Sciences
Advisor: Dr. Gabriel Baud-Bovy (Experimental Psychologist/
Computer Scientist)

Postdoctoral Research Associate Baltimore, USA Jun 2011 - Nov 2011
Johns Hopkins University
Department of Mechanical Engineering
Advisor: Dr. Allison Okamura (Mechanical Engineer)

Research Assistant Baltimore, USA Sep 2004 - Dec 2010
Johns Hopkins University
Department of Mechanical Engineering
Advisor: Dr. Allison Okamura (Mechanical Engineer)

Undergraduate Researcher Philadelphia, USA Jan 2003 - May 2004
University of Pennsylvania
Department of Neurology and Otolaryngology
Advisor: Dr. David Solomon (Neurobiologist/Physician)

Undergraduate Researcher Tel Aviv, Israel Jun 2002 - Aug 2002
Tel Aviv University
Department of Biomedical Engineering
Advisor: Dr. David Elad (Biomedical Engineer)

Awards and Honors

Virginia Tech Graduate School Faculty Mentor of the Month (October)	2023
Northwestern University Office of Undergraduate Research Faculty Honor Roll	2022
American Society of Neurorehabilitation Training in Grantsmanship for Rehabilitation Research Travel Award	2022
Fletcher Prize for Excellence in Research Mentorship	2021 (Summer)
Fletcher Prize for Excellence in Research Mentorship *(Finalist)*	2021 (Spring)
Karl Rosengren Faculty Mentoring Award	2020
National Institutes of Health Career Development Award	2018 - 2023
Bexley High School Judah Folkman Scientist-in-Residence	2017
BexTalks Inaugural Speaker	2016
National Science Foundation Graduate Research Fellow	2006 - 2008, 2010
Johns Hopkins University Whiting School of Engineering Dean's Fellow	2004 - 2009
Jacob M. Abel Undergraduate Summer Internship Award	2003
John and Lillian Neff Endowed Scholar	2000 - 2004

Grants and Fellowships

Current

Title: Educating Students on Stakeholder Perspectives Following Brain Injury — 2024 - 2026
PI: Netta Gurari
Amount Awarded: 75,000 USD
Funding Source: Dana Foundation

Title: Development of a Southwest Virginia Stroke Registry — 2023 - 2025
PI: Kevin Parcetich
Role: Co-Investigator
Amount Awarded: 10,000 USD
Funding Source: Radford University SEED Grant Program

Completed

Title: Educating Students on Stakeholder Perspectives to NeuroRehabilitation — 2024
PI: Netta Gurari
Amount Awarded: 7,491 USD
Funding Source: Virginia Tech Institute for Society, Culture, and Environment

Title: New Faculty Mentoring Grant — 2023
PI: Netta Gurari
Amount Awarded: 1,500 USD
Funding Source: Virginia Tech Office of the Provost

Title: Tactile Deficits in Individuals with Stroke — 2022 - 2024
PI: Netta Gurari
Amount Awarded: 80,000 USD
Funding Source: Virginia Tech Institute for Critical Technology and Applied Science Junior Faculty Program

Title: Design and Development of a Study to Investigate Torque Perception in Young Children — 2021
PI: Netta Gurari
Amount Requested: 7,500 USD
Funding Source: Northwestern University Undergraduate Research Assistant Program (999URAP1319908)

Title: Development of an Electromechanically-Controlled Tactile Stimulator for Assessing Perception at the Fingertip — 2021
PI: Netta Gurari
Amount Requested: 3,500 USD
Funding Source: Northwestern University Undergraduate Research Assistant Program (999URAP1318855)

Title: Determination of the Recruitment of Indirect Motor Pathways in Chronic Hemiparetic Stroke — 2019 - 2023
PIs: Yuan Yang & Julius P.A. Dewald
Role: Co-Investigator
Amount Awarded: 416,079 USD
Funding Source: National Institutes of Health, Eunice Kennedy Shriver National Institute of Child Health & Human Development (R21HD099710)

Title: Accuracy of Judging Elbow Torques During a Multi-Joint Task in Individuals with Hemiparetic Stroke — 2019 - 2020
PI: Netta Gurari
Amount Awarded: 2,250 USD
Funding Source: Northwestern University Undergraduate Research Assistant Program (999URAP13166020)

Title: Upper-Extremity Torque Perceptual Impairments in Chronic Hemiparetic Stroke — 2018 - 2024
PI: Netta Gurari
Amount Awarded: 696,105 USD
Funding Source: National Institutes of Health, Eunice Kennedy Shriver National Institute of Child Health & Human Development (K25HD096116)

Title: Enhancing Stroke Rehabilitation with a Novel Tactile Feedback Device — 2013 - 2016
Co-PIs: Netta Gurari, Alberto Ansaldo, Michela Bassolino
Amount Awarded: 200,000 Euro
Funding Source: Istituto Italiano di Tecnologia, Department of Robotics, Brain, and Cognitive Sciences

Title: Kinematic and Dynamic Errors in Teleoperator Systems — 2006 - 2008, 2010
PI: Netta Gurari
Amount Awarded: 121,500 USD
Funding Source: National Science Foundation Graduate Research Fellowship Program (NSF GRFP)

Title: Dean's Fellowship — 2004 - 2009
PI: Netta Gurari
Amount Awarded: 181,200 USD
Funding Source: Johns Hopkins University, Whiting School of Engineering

Title: Locomotion and Vestibular Ocular Motor Control — 2003
PI: Netta Gurari
Amount Awarded: 4,000 USD
Funding Source: Jacob M. Abel Undergraduate Summer Research Internship, University of Pennsylvania, Department of Mechanical Engineering and Applied Mechanics

Title: John and Lillian Neff Endowed Scholarship — 2000 - 2004
PI: Netta Gurari
Amount Awarded: 85,200 USD
Funding Source: University of Pennsylvania

Publications

Peer-Reviewed Journal Publications

[J1] A. P. Paul, K. Nayak, L. C. Sydnor, N. Kalantaryardebily, K. M. Parcetich, D. G. Miner, Q. E. Wafford, J. E. Sullivan, and **N. Gurari**, *A Scoping Review on Examination Approaches for Identifying Tactile Deficits at the Upper Extremity in Individuals with Stroke.* Journal of Neuroengineering and Rehabilitation, 2024. [In Press]

[J2] N. Cai, J. P.A. Dewald, and **N. Gurari**, *Individuals with Hemiparetic Stroke Abnormally Perceive their Elbow Torques when Abducting their Paretic Shoulder.* Clinical Neurophysiology, vol 156, pp. 38-46, 2023.

[J3] N. Cai, E. G. Medina, A. Duong, S. Gonzalez, and **N. Gurari**, *Impact of Arm Dominance and Location on Detecting Electrical Stimuli during Voluntary Motor Activation in Older Adults.*

IEEE Transactions on Haptics, vol 16, issue 4, pp. 484-490, 2023.

[J4] M. D. Ellis, **N. Gurari**, N. T.A. Gerritsen, S. M. Lee, A. Wang, and J. P.A. Dewald, *Shear Wave Ultrasound Elastography of the Biceps Brachii can be used as a Precise Proxy for Passive Elbow Torque in Individuals with Hemiparetic Stroke.* Physiological Reports, vol 11, issue 10, 2023.

[J5] N. Cai and **N. Gurari**, *Perception of Torque is Impacted by a Subset of Features Related to the Central Motor Command.* IEEE Transactions on Haptics, vol 16, issue 2, pp. 194-203, 2023.

[J6] J. R. Patterson, J. P.A. Dewald, J. M. Drogos, and **N. Gurari**, *Impact of Voluntary Muscle Activation on Stretch Reflex Excitability in Individuals with Hemiparetic Stroke.* Frontiers in Neurology — Stroke, vol 13, article 764650, 2022.

[J7] **N. Gurari**, J. M. Drogos, and J. P.A. Dewald, *Investigation of how Accurately Individuals with Hemiparetic Stroke can Mirror their Forearm Positions.* PLOS ONE, vol 16, issue 4, 2021.

[J8] N. Cai, J. P.A. Dewald, and **N. Gurari**, *Accuracy in Judging Self-Generated Elbow Torques During Multi-Joint Isometric Tasks.* Scientific Reports, vol 10, article 13011, 2020.

[J9] Y. Yang, N. Sinha, R. Tian, **N. Gurari**, J. M. Drogos, and J. P.A. Dewald, *Quantifying Altered Neural Connectivity of the Stretch Reflex in Chronic Hemiparetic Stroke.* IEEE Transactions on Neural Systems and Rehabilitation Engineering, vol 28, issue 6, pp. 1436-1441, 2020.

[J10] N. Cai, J. M. Drogos, J. P.A. Dewald, and **N. Gurari**, *Individuals with Hemiparetic Stroke can Accurately Judge their Self-Generated Elbow Torques.* Frontiers in Neuroscience, vol 13, article 1293, 2019.

[J11] **N. Gurari**, N. A. van der Helm, J. M. Drogos, and J. P.A. Dewald, *Accuracy of Individuals Post-Hemiparetic Stroke in Matching Torques Between Arms Depends on the Arm Referenced.* Frontiers in Neurology, vol 10, article 921, 2019.

[J12] **N. Gurari**, J. M. Drogos, and J. P.A. Dewald, *Ability of Individuals with Chronic Hemiparetic Stroke to Locate their Forearms during Single-Arm and Between-Arms Tasks.* PLOS ONE, vol 13, issue 10, pp. 1-24, 2018.

[J13] **N. Gurari**, J. M. Drogos, S. Lopez, and J. P.A. Dewald, *Impact of Motor Task Execution on an Individual's Ability to Mirror Forearm Positions.* Experimental Brain Research, vol 236, issue 3, pp. 765-777, 2018.

[J14] **N. Gurari**, A. M. Okamura, and K. J. Kuchenbecker, *Perception of Force and Stiffness in the Presence of Low-Frequency Haptic Noise.* PLOS ONE, vol 12, issue 6, pp. 1-26, 2017.

[J15] **N. Gurari**, J. M. Drogos, and J. P.A. Dewald, *Individuals with Chronic Hemiparetic Stroke can Correctly Match Forearm Positions Within a Single Arm.* Clinical Neurophysiology, vol 128, issue 1, pp. 18-30, 2017.

[J16] **N. Gurari** and G. Baud-Bovy, *Customization, Control, and Characterization of a Commercial Haptic Device for High-Fidelity Rendering of Weak Forces.* Journal of Neuroscience Methods, vol 235, pp. 169-180, 2014.

[J17] **N. Gurari**, K. J. Kuchenbecker, and A. M. Okamura, *Perception of Springs with Visual and Proprioceptive Motion Cues: Implications for Prosthetics.* IEEE Transactions on Human-Machine Systems, vol 43, issue 1, pp. 102-114, 2013.

Under Review with Peer-Reviewed Journals

[1] E. M. Tirrell, A. C. Feldbush, L. C. Sydnor, N. KalantaryArdebily, C. Grubb, **N. Gurari**, *Impact of Arm Dominance, Nerve, and Location on Consciously Detecting Electrotactile Stimuli.*

Book Chapter

[B1] **N. Gurari** and A. M. Okamura, *Compliance Perception using Natural and Artificial Motion Cues.* In Massimiliano Di Luca, editor, Multisensory Softness: Perceived Compliance from Multiple Sources of Information, chapter 10, pp. 189-217, Springer, July 2014.

Peer-Reviewed Conference Publications

[C1] N. Cai, E. G. Medina, A. Duong, S. Gonzalez, and **N. Gurari**, *Impact of Arm Dominance and Location on Detecting Electrical Stimuli during Voluntary Motor Activation in Older Adults.* IEEE World Haptics Conference, 2023. (Accepted for Oral Presentation)

[C2] N. Cai, P. Cherepanova, and **N. Gurari**, *Impact of Abducting at the Shoulder on Perceiving Torques about the Elbow.* IEEE World Haptics Conference, 2021. (Accepted for Oral Presentation)

[C3] A. Mandana, N. Cai, N. Reddy, and **N. Gurari**, *Development of a Training Game to Coordinate Torques Produced Between Arms.* Proceedings of the 16th International Conference on Rehabilitation Robotics (ICORR), pp. 447-452, 2019. (Accepted for Oral Presentation)

[C4] *N. A. van der Helm, ****N. Gurari**, J. M. Drogos, and J. P.A. Dewald, *Task Directionality Impacts the Ability of Individuals with Chronic Hemiparetic Stroke to Match Torques Between Arms: Preliminary Findings.* Proceedings of the 15th International Conference on Rehabilitation Robotics (ICORR), pp. 714-719, 2017. *N. A. van der Helm and **N. Gurari** equally contributed to this work.

[C5] *E. J. Euving, ****N. Gurari**, J. M. Drogos, S. Traxel, A. H.A. Stienen, and J. P.A. Dewald, *Individuals with Chronic Hemiparetic Stroke Correctly Match Forearm Position Within a Single Arm: Preliminary Findings.* In International Conference on Human Haptic Sensing and Touch Enabled Computer Applications (Eurohaptics), Springer International Publishing, pp. 122-132, 2016. (Acceptance Rate for Oral Presentation = 22%) *E. J. Euving and **N. Gurari** equally contributed to this work.

[C6] F. Tatti, **N. Gurari**, and G. Baud-Bovy, *Static Force Rendering Performance of Two Commercial Haptic Systems.* In International Conference on Human Haptic Sensing and Touch Enabled Computer Applications (Eurohaptics), Springer Berlin Heidelberg, pp. 342-350, 2014.

[C7] **N. Gurari**, J. Wheeler, A. Shelton, and A. M. Okamura, *Discrimination of Springs with Vision, Proprioception, and Artificial Skin Stretch Cues.* In International Conference on Human Haptic Sensing and Touch Enabled Computer Applications (Eurohaptics), Springer International Publishing, pp. 160-172, 2012. (Acceptance Rate for Oral Presentation = 24%)

[C8] A. Cheng, K. Nichols, H. Weeks, **N. Gurari**, and A. M. Okamura, *Conveying the Configuration of a Virtual Human Hand Using Vibrotactile Feedback.* Proceedings of the Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems (Haptics Symposium), pp. 155-162, 2012. (Acceptance Rate for Oral Presentation = 26%)

[C9] **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.

[C10] **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. (Overall Acceptance Rate = 55%)

[C11] 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.

[C12] 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.

[C13] **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. (Acceptance Rate for Oral Presentation = 32%)

[C14] 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 Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems (Haptics Symposium), pp. 561-562, 2007. (Overall Acceptance Rate = 73%)

Peer-Reviewed Extended Abstract and Work-In-Progress Publications

[W1] N. M. Cai, C. Guzman, and **N. Gurari**, *Accuracy in Judging Self-Generated Elbow Torques during Multi-Joint Isometric Tasks: Preliminary Findings.* Proceedings of the IEEE Haptics Symposium, 2020.

[W2] **N. Gurari** and G. Baud-Bovy, *Design of a Joystick with an Adjustable Damper to Study Kinematically Constrained Movements made by Children.* Proceedings of the IEEE Haptics Symposium, pp. 103-105, 2014. (Acceptance Rate for Oral Presentation = 27%)

Peer-Reviewed Abstract Publications

[A1] A. P. Paul, K. Nayak, L. Sydnor, N. Kalantaryardebily, K. M. Parcetich, D. G. Miner, Q. E. Wafford, J. E. Sullivan, and **N. Gurari**, *Tactile Examination at the Upper Extremity in Individuals with Stroke: A Scoping Review for Engineers.* American Society for Neurorehabilitation, 2024.

[A2] K. Nayak, L. Sydnor, N. Kalantaryedibly, K. Parcetich, A. Paul, D. Miner, Q. E. Wafford, J. E. Sullivan, and **N. Gurari**, *Assessments for Identifying Tactile Deficits at the Upper Extremity of Individuals with Stroke: Preliminary Results of a Scoping Review.* Chicago Undergrad Research Symposium, 2023.

[A3] K. Nayak, L. Sydnor, N. Kalantaryedibly, K. Parcetich, A. Paul, D. Miner, Q. E. Wafford, J. E. Sullivan, and **N. Gurari**, *Assessments for Identifying Tactile Deficits at the Upper Extremity of Individuals with Stroke: Preliminary Results of a Scoping Review.* Carilion Clinic 16th Annual Research Day, 2023.

[A4] E. Tirrell, **N. Gurari**, S. Ramey, S. DeLuca, *A Novel Approach for Assessing Sensorimotor Deficits in Children with Cerebral Palsy: Preliminary Findings.* Carilion Clinic 16th Annual Research Day, 2023.

[A5] B. Frizzle, J. Greenway, E. Lyle, T. Scott, E. Medina, **N. Gurari**, and K. Parcetich Jr., *Considerations for Stroke-Related Recruitment in Small Urban and Rural Settings.* Waldron College Interprofessional Symposium, 2023.

[A6] N. M. Cai, J. P.A. Dewald, and **N. Gurari**, *Individuals with Hemiparetic Stroke Abnormally Perceive their Elbow Torques when Abducting their Paretic Shoulder.* American Society of Neurorehabilitation, 2023.

[A7] M. H. Sohn, **N. Gurari**, J. R. Patterson, J. M. Drogos, and J. P.A. Dewald, *Spasticity without Stretch: A Simple EMG-Based Hypertonia Measure as a Practical Surrogate of Motoneuron and Associated Stretch Reflex Excitability in Individuals with Hemiparetic Stroke.* Neuroscience, 2022.

[A8] N Cai, A. Duong, E. Medina, and **N. Gurari**, *Voluntary Muscle Activation Increases the Threshold at which an Electrical Stimulus is Detected Post-Hemiparetic Stroke: Preliminary Findings.* American Society of Neurorehabilitation, 2022.

[A9] N Cai, E. Medina, S. Gonzalez, A. Duong, and **N. Gurari**, *Effects of Volitional Activity on Detecting a Tactile Stimulus in Individuals Post-Hemiparetic Stroke: A Pilot Study.* Neuroscience, 2021.

[A10] N Cai, P. Cherepanova, J. P.A. Dewald, and **N. Gurari**, *Torques Unintentionally Generated about the Elbow after a Hemiparetic Stroke are Inaccurately Perceived: Preliminary Findings.* The 8th IEEE RAS/EMBS International Conference on Biomedical Robotics & Biomechatronics, 2020.

[A11] J. R. Patterson, J. P.A. Dewald, J. M. Drogos, and **N. Gurari**, *Volitional Muscle Activation Reverses Multiple Stretch-Induced Hyperactive Stretch Reflex Accommodation in Chronic Stroke.* Combined Sections Meeting American Physical Therapy Association, 2020.

[A12] Y. Yang, R. Tian, N. Sinha, **N. Gurari**, J. M. Drogos, and J. P.A. Dewald, *Determining the Increased Usage of Indirect Motor Pathways in Hemiparetic Stroke.* Combined Sections Meeting American Physical Therapy Association, 2020. (Accepted for Oral Presentation)

[A13] N. Cai, C. Guzman, J. P.A. Dewald, and **N. Gurari**, *Accuracy in Judging Elbow Flexion Torques During Single- and Multi-Joint Isometric Tasks.* Neuroscience, 2019.

[A14] N. Cai, J. M. Drogos, J. P.A. Dewald, and **N. Gurari**, *Individuals with Chronic Hemiparetic Stroke Can Accurately Identify Elbow Flexion Torques Within Each Arm.* Congress on NeuroRehabilitation and Neural Repair, 2019. (Accepted for Oral Presentation)

[A15] A. Alberto, J. M. Drogos, N. Cai, N. Reddy, J. P.A. Dewald, and **N. Gurari**, *Single-Arm Torque Perceptual Deficits in Individuals with Chronic Hemiparetic Stroke.* Medicine & Science in Sports & Exercise, (51)6, 2019.

[A16] A. Alberto, J. M. Drogos, N. Cai, N. Reddy, J. P.A. Dewald, and **N. Gurari**, *Single-Arm Torque Perception in Individuals with Chronic Hemiparetic Stroke.* American College of Sports Medicine, 2019.

[A17] Y. Yang, N. Sinha, **N. Gurari**, J. M. Drogos, and J. P.A. Dewald, *Recruitment of Indirect Motor Pathways in the Stretch Reflex following Hemiparetic Stroke: A Pilot Study.* International IEEE EMBS Conference on Neural Engineering, 2019.

[A18] Y. Avelar, M. Cregg, L. Kettering, M. Kulbersh, **N. Gurari**, and C. Ingo, *Motor Perception Deficits and White Matter Volume in the Corpus Callosum in Patients with Chronic Hemiparetic Stroke.* Combined Sections Meeting American Physical Therapy Association, 2019.

[A19] A. Alberto, J. M. Drogos, N. Cai, N. Reddy, J. P.A. Dewald, and **N. Gurari**, *Single-Arm Torque Perception in Individuals with Chronic Hemiparetic Stroke.* Annual Biomedical Research Conference for Minority Students, 2018. (Accepted for Oral Presentation)

[A20] J. R. Patterson, J. M. Drogos, **N. Gurari**, and J. P.A. Dewald, *Stretching Only Temporarily Ameliorates Elevated Motoneuron Excitability in Chronic Stroke.* Neuroscience, 2018.

[A21] J. R. Patterson, J. M. Drogos, **N. Gurari**, and J. P.A. Dewald, *Muscle Activation Restores Elevated Motoneuron Excitability Following Stretching in Chronic Stroke.* Progress in Clinical Motor Control 1: Neurorehabilitation, 2018.

[A22] J. M. Drogos, N. A. van der Helm, J. P.A. Dewald, and **N. Gurari**, *Torque Matching Impairment can be Predicted Based on Motor Impairment Level in Individuals with Chronic Hemiparetic Stroke.* Combined Sections Meeting American Physical Therapy Association, 2018.

[A23] A. E. Paramadilok, N. A. Newman, K. N. Ogden, N. R. Stortini, J. Urbaniak, **N. Gurari**, S. M. Lee, and M. D. Ellis, *Inter-Rater Reliability of Shear Wave Ultrasound Elastography in the Biceps Brachii Muscle of Individuals with Chronic Stroke.* Combined Sections Meeting American Physical Therapy Association, 2018.

[A24] *N. A. van der Helm, ***N. Gurari**, J. M. Drogos, and J. P.A. Dewald, *Between Arms Torque Matching Ability in Individuals with Chronic Hemiparetic Stroke: Preliminary Findings.* Second Congress on NeuroRehabilitation and Neural Repair, 2017. *N. A. van der Helm and **N. Gurari** equally contributed to this work.

[A25] M. D. Ellis, N. T. A. Gerritsen, S. M. Lee, J. P.A. Dewald, and **N. Gurari**, *Increased Passive Elbow Joint and Biceps Muscle Stiffness in Chronic Stroke.* Second Congress on NeuroRehabilitation and Neural Repair, 2017.

[A26] J. M. Drogos, J. P.A. Dewald, and **N. Gurari**, *Between Arms and Within Arm Position Matching Assessments Lead to Differing Findings in Individuals with Chronic Hemiparetic Stroke.* Combined Sections Meeting American Physical Therapy Association, San Antonio, TX, 2017.

[A27] **N. Gurari**, J. M. Drogos, and J. P.A. Dewald, *Using Robotic Systems to Assess Proprioceptive Deficits in Individuals with Hemiparetic Stroke.* XXI International Society of Electrophysiology and Kinesiology Congress, 2016.

[A28] **N. Gurari**, J. Drogos, and J. P.A. Dewald, *Perception of Angular Position during Passive and Slow Movements about the Elbow Joint in Individuals with Chronic Hemiparesis.* Neuroscience, 2015.

Non-Peer-Reviewed Abstract Publications

[N1] J. Yang, P. Yu, J. Dean, N. Reddy, A. Mandana, M. Bright, and **N. Gurari**, *MR-Compatible System to Assess Force-Dependent Neural Activity.* Northwestern University Undergraduate Research Expo, 2023. (Best Poster Award)

[N2] N Cai, E. Medina, S. Gonzalez, A. Duong, and **N. Gurari**, *Effect of Volitional Muscle Activation on Detecting a Tactile Stimulus in Individuals Post-Hemiparetic Stroke.* Tenth Annual Movement and Rehabilitation Sciences Training Day, 2021.

[N3] N. Cai, J. M. Drogos, J. P.A. Dewald, and **N. Gurari**, *Individuals Post-Hemiparetic Stroke can Accurately Identify Elbow Flexion Torques they Generate about Each Elbow.* Ninth Annual Movement and Rehabilitation Sciences Training Day, 2019.

[N4] N. Cai, J. M. Drogos, J. P.A. Dewald, and **N. Gurari**, *Individuals Post Chronic Hemiparetic Stroke can Accurately Identify Extension Torques about Each Elbow.* Science of Ability Symposium: Breakthroughs in Rehabilitation and Recovery, Shirley Ryan AbilityLab, 2019.

[N5] Y. Yang, N. Sinha, R. Tian, J. M. Drogos, **N. Gurari**, and J. P.A. Dewald, *A Quantitative Measure for Determining the Increased Usage of Indirect Motor Pathway after Hemiparetic Stroke.* Science of Ability Symposium: Breakthroughs in Rehabilitation and Recovery, Shirley Ryan AbilityLab, 2019.

[N6] R. Tian, Y. Yang, O. G. Filatova, P. Maceira-Elvira, K. B. Wilkins, **N. Gurari**, C. Ingo, Y. Takeda, G. Kwakkel, O. Yamashita, F. C.T. van der Helm, and J P.A. Dewald, *Neural Dynamics based on Multi-Modal Brain Imaging: Potential in Studying Stroke.* Computational Research Day, Northwestern University, 2018.

[N7] A. Alberto, J. M. Drogos, N. A. Reddy, N. Cai, J. P.A. Dewald, and **N. Gurari**, *Single-Arm Torque Perception in Individuals with Chronic Hemiparetic Stroke.* Eighth Annual Movement and Rehabilitation Sciences Training Day, 2018.

[N8] J. R. Patterson, J. M. Drogos, **N. Gurari**, and J. P.A. Dewald, *Volitional Muscle Activation Restores Elevated Motoneuron Excitability Following Multiple Stretches in Chronic Hemiparetic Stroke.* Eighth Annual Movement and Rehabilitation Sciences Training Day, 2018.

[N9] *S. Lopez, ****N. Gurari**, J. M. Drogos, P. Krueger, and J. P.A. Dewald, *The Ability of Individuals with Chronic Hemiparetic Stroke to Mirror Arm Positions Depends on the Task.* Sixth Annual Movement and Rehabilitation Science Training Day, 2016. *S. Lopez and **N. Gurari** equally contributed to this work.

[N10] **N. Gurari**, J. Drogos, and J. P.A. Dewald, *Individuals with Chronic Hemiparesis Estimate Angular Positions about the Elbow Joint in the Paretic and Non-Paretic Arm during Slow Passive Movements.* Fifth Annual Movement and Rehabilitation Science Training Day, 2015.

[N11] G. Baud-Bovy and **N. Gurari**, *A Joystick to Study how Children Control the Interaction Force during the Manipulation of Kinematically Constrained Objects.* 9th FENS Forum of Neuroscience, 2014.

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, Dec 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, Dec 2003.

PRESENTATIONS

University Research Presentations

[U1] *Somatosensory Perception and Stroke: An Engineer's Perspective.* Rice Neuroengineering Initiative – Engineering Minds, Houston, TX, USA, Nov 8, 2023.

[U2] *Somatosensory Perception and Stroke: Considering Voluntary Motor Activation and the Entire Nervous System.* Advancing VT Neuroscience Symposium, Roanoke, VA, USA, Aug 11, 2023.

[U3] *Tactile Perception in Individuals with Stroke.* Shirley Ryan AbilityLab Legs + Walking Seminar Series, Chicago, IL, USA, Apr 20, 2023.

[U4] *Somatosensory Perceptual Deficits in Individuals with Stroke.* Engineering Mechanics Seminar Series, Virginia Tech, Blacksburg, VA, USA, Apr 4, 2023.

[U5] *Somatosensory Perceptual Deficits in Individuals with Stroke.* BioRobotics Lab, University of California, Irvine, Irvine, CA, USA, Sep 20, 2022.

[U6] *Neuroimaging of Tactile Deficits in Individuals with Stroke.* Cognitive Brain Mapping Group, Northwestern University, Chicago, IL, USA, Jul 27, 2022.

[U7] *Investigation of Somatosensory Perceptual Deficits Occurring in Individuals with Stroke.* Shirley Ryan AbilityLab, Chicago, IL, USA, Jan 24, 2022.

[U8] *New Approaches for Characterizing Proprioception: Implications for Stroke.* Department of Biomedical Engineering and Mechanics, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA, Mar 15, 2021.

[U9] *New Approaches for Characterizing Proprioception: Implications for Stroke.* School of Clinical and Rehabilitation Sciences, Northeastern University, Boston, MA, USA, Mar 2, 2021.

[U10] *New Approaches for Characterizing Proprioception using Mechatronic Systems: Implications for Stroke.* Department of Mechanical Engineering, Boston University, Boston, MA, USA, Feb 12, 2021.

[U11] *New Approaches for Characterizing Proprioception using Human-Machine Interfaces: Implications for Stroke.* Department of Computer Science, Northwestern University, Chicago, IL, USA, Dec 2, 2020.

[U12] *New Approaches for Characterizing Proprioception in Individuals with Stroke.* Shirley Ryan AbilityLab, Chicago, IL, USA, Aug 3, 2020.

[U13] *New Approaches for Characterizing Proprioception in Individuals with Stroke.* Department of Biomedical Engineering and Mechanics, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA, Feb 10, 2020.

[U14] *Understanding the Science of Touch using Robotics.* Department of Mechanical Engineering, University of Colorado Denver, Denver, CO, USA, Feb 3, 2020.

[U15] *New Approaches for Characterizing Proprioception in Individuals with Stroke.* Department of Mechanical Engineering, University of Colorado Denver, Denver, CO, USA, Feb 3, 2020.

[U16] *New Approaches for Characterizing Proprioception in Individuals with Stroke.* Department of Integrative Physiology, University of Colorado Boulder, Boulder, CO, USA, Jan 13, 2020.

[U17] *New Approaches for Characterizing Proprioception in Individuals with Stroke.* Department of Human Physiology, University of Oregon, Eugene, OR, USA, Jan 8, 2020.

[U18] *New Approaches for Characterizing Proprioception in Individuals with Stroke.* Department of Mechanical Engineering, Marquette University, Milwaukee, WI, USA, Dec 12, 2019.

[U19] *New Approaches for Characterizing Proprioception in Individuals with Stroke.* Department of Kinesiology, The Pennsylvania State University, State College, PA, USA, Dec 2, 2019.

[U20] *New Approaches for Characterizing Proprioception in Individuals with Stroke.* Department of Biomedical Engineering, University of Wisconsin - Milwaukee, Milwaukee, WI, USA, Nov 25, 2019.

[U21] *Proprioception after Chronic Hemiparetic Stroke.* Delft Haptics Lab, Delft University of Technology, Delft, South Holland, The Netherlands, May 28, 2019.

[U22] *Using Mechatronic Systems to Debug Proprioceptive Deficits in Individuals with Chronic Hemiparetic Stroke.* Clinically Applied Rehabilitation Research and Engineering Seminar, The University of Texas at Austin, Austin, TX, USA, Dec 8, 2017.

[U23] *Using Mechatronic Systems to Debug Proprioceptive Deficits in Individuals with Chronic Hemiparetic Stroke.* Department of Physical Therapy and Human Movement Sciences Research Seminar, Feinberg School of Medicine, Northwestern University, Chicago, IL, USA, Dec 6, 2017.

[U24] *Using Mechatronic Systems to Debug Proprioceptive Deficits in Individuals with Chronic Hemiparetic Stroke.* Robotics Lab Meeting, Shirley Ryan Abilitylab, Chicago, IL, USA, Dec 4, 2017.

[U25] *Debugging Clinical Sensory Assessments Using Robotics: Implications for Rehabilitation of Individuals with Stroke.* Joint Marquette/MCW/UWM Biomedical Engineering Seminar, Milwaukee, WI, USA, Nov 18, 2016.

[U26] *Debugging Clinical Sensory Assessments Using Robotics: Implications for Rehabilitation of Individuals with Stroke.* Department of Physical Therapy and Human Movement Sciences, Feinberg School of Medicine, Northwestern University, Chicago, IL, USA, Oct 26, 2016.

[U27] *Understanding and Enhancing Touch Perception and Motor Control Using Haptic Systems.* Department of Computer Science, Rutgers University, New Brunswick, NJ, USA, Jul 8, 2014.

[U28] *Characterization and Enhancement of Touch Perception and Motor Control Using Haptic Systems.* Grand Rounds Lecture, Department of Physical Therapy and Human Movement Sciences, Feinberg School of Medicine, Northwestern University, Chicago, IL, USA, Jun 12, 2014.

[U29] *Characterization of Touch Perception Using Custom Haptic Systems.* Computational Motor Control Lab, Ben Gurion University of the Negev, Beer Sheva, Israel, Jul 15, 2012.

[U30] *Characterization and Enhancement of Touch Perception Using Custom Haptic Systems.* Robotics, Brain and Cognitive Sciences Department, Istituto Italiano di Tecnologia, Genova, Italy, Nov 23, 2011.

[U31] *Characterization and Enhancement of Touch Perception Using Custom Haptic Systems.* Sensory Motor Performance Program, Rehabilitation Institute of Chicago, Chicago, IL, USA, Oct 17, 2011.

[U32] *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, Eaton E. Lattman Graduate Student Community Lecture Series, MD, USA, Apr 14, 2010.

Conference and Workshop Research Presentations

[P1] *Tactile Assignments for the Upper Extremity of Individuals with Stroke: An Engineer's Perspective.* Invited Speaker, 2024 American Society for Neurorehabilitation Annual Meeting, San Antonio, Texas, Apr 11, 2024.

[P2] *Torque Perception in Chronic Hemiparetic Stroke.* Invited Speaker, Third Congress on Neurorehabilitation and Neural Repair, Maastricht, The Netherlands, May 23, 2019.

[P3] *Torque Perception in Chronic Hemiparetic Stroke.* Invited Speaker, 15th Karniel Computational Motor Control Workshop, Ben-Gurion University of the Negev, Be'er Sheva, Israel, Mar 25, 2019.

[P4] *Torque Perceptual Deficits in Individuals with Chronic Hemiparetic Stroke.* Invited Speaker, Progress in Clinical Motor Control: Neurorehabilitation, Pennsylvania State University, State College, PA, USA, Jul 24, 2018.

[P5] *Using Robotic Systems to Assess Proprioceptive Deficits in Individuals with Hemiparetic Stroke.* Symposium Presentation: Implementation of Impairment Based Neuro-Rehabilitation Devices and Technologies following Brain Injury, XXI International Society of Electrophysiology and Kinesiology Congress, Chicago, IL, USA, Jul 7, 2016.

[P6] *Design of a Joystick with an Adjustable Damper to Study Kinematically Constrained Movements made by Children.* Paper Presentation, Haptics Symposium, Houston, TX, USA, Feb 25, 2014.

[P7] *Compliance Perception using Natural and Artificial Motion Cues.* Workshop Presentation, Haptics Symposium, Houston, TX, USA, Feb 23, 2014.

[P8] *Discrimination of Springs with Vision, Proprioception, and Artificial Skin Stretch Cues.* Paper Presentation, Eurohaptics, Tampere, Finland, Jun 15, 2012.

[P9] *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

[E1] *Understanding the Science of Touch Using Robotics.* Presentation to Bexley School System, Bexley Education Foundation, Speaker for the 2016-2017 Bexley High School Judah Folkman Scientist in Residence, Bexley, OH, USA, Oct 21, 2016.

[E2] *Robotics in the Science of Touch.* Presentation to FIRST Robotics Club and Engineering Class, Bexley High School, Bexley, OH, USA, Jan 29, 2016.

[E3] *Robotics in the Science of Touch.* Presentation to middle and high school female students, Columbus School for Girls, Bexley, OH, USA, Jan 29, 2016.

[E4] *Robotics in the Science of Touch.* BexTalks inaugural lecture to members of the community, Invited speaker by the City of Bexley, Bexley Public Library, and Bexley Community Foundation, Bexley, OH, USA, Jan 28, 2016.

[E5] *Leading Labs: Engineering.* Lecture to incoming graduate students, JHU Teaching Assistant Orientation, Johns Hopkins University, MD, USA, Sep 3, 2008.

[E6] *Get a Grip!* Break Out Session Leader – presentation to primarily middle school female students, Computer Mania Day, University of Maryland, MD, USA, Apr 9, 2005.

Hands-On Demonstrations

[H1] *MR-Compatible Tactile Stimulator for Individuals with Stroke.* S. Rathore, A. Kim, J. Segal, R. Hollar, N. Smith, J. Rios, N. Kalantaryardebily, A. C. Feldbush, J. Todd, K. Parcetich, and **N. Gurari**, Hands-on demonstration presented at IEEE World Haptics Conference, Delft, The Netherlands, July 10, 2023.

[H2] *Development of Object Interaction Skills: Manipulating a Joystick.* **N. Gurari** and G. Baud-Bovy, Hands-on demonstration presented at IEEE World Haptics Conference, Daejeon, Korea, Apr 16, 2013.

[H3] *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.

[H4] *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, MD, USA, Apr 9, 2005.

Teaching Experience

Guest Speaker, VT, Quantitative Organ System Physiology — Spring 2024
Level of Course: Graduate
Role: Presented students two lectures I created in which I summarized the central nervous system.

Guest Speaker, VT, Neurobiology & Mechanics of Motor Control — Spring 2024
Level of Course: Undergraduate
Role: Presented students a lecture I created in which I discussed sensorimotor control by summarizing my group's research on somatosensation and stroke.

Primary Instructor, VT, Stakeholder Perspectives to Neurological Rehabilitation — Spring 2024
Level of Course: Graduate
Role: Designed and delivered a new course to expose students to the lived neurological injury experience. This course applied innovative methods include immersive learning in the home and hospital setting, in addition to verbal reflections to encourage understanding and growth based on the students' experiences.

Guest Speaker, VT, Rehabilitation Engineering — Spring 2023
Level of Course: Graduate
Role: Presented to students a lecture on Design Ethics and User Needs Assessment as relevant to rehabilitation engineering.

Guest Speaker, NU, Emerging Technology in Rehabilitation — Fall 2015/ Summer 2016
Level of Course: Graduate
Role: Provided to Doctor of Physical Therapy students an overview of my research in which I use robotics to investigate the reason for haptic perceptual impairments in individuals with chronic stroke.

Co-Instructor, IIT, RBCS Methods Toolbox — Fall 2013
Level of Course: Graduate
Role: Created and delivered a 2-hour overview lecture on the field of haptics.

Teaching Assistant, JHU, Electronics & Instrumentation — Spring 2008
Level of Course: Sophomore Undergraduate
Primary Instructor: Dr. Noah Cowan
Role: Instructed weekly lab sessions, graded lab reports, held office hours, and lectured three classes.

Teaching Assistant, JHU, Design and Analysis of Dynamic Systems — Fall 2006
Level of Course: Junior Undergraduate
Primary Instructor: Dr. Allison Okamura
Role: Held office hours, conducted problem solving sessions, graded homework, wrote homework solutions, and lectured one class.

Advising

Mentored Doctoral Students

Nahid Kalantaryardebily (Engineering Mechanics)	VT	2023 - Present
Anna Feldbush (Neuroscience)	VT	2022 - Present
Emily Tirrell (Translational Biology, Medicine, and Health)	VT	2022 - Present
Doctor of Physical Therapy Capstone Project Students	RU	2022 - Present
Ninghe Cai (Neuroscience, *AHA Predoctoral Fellow*)	NU	2018 - 2023
Doctor of Physical Therapy Synthesis Project Students	NU	2016 - 2020

Doctoral Students (Co-Mentored)

Neha Reddy (Biomedical Engineering, *NU Medical Scientist Training Program (MD/PhD)*)	NU	2018 - 2019
Jacqueline Patterson (Neuroscience, *NSF GRFP Honorable Mention*)	NU	2017 - 2021

Masters Students

Ben Wilkinson (Biomedical Engineering and Mechanics)	VT	2023 - 2024
Mackenzie Gray (Mechanical Engineering)	NU	2021 - 2022
Nicole Baptist (Robotics)	NU	2021
Musheng He (Robotics)	NU	2020 - 2021
Alex Hay (Robotics)	NU	2020 - 2021
Alexander Webb (Mechanical Engineering)	NU	2019
Jingyan Ling (Robotics)	NU	2019
Nirvik Sinha (Medical Sciences/Bioengineering, *Khorana Program Scholar*)	NU	2018 - 2019
Ahalya Mandana (Robotics)	NU	2018
Nina van der Helm (Biomedical Engineering)	NU	2016 - 2017
Ninette Gerritsen (Biomedical Engineering)	NU	2015 - 2016
Erik Euving (Biomedical Engineering)	NU	2015 - 2016

Undergraduate Students

Rishit Vijay (Biomedical Engineering)	VT	2023 - Present
Biomedical Engineering Senior Design Students	VT	2023 - 2024
Mechanical Engineering Capstone Project Students	VT	2022 - 2024
Lindsey Sydnor (Clinical Neuroscience)	VT	2021 - 2023
Karan Nayak (Neuroscience, *NU WCAS, NU SURG*)	NU	2021 - 2023
Jason Yang (Neuroscience, *NU SIGP, NU SURG*)	NU	2021 - 2023
Alan Duong (Neuroscience, *NU AYURG*)	NU	2021 - 2022
Eileen Medina (Neuroscience/Statistics, *NU URAP, NU CTG, NU AYURG*)	NU	2021 - 2022
Amy Wang (Computer Science)	NU	2021 - 2022
Marl Calida (Computational and Systems Neuroscience)	VT	2022 - 2022
Stefani Gonzalez (Communication Studies, *NU SIGP, NU SURG*)	NU	2020 - 2022
Zarif Ceasar (Computer Science, *NU SIGP*)	NU	2021
Jackson Bremen (Electrical and Computer Engineering, *NU URAP*)	NU	2021
Sophie Chang (Biological Sciences, *NU URAP*)	NU	2021
Katie Mumford (Cognitive Science, *NU URAP, NU SURG*)	NU	2021
Eric McDougal (Electrical Engineering, *NU URAP*)	NU	2021
Therese Schachner (Computer Science)	NU	2020 - 2021
Polina Cherepanova (Biological Sciences, *NU URAP, NU SURG, Fletcher URG Prize*)	NU	2020 - 2021
Camille Guzman (Biomedical Engineering, *NU SIGP, NU CTG*)	NU	2019 - 2020
Angelica Alberto (Kinesiology and Exercise Science, *NU SROP*)	NU	2018
Cristina Costantino (Psychology)	IIT	2013
Alice Wu (Mechanical Engineering, *NSF GRFP*)	JHU	2008 - 2012
Kathryn Smith (Mechanical Engineering)	JHU	2008 - 2009
David Ferguson (Mechanical Engineering)	JHU	2007 - 2008

High School Students

Om Gandhi	NU	2019 - 2020
Jackson Bremen	NU	2019 - 2020
Jennifer Lee	JHU	2006

COMMITTEE MEMBER

Masters Thesis

Robyn Hansen	VT	2022 - 2023

ADDITIONAL RELEVANT TRAINING

Clinical Training 2019 - 2022

Supported by my NIH K25 clinical mentor and advisors, I developed and am completing a training course to learn about clinical topics relevant to my research on somatosensory deficits in individuals post brain injury. This course includes readings, hands-on exercises, one-on-one training, conversations with clinicians, and observations at the Shirley Ryan AbilityLab.

Fundamentals of Neuroscience: Motor Systems and Cognitive Neuroscience 2021

Graduate-level course designed to embrace a diverse range of academic backgrounds while also providing intensive training in the basics of neuroscience. This course is team-taught and includes lecture and discussion sections on motor systems and cognitive neuroscience.

Issues in Movement & Rehabilitation Science 2021

Graduate-level course designed to share the neuropathophysiology behind many motor disorders, as well as current research on how to improve outcomes. This course is team-taught and includes lecture and discussion sections.

Examination and Evaluation II 2020

Thirteen-week Northwestern University Physical Therapy and Human Movement Sciences graduate-level course (PT 530-2). I am participating in the portion of this course that provides skills in examining muscle force, range of motion, and muscle length.

Physiology 2019

Thirteen-week Northwestern University Physical Therapy and Human Movement Sciences graduate-level course (PT 514-1) that provides a fundamental understanding of normal physiology, abnormal physiology, and common clinical manifestations for the major systems of the human body. I participated in the portion of this course relevant to the musculoskeletal and connective tissue systems.

Gross Anatomy I 2019, 2021

Thirteen-week Northwestern University Physical Therapy and Human Movement Sciences graduate-level course (PT 510-1) that provides a fundamental understanding of human anatomy. This course includes lectures and demonstrations, laboratory exercises in which students dissect the human body, and palpation labs.

Kinesiology 2019

Thirteen-week Northwestern University Physical Therapy and Human Movement Sciences graduate-level course that provides a fundamental understanding of biomechanical factors contributing to the control of human movement. I participated in the portion of this course relevant to the upper-extremity.

Taking Responsibility for Responsible Conduct of Research 2019
This course was created for postdoctoral fellows and junior faculty who are recipients of NIH or other training awards that require training in Responsible Conduct of Research. The course covers the principles and expectations for conducting biomedical research ethically and responsibly, and goes one step farther to guide participants in teaching others for whom they are responsible.

Advanced Neuroanatomy 2019
Seven-week Northwestern University Interdepartmental Neuroscience graduate-level course (NUIN 440) that provides a fundamental understanding of neuroanatomy. This course considers the nervous system from both structural and functional perspectives, resulting in an integrated view of the brain. In addition to lectures and demonstrations, half the time is devoted to laboratory exercises in which students view histological sections and participate in the dissection of a human brain.

Advanced Systems Physiology: Neuroscience 2018
Graduate-level course (BMD ENG 401) that provides a basic understanding of the structure and function of the human nervous system from an engineering and evolutionary perspective. Emphasis is placed on the structure and electrical properties of the neuron, its means of signaling and how neurons pass signals from one to another. The organization of neural systems on a macro scale is covered within the context of the somatosensory, visual, and motor system.

Dutch Summer School 2016
One-week course hosted by the Rehabilitation Institute of Chicago and Northwestern University in which Dutch and American attendees gain an in-depth understanding of stroke-related topics from clinical and research perspectives, with a focus on rehabilitation. Topics covered at the summer school include neuroscience basic principles, neuropathophysiologies, clinical practices, and state-of-the-art in rehabilitation.

Movement and Rehabilitation Science Clinical Boot Camp 2014, 2015
Four-day event hosted at Northwestern University's Department of Physical Therapy & Human Movement Sciences in which participants gain an in-depth understanding of a subset of movement disorders from clinical and research perspectives, with a focus on rehabilitation. Topics covered at the boot camp include neuroscience basic principles, neuropathophysiologies, clinical practices, and state-of-the-art in rehabilitation.

Tenth Motor Control Summer School 2013
Three-day event in which participants are introduced to topics in motor control by leading researchers in various areas.

Telluride Neuromorphic Cognition Engineering Workshop 2008
Three-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. My unique experiences included a mini-course on how to perform fly electrophysiology.

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

Program Committee

VT BEAM Memorial Lecture Committee	2023 - Present
15th Karniel Computational Motor Control Workshop, *Program Committee Guest Session Organizer*	2019

Organization of Workshop/Congress/Conference Sessions

American Society for NeuroRehabilitation Annual Meeting Sympoisum, *(Chair of Session on Tactile Assessments and Treatments for Stroke)*	2024
15th Karniel Computational Motor Control Workshop, *Co-Chair of Session on Stroke Recovery*	2019
Congress on NeuroRehabilitation and Neural Repair, *Co-Chair of Session on Sensorimotor Impairments Post Unilateral Brain Injury*	2019

Editorial Board

IEEE RAS/EMBS BioRob 2024, *Associate Editor*	2024

Service

VT-WF SBES Student Symposium, *Oral Presentation Facilitator, Poster Presentation Judge*	2024
VT School of Neuroscience Graduate Student Visit Days, *Faculty Interviewer*	2023 - 2024
VT TBMH Rotation Presentation, *Guest Judge*	2023 - 2024
VT TBMH Mock Study Section, *Guest Reviewer*	2022 - 2023
NUIN Graduate Student Visit Days, *Faculty Interviewer*	2019
UT Austin Crowdsourcing for Computer Vision Course, *Student Projects Guest Judge*	2017

Leadership

SYNAPSE (Students Supporting Brain Injury), VT, *Faculty Advisor*	2024 - Present
LCSR Graduate Student Committee, JHU, *Haptics Lab Representative*	2007 - 2010
Women of Whiting, JHU, *Social Chair; Panel Chair; Peer Advisor*	2006 - 2009
Haptics Laboratory, JHU, *IRB Manager; Demo Coordinator; Web Master*	2004 - 2009

Professional Communities

Center for Human Computer Interaction, VT, *Faculty Affiliate*	2022 - Present
Center for Gerontology, VT, *Faculty Affiliate*	2022 - Present
Faculty of Health Sciences, VT	2022 - Present
School of Neuroscience, VT, *Faculty Affiliate*	2021 - Present
Master of Science in Robotics Program, NU, *Faculty Affiliate*	2020 - 2023
Institute for Innovations in Developmental Sciences, NU, *Faculty Affiliate*	2019 - 2023
The Graduate School, NU, *Faculty Member*	2019 - 2023
Northwestern University Interdepartmental Neuroscience Program, NU, *Preceptor*	2018 - 2023

Outreach

NU IN-PREP Faculty Perspective Panel, *Panelist*	2018
Science-Engineering-Technology Congressional Visits Days	2010
Engineers Without Borders, *JHU South Africa Team Volunteer*	2010
JHU Teaching Assistant Orientation, *Panel Member*	2008
Women of Whiting, *WISE Panel Speaker*	2006
Ready, Set, Design!, *Volunteer*	2006
Surgical Lego Competition, *Volunteer*	2005

Technical Reviews

Journals

Journal of Neurophysiology
Neurorehabilitation and Neural Repair
Experimental Brain Research
IEEE Transactions on Haptics
IEEE Transactions on Systems, Man, & Cybernetics (w/ Peer)
Journal of NeuroEngineering and Rehabilitation
IEEE Transactions on Neural Systems and Rehabilitation Engineering
Medical & Biological Engineerinng & Computing
Frontiers in Neuroscience

Conferences

IEEE/RSJ International Conference on Intelligent Robots and Systems
IEEE Conference on Decision and Control
IEEE Haptics Symposium
IEEE International Conference on Robotics & Automation
IEEE World Haptics Conference
Eurohaptics
IEEE RAS/EMBS International Conference on Biomedical
Robotics and Biomechatronics

Grants

FBRI Seale Innovation Award Review 2022

Media

[M1] *Researching how Stroke Affects Sense of Touch.* Virginia Tech News. May 31, 2024.

[M2] *Engineering Students Learn from People with Brain Injuries as Part of College Class.* National Public Radio (NPR), WVTF, Radio IQ. May 2, 2024.

[M3] *Experiential Learning in Brain Injury Rehabilitation.* Virginia Tech News. March 14, 2024.

[M4] *Using Robotics to Explore Touch.* Northwestern University, McCormick School of Engineering, Master of Science in Robotics. February 9, 2019.

[M5] *Speakers with Local Ties to Share 'Big Ideas' in Bexley.* The Columbus Dispatch. January 25, 2016.

Skills

Programming

R, C, C++, Python, Matlab/Simulink, Latex, HTML

Spoken

Fluency: English [Native], Hebrew
Proficiency: Russian, Spanish, Italian
Working Knowledge: Polish, Portuguese

Personal

Citizenship: United States of America, Israel