Waiman Meinhold

805-570-4838 | waiman.m1@gmail.com | linkedin.com/in/wmeinhold | Los Angeles, CA

Education

Georgia Institute of Technology August 2021
Ph.D in Robotics

University of California, Berkeley May 2016
B.S. in Mechanical Engineering, Minor in Natural Resource Management

Experience

Postdoctoral Fellow May 2021 - June 2023
Biorobotics and Human Modeling Laboratory, Georgia Institute of Technology *Atlanta, GA*

- Developed precision MRI guided robots and control methods, along with wearable healthcare monitoring systems
- Developed analysis and prediction methods for sensorimotor responses
- Worked with industry, scientific and clinical collaborators to identify and build robotic interventions
- Collaborated with clinical partners to produce reflex stimulation prototypes now in clinical evaluation, and worked with an industry collaborator to generate production ready software and hardware
- Demonstrated privacy and security implications of continuous physiological measurements
- Wrote and planned funding proposals, reports to funding agencies and collaboration pitches to industry and academic groups
- Managed multi-institution interdisciplinary teams to develop and evaluate novel medical devices

Graduate Research Assistant August 2016 - May 2021
Biorobotics and Human Modeling Laboratory, Georgia Institute of Technology *Atlanta, GA*

- Developed a robot and visual control system for MRI guided interventions
- Headed development of an automated tendon reflex stimulation/examination system with industry and clinical collaborators
- Conducted human subjects research involving mechanical and electrical stimulation, EMG, EEG, and TMS
- Initiated successful interdisciplinary funding proposals for multiple medical robotics projects
- Authored 8 peer-reviewed publications, presented research findings at conferences and public outreach events
- 2 years of clinical immersion and collaboration training as an NSF-ARMS healthcare robotics fellow

Undergraduate Researcher August 2013 - July 2016
Bajcsy and Tomizuka Labs, UC Berkeley *Berkeley, CA*

- Developed novel assistive exoskeletons and pneumatic actuators
- Responsible for design, prototyping and characterization of novel pneumatic actuators (US Pat. 10,729,610)

Application Science Intern Summer, 2012 - 2015
Asylum Research/Oxford Instruments *Santa Barbara, CA*

- Aided development and evaluation of a new method for mechanical characterization at the nanometer scale
- Presented findings in a variety of venues, including client reports and research publications

Owner/Operator 2015 - 2016
Commercial Fishing *Santa Barbara, CA*

- Fabrication and maintenance of fishing gear, mechanical and electrical systems
- Participated in a variety of regulated fisheries with retail, community, and wholesale buyers

Machinist Summer, 2011 - 2012
Bobro Engineering *Goleta, CA*

- CNC and manual machining, QA

Skills

Software/Programming: MATLAB (Machine learning, Data analysis), Solidworks, LabVIEW, Python, Java, COMSOL, R
Other: Mechanical design, Prototyping, Robotics, Machining/Fabrication, Sensing, System dynamics, Human subjects research (IRB protocols, Design of experiments, EEG, EMG, TMS, TES, MRI, Statistics)

Invited Talks

W. Meinhold. "**Neurological diagnosis and treatment via precise robotic intervention**" (ASME Modelling Estimation and Control Conference). 2022.

W. Meinhold and J. Ueda. "**A smart system for improved tendon reflex stimulation utility**" (IEEE Conference on Systems Man, and Cybernetics (SMC) 2022 Workshop on NeuroDesign in Human Robot Interaction). 2022.

W. Meinhold, E. Ozkaya, J. Ueda, and M. Kurt. "**Frequency Tunable Actuator Design for Elasticity Imaging of Human Intervertebral Disk**". Annual Symposium of the Ultrasonic Industry Association, Atlanta, GA. 2018.

Journal Articles

W. Meinhold, E. Ozkaya, D. Petti, V. Rice, E. Triolo, F. Rezayaraghi, P. Kennedy, L. Fleysher, A.-P. Hu, J. Ueda, et al. "**Towards Image Guided Magnetic Resonance Elastography via Active Driver Positioning Robot**". In: *IEEE Transactions on Biomedical Engineering* 69.11 (2022), pp. 3345–3355.

D. E. Martinez, **W. Meinhold**, J. Oshinski, A.-P. Hu, and J. Ueda. "**Super Resolution for Improved Positioning of an MRI-Guided Spinal Cellular Injection Robot**". In: *Journal of Medical Robotics Research* (2021).

W. Meinhold, D. E. Martinez, J. N. Oshinski, A.-P. Hu, and J. Ueda. "**A direct drive parallel plane piezoelectric needle positioning robot for MRI guided intraspinal injection**". In: *IEEE Transactions on Biomedical Engineering* 68.3 (2021), pp. 807–814. DOI: 10.1109/TBME.2020.3020926.

W. Meinhold, Y. Yamakawa, H. Honda, T. Mori, S.-i. Izumi, and J. Ueda. "**A Smart Tendon Hammer System for Remote Neurological Examination**". In: *Frontiers in Robotics and AI* 8 (2021), p. 28.

E Ozkaya, E. Triolo, F Rezayaraghi, J Abderezaei, **W. Meinhold**, K Hong, A Alipour, P Kennedy, L Fleysher, J Ueda, et al. "**Brain-mimicking phantom for biomechanical validation of motion sensitive MR imaging techniques**". In: *Journal of the Mechanical Behavior of Biomedical Materials* 122 (2021), p. 104680.

E. Kim, **W. Meinhold**, M. Shinohara, and J. Ueda. "**Statistical Inter-stimulus Interval Window Estimation for Transient Neuromodulation via Paired Mechanical and Brain Stimulation**". In: *Frontiers in neurorobotics* 14 (2020), p. 1.

W. Meinhold, J. Oshinski, A.-P. Hu, and J. Ueda. "**Design and Fabrication of an Automated Spinal Precision Injection Robot**". In: *presented at the Biomedical Engineering Society Annual Meeting, Philadelphia, PA* (2019).

M. Kocun, A. Labuda, **W. Meinhold**, I. Revenko, and R. Proksch. "**Fast, high resolution, and wide modulus range nanomechanical mapping with bimodal tapping mode**". In: *ACS nano* 11.10 (2017), pp. 10097–10105.

A. Labuda, M. Kocun, M. Lysy, T. Walsh, J. Meinhold, T. Proksch, **W. Meinhold**, C. Anderson, and R. Proksch. "**Calibration of higher eigenmodes of cantilevers**". In: *Review of Scientific Instruments* 87.7 (2016), p. 073705.

A. Labuda, M. Kocuń, **W. Meinhold**, D. Walters, and R. Proksch. "**Generalized Hertz model for bimodal nanomechanical mapping**". In: *Beilstein journal of nanotechnology* 7.1 (2016), pp. 970–982.

R. Proksch, M. Kocun, D. Hurley, M. Viani, A. Labuda, **W. Meinhold**, and J. Bemis. "**Practical loss tangent imaging with amplitude-modulated atomic force microscopy**". In: *Journal of Applied Physics* 119.13 (2016), p. 134901.

Conference Papers

H. Kawase, **W. Meinhold**, and J. Ueda. "**Encrypted Classification for Prevention of Adversarial Perturbation and Individual Identification in Health-Monitoring**". In: *2023 IEEE/ASME International Conference on Advanced Intelligent Mechatronics*. IEEE/ASME. 2023.

W. Meinhold, H. A. Nieves-Vazquez, D. E. Martinez, J. Lee, S. Li, J. Ueda, and A.-P. Hu. "**A Virtual Reality Guidance System for a Precise MRI Injection Robot**". In: *2023 IEEE/SICE International Symposium on System Integration (SII)*. IEEE. 2023, pp. 1–6.

H. Nieves-Vazquez, E. Ozkaya, **W. Meinhold**, and J. Ueda. "**Effects of Driver Placement and Phase on Multi-actuator Magnetic Resonance Elastography via Finite Element Analysis** ". In: *2023 American Control Conference (ACC)*. IEEE. 2023.

W. Meinhold, H. Nieves, and J. Ueda. "**Prediction of Single Trial Somatosensory Evoked Potentials From Mechanical Stimulation Intensity** ". In: *International Conference on Rehabilitation Robotics*. IEEE. 2022, pp. 1–6.

W. Meinhold, H. A. Nieves-Vazquez, and J. Ueda. "Prediction of Single Trial Somatosensory Evoked Potentials From Mechanical Stimulation Intensity". In: *2022 International Conference on Rehabilitation Robotics (ICORR)*. IEEE. 2022, pp. 1–6.

D. Martinez, **W. Meinhold**, J. Oshinski, A.-P. Hu, and J. Ueda. "**Resolution-Enhanced MRI-Guided Navigation of Spinal Cellular Injection Robot**". In: *2020 International Symposium on Medical Robotics (ISMR)*. IEEE. 2020.

W. Meinhold, S.-I. Izumi, and J. Ueda. "**Automated Variable Stimulus Tendon Tapping Modulates Somatosensory Evoked Potentials**". In: *2019 IEEE 16th International Conference on Rehabilitation Robotics (ICORR)*. IEEE. 2019, pp. 1025–1030.

W. Meinhold, E. Ozkaya, J. Ueda, and M. Kurt. "**Tuneable Resonance Actuators for Magnetic Resonance Elastography**". In: *2019 Design of Medical Devices Conference*. American Society of Mechanical Engineers Digital Collection. 2019.

W. Meinhold and J. Ueda. "**Tendon Tapping Location Detection Through Impact Modeling**". In: *2019 International Symposium on Medical Robotics (ISMR)*. IEEE. 2019, pp. 1–7.

E. Kim, **W. Meinhold**, and J. Ueda. "**Assessment of robot necessity in time interval dependent rehabilitation therapy**". In: *2018 International Symposium on Medical Robotics (ISMR)*. IEEE. 2018, pp. 1–6.

W. Meinhold and J. Ueda. "**Tendon Tapping Stimulus Characterization Through Contact Modeling**". In: *ASME 2018 Dynamic Systems and Control Conference*. American Society of Mechanical Engineers. 2018.

W. Meinhold, E. Kaplan, J. Ueda, T. Mori, and S.-i. Izumi. "**An instrumented medical hammer with diagnostic, therapeutic and pedagogical applications**". In: *Dynamic Systems and Control Conference*. American Society of Mechanical Engineers. 2017.

R. P. Matthew, E. J. Mica, **W. Meinhold**, J. A. Loeza, M. Tomizuka, and R. Bajcsy. "**Initial investigation into the effect of an Active/Passive exoskeleton on hammer curl performance in healthy subjects**". In: *2015 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*. IEEE. 2015, pp. 3607–3610.

R. P. Matthew, E. J. Mica, **W. Meinhold**, J. A. Loeza, M. Tomizuka, and R. Bajcsy. "**Introduction and initial exploration of an active/passive exoskeleton framework for portable assistance**". In: *2015 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. IEEE. 2015, pp. 5351–5356.

Patents

W. Meinhold, A.-P. Hu, J. Oshinski, J. Ueda, and D. Martinez. ***Systems and Methods for Magnetic Resonance Imaging Guided Robotics***. US Patent Application 17/404,619. 2021.

W. Meinhold, E. Ozkaya, M. Kurt, and J. Ueda. ***Method and system for mri-guided visual servoing***. US Patent Application 2021/025131. 2021.

R. P. Matthew, E. J. Mica, **W. Meinhold**, J. A. Loeza, R. Bajcsy, and M. Tomizuka. ***Semi-passive control system and method for assistive orthoses***. US Patent 10,729,610. 2020.

Teaching Experience

Teaching Assistant 2019 - 2020

Georgia Institute of Technology

Courses: ME 6407 Robotics (Graduate), ME 3017 System Dynamics (Undergraduate)

Academic Service

Manuscript Reviewer 2016-Present

Reviewer of articles for IEEE International Conference on Robotics and Automation, IEEE International Conference on Intelligent Robots and Systems, IEEE Transactions on Biomedical Engineering , IEEE Transactions on Robotics, IEEE Robotics and Automation Letters, ASME Dynamic Systems and Control Conference, AACC/IFAC Modeling Estimation and Control Conference, International Symposium on Medical Robotics, IEEE International Conference on Rehabilitation Robotics, IEEE Transactions on Neural Systems and Rehabilitation Engineering.

Conference Organization 2016-Present

Assisted in the organization and coordination of ASME Dynamic Systems and Control Conference 2018, Southeast Robotics Symposium 2019, National Robotics Week 2016-2021, and SII 2023

Grant Writing 2016-Present

Assisted in the preparation of multiple grants both based upon and to further fund thesis related work, GT Institute for Robotics and Intelligent Machines seed grants (2019 and 2020, awarded), Congressionally Directed Medical Research Program 2019 (awarded), Children's Healthcare of Atlanta Imlay 2021 (not awarded). 2023 NSF Engineering Research Center program submission with collaborators from Georgia Tech, MIT, Morehouse, Stanford, Harvard, and associated teaching hospitals (under review).