Jennifer Mak

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EDUCATION

Aug 2019 – Present
Doctor of Philosophy, Bioengineering
University of Pittsburgh
- Thesis work: Brain Mechanisms of Visuomotor Deficits after Stroke
- Track: Neural Engineering
- Advisor: Dr. George Wittenberg, MD, PhD
- Committee: Drs. Murat Akcakaya, PhD, Elvira Pirondini, PhD, Gelsy Torres-Oviedo, PhD

Aug 2015 – May 2019
Bachelor of Science, Biomedical Engineering
Virginia Commonwealth University
- Minor: Mathematics
- Track: Rehabilitation Engineering
- Graduated *cum laude* with Honors
- Study abroad: Robotics Engineering in Barcelona, Spain (Summer 2017)

RESEARCH AND WORK EXPERIENCE

Aug 2019 – Present
PhD Candidate, NSF GRFP Fellow
University of Pittsburgh, Rehabilitation and Neural Engineering Labs
- Developing EEG-guided augmented reality system for detection, assessment, and rehabilitation of stroke-related spatial neglect
- Investigating upper-limb motor control using TMS of the brain to probe motor cortex connectivity during reaching in stroke patients
- Collecting structural and functional MRI to investigate motor planning behavior in stroke
- Created EEG neurofeedback system for affect-biased attention training for adolescents with major depressive disorder

Jun 2018 – Jul 2018
Pre-PhD REU Scholar
University of Pittsburgh, Rehabilitation and Neural Engineering Lab
- Investigated the use of high-density EMG to map forearm muscle activity in stroke and neurologically-intact subjects with Dr. Doug Weber
- Awarded Pre-PhD Most Outstanding Mentee Award

May 2017 – May 2019
Undergraduate Research Assistant
Virginia Commonwealth University, Biomagnetics Lab
- Created fiber tract models using DTI to better analyze neural signal pathways during simulated TMS with Dr. Ravi Hadimani
- Developed 3D brain models for finite element analyses and 3D printing

Aug 2016 – May 2019
Head Teaching Assistant
Virginia Commonwealth University, Honors 200 Rhetoric
- Assisted students with research question development and technical writing
- Held weekly walk-in breakout sessions for students and individual conferences
- Attended classroom sessions for immediate feedback and direction

Aug 2016 – Aug 2019
Engineering Testing Officer, Co-founder
DuraSafe, LLC
- Designed pressure-sensing epidural needle to increase efficiency of locating the epidural space and safety of the epidural procedure
- Developed competitive analysis of existing epidural needles, product design controls, and clinical testing protocols
- Led focus groups and interviews with stakeholders in the VCU Department of Nurse Anesthesia with to identify customer needs and pain points
- Placed 1st in the VCU Pre-X program and secured $10,000 in funding to form LLC

FUNDING

Sep 2021 – Aug 2024 **National Science Foundation (NSF)**
Graduate Research Fellowship Program (GRFP)
- Three years of graduate funding ($34,000-$37,000/year)

Sep 2019 **National Science Foundation (NSF)**
Integrative Graduate Education and Research Traineeship (IGERT) Program: Interdisciplinary Research Training in Rehabilitation Engineering
- One-time $10,000 graduate funding

SKILLS

Medical Device Startup	Design controls, human factors, customer discovery, intellectual property protection
Research Techniques	Transcranial magnetic stimulation (TMS), electroencephalography (EEG), electromyography (EMG), magnetic resonance imaging (MRI), signal processing, KINARM Exoskeleton robot, statistical modeling, machine learning, diffusion tensor imaging (DTI), finite element analysis (FEA) and simulation, 3D printing, technical writing, and scientific communication
Programming	MATLAB and Simulink, Python, Java
Software	Stata, SPSS, JMP, Freesurfer, FSLeyes, SPM12, E-Prime, Sim4Life, Autodesk Fusion 360, SOLIDWORKS, Adobe Illustrator

PUBLICATIONS

Mar 2023 Jantz, M.K., **Mak, J.**, Dalrymple, A.N., Farooqui, J., Grigsby, E.M., Herrera, A.J., Pirondini, E. and Collinger, J.L., 2023. Lifting as we climb: Experiences and recommendations from women in neural engineering. *Frontiers in Neuroscience*, 17, p.350.

Sep 2022 Huang, X., **Mak, J.**, Wears, A., Price, R.B., Akcakaya, M., Ostadabbas, S. and Woody, M.L., 2022, July. Using Neurofeedback from Steady-State Visual Evoked Potentials to Target Affect-Biased Attention in Augmented Reality. In *2022 44th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)* (pp. 2314-2318). IEEE.

July 2022 **Mak, J.**, Kocanaogullari, D., Huang, X., Kersey, J., Shih, M., Grattan, E.S., Skidmore, E.R., Wittenberg, G.F., Ostadabbas, S. and Akcakaya, M., 2022. Detection of Stroke-Induced Visual Neglect and Target Response Prediction Using Augmented Reality and Electroencephalography. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, *30*, pp.1840-1850.

Nov 2021 Kocanaogullari, D., Huang, X., **Mak, J.**, Shih, M., Skidmore, E., Wittenberg, G.F., Ostadabbas, S. and Akcakaya, M., 2021, November. Fine-tuning and personalization of EEG-based neglect detection in stroke patients. In *2021 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)* (pp. 1096-1099). IEEE.

Jul 2020 Kocanaogullari, D., **Mak, J.**, Kersey, J., Khalaf, A., Ostadabbas, S., Wittenberg, G., Skidmore, E. and Akcakaya, M., 2020, July. EEG-based neglect detection for stroke patients. In *2020 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)* (pp. 264-267). IEEE.

PENDING PATENTS

Sep 2022 Akcakaya, M., Woody, M.L., Wears, A., **Mak, J.,** Price, R.B., McDonald, N., Huang, X., Ostadabbas, S. 2022. System and Method for Providing Neurofeedback from Steady-State Visual Evoked Potentials to Target Affect-Based Attention. U.S. Patent 63/376,494, filed September 21, 2022.

Mar 2022 — Akcakaya, M., **Mak, J.**, Kocanaogullari, D., Skidmore, E.R., Wittenberg, G.F., Shih, M., Ostadabbas, S., Huang, X., Grattan, E., Kersey, J. 2022. AR-Based EEG-Guided Neglect Detection System (AREEN). U.S. Patent 63/325,378 filed March, 2022.

PRESENTATIONS AND TALKS

Apr 2024 (Upcoming) — **"Non-Primary Motor Area Involvement in Reaching Behavior after Subcortical Stroke"**
Neural Control of Movement 2024 Annual Meeting, Dubrovnik, Croatia
- Scientific talk for the panel discussion on "The underlying mechanisms of motor impairments after stroke"

Nov 2023 — **"Jennifer Mak at University of Pittsburgh"**
Where does your journey STEM From? Podcast with Dr. Carina Minardi
- Educational podcast discussing STEM career journeys, academic research, and interests in science

Nov 2023 — **"Non-Primary Motor Area Involvement in Reaching Behavior after Subcortical Stroke"**
Society for Neuroscience 2023 Annual Meeting, Washington DC
- Scientific talk in the "Imaging and Assessment of Stroke Damage" Nanosymposium session

Jan 2022, Jan 2023 — **"How to Prelim: Professional and Technical Development Seminar Series"**
Rehab and Neural Engineering Labs, University of Pittsburgh
- Information session for first- and second-year Bioengineering PhD students on how to successfully prepare for the PhD preliminary exam milestone

Aug 2021, Jul 2022 — **"Applying to Grad School"**
Rehab and Neural Engineering Labs, University of Pittsburgh
- Summer workshop for undergrads on the process of and tips for applying to graduate programs

Jul 2021, Jul 2022, Jun 2023 — **"Biosignals Processing Basics"**
Rehab and Neural Engineering Labs, University of Pittsburgh
- Summer workshops for undergrads on an introduction to signals processing for biological systems with hands-on examples in EMG, EEG, and peripheral nerve recordings

HONORS AND AWARDS

Jan 2024 — **Career Development Award**
Center for Neural Basis of Cognition, Carnegie Mellon University and University of Pittsburgh

May 2023 — **Young Investigator Poster Presentation Award**
Early Career Investigator Contest, 2023 VA Research Week, Pittsburgh VA Medical Center

Oct 2019 — **George M. Bevier Award**
Department of Bioengineering, University of Pittsburgh

Jul 2018 — **Pre-PhD Most Outstanding Mentee Award**
Pitt STRIVE, University of Pittsburgh

Dec 2017 — **Virginia Asian Foundation Scholarship Award**
Virginia Asian Chamber of Commerce

Aug 2015 – May 2019 — **Provost Scholarship**
Virginia Commonwealth University

LEADERSHIP AND SERVICE EXPERIENCE

Sep 2022 – Jun 2023 — **Volunteer Instructor, Adult Computer Programming**
Hill District Community Engagement Center, University of Pittsburgh

- Instructed 8-week adult coding course for 10+ students
- Taught basic programming logic and Python syntax

Sep 2021 – Aug 2023 **Vice President, Brain Bag Committee Member**
Center for Neural Basis of Cognition, Carnegie Mellon University and University of Pittsburgh
- Coordinating and moderating weekly student research presentations and ethics seminars
- Tracking attendance during student talks and seminars
- Liaison for student committees and faculty program directors

Jul 2020 – Aug 2023 **Head of Undergraduate Summer Research Program**
Rehab and Neural Engineering Labs, University of Pittsburgh
- Led summer programming for undergrad for ~10 students every summer
- Organized weekly journal clubs and workshops for summer undergrad research assistants (Biosignals Processing Basics, How to Apply to Grad School)
- Improved hiring process and advertising for undergrad research program
- Spoke at Community College of Allegheny County and Point Park University classes and local National Society of Black Engineers chapter about research opportunities

Jan 2021 – Apr 2021 **Teaching Assistant**
University of Pittsburgh, BIOENG 2151 Medical Product Development
- Graded homework and final projects for 24 Masters of Medical Product Engineering students
- Assisted in in-class Q&As, activities, and discussions on the topics of FDA design controls, clinical strategies, human factors, competitive analyses, and risk management

Sep 2020 – Apr 2021 **Co-Editor-in-Chief, *Ingenium***
University of Pittsburgh, Swanson School of Engineering
- Coordinate abstract and manuscript submissions for the undergraduate engineering research journal *Ingenium*
- Review and edit abstracts and manuscripts
- Finalize manuscripts for publication

Aug 2020 – Dec 2020 **Teaching Assistant**
University of Pittsburgh, BIOENG 2167 Managing Medical Product Innovations
- Graded homework and final projects for 18 Masters of Medical Product Engineering students
- Assisted in in-class Q&As, activities, and discussions on the topics of product management, design thinking, Lean startup, and market discovery

Sep 2015 – May 2019 **President, Founder**
Virginia Commonwealth University, Phi Sigma Rho Engineering Society
- Led weekly chapter meetings overseeing 30+ members and e-board meetings overseeing 10+ members
- Drafted and enforced chapter bylaws and constitution
- Maintained communication between Nationals, VCU Fraternity and Sorority Life Office, and chapter

Aug 2017 – May 2018 **Chair of Membership and Initiation**
Virginia Commonwealth University, Tau Beta Pi Engineering Honors Society
- Led recruitment meetings and initiation ceremony
- Assisted in organizing annual Pi Day event, raising money to faculty's charity of choice

Aug 2017 – May 2018 **Secretary**
Virginia Commonwealth University, Engineering Student Council
- Maintained correspondence between the council, the School of Engineering faculty and administration, and sponsors of the annual Engineering Gala attended by 200+ students and faculty

Aug 2016 – May 2019 **Ambassador**
Virginia Commonwealth University, Engineering Student Ambassadors
- Advertised engineering student organizations

- Led tour groups to presentations and labs for prospective students

CONFERENCES

Nov 2023 — **Society for Neuroscience 2023 Annual Meeting**
Washington, DC
- Accepted nanosymposium talk on "Non-Primary Motor Area Involvement in Reaching Behavior after Subcortical Stroke"

Apr 2023 — **2023 11th International IEEE EMBS Conference on Neural Engineering**
Baltimore, MD
- Accepted abstract on "Visual Reaction Time Prediction in Stroke Patients with Spatial Neglect"

Mar 2023 — **2023 American Society for Neurorehabilitation Annual Meeting**
Charleston, SC
- Accepted abstract on "Non-Primary Motor Area Involvement in Reaching Behavior After Stroke"

Nov 2022 — **Society for Neuroscience 2022 Annual Meeting**
San Diego, CA
- Accepted abstract and presented poster on "Detection of Stroke-Induced Spatial Neglect and Prediction of Neglected Visual Targets with an Augmented Reality (AR)-Encephalography (EEG) System"

Mar 2022 — **2022 American Society for Neurorehabilitation Annual Meeting**
St. Louis, MO
- Accepted abstract and presented poster on "Detection of Stroke-Induced Spatial Neglect and Prediction of Neglected Visual Targets with an Augmented Reality (AR)-Encephalography (EEG) System"

Nov 2021 — **Society for Neuroscience 2021 Annual Meeting**
Virtual due to COVID-19 pandemic
- Accepted abstract and presented poster on "An Integrated Augmented Reality (AR) Encephalography (EEG) System for Detecting and Measuring Post-Stroke Spatial Neglect"

Nov 2021 — **2021 43rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society**
Virtual due to COVID-19 pandemic
- Accepted conference paper "Fine-tuning and personalization of EEG-based neglect detection in stroke patients"

Jul 2020 — **2020 42nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society**
Virtual due to COVID-19 pandemic
- Accepted conference paper "EEG-based Neglect Detection for Stroke Patients"

Oct 2019 — **2019 Biomedical Engineering Society Annual Meeting**
Atlanta, GA
- Accepted abstract and presented poster on "High-Density EMG and Mapping of Forearm Muscle Activity in Stroke and Neurologically-Intact Subjects"

Jan 2019 — **2019 14th IEEE Joint MMM-Intermag Conference**
Washington, DC
- Accepted abstract and presented poster on "3D Modeling of Diffusion Tensor Imaging Tractography Data for Finite Element Analysis of Transcranial Magnetic Stimulation"

Apr 2018 — **2018 IEEE 15th International Symposium on Biomedical Imaging**
Washington, DC

- Accepted abstract and presented poster on “3D Modeling of Diffusion Tensor Imaging Tractography Data for Finite Element Analysis”

Nov 2017 **2017 National Conference for Undergraduate Research**
Memphis, TN
- Accepted abstract and presented poster on “Filial Piety in Confucianism and the Educational Expectations of Chinese Parents in China vs. Chinese Immigrant Parents in the United States”

ORGANIZATIONS

Dec 2019 – Present **Center for Neural Basis of Cognition**
Carnegie Mellon University, University of Pittsburgh

Sep 2019 – May 2021 **Graduate Women in Engineering (GWEN)**
University of Pittsburgh

Mar 2017 – May 2019 **Tau Beta Pi Engineering Honors Society (VA-E)**
Virginia Commonwealth University

Aug 2017 – May 2018 **Engineering Student Council**
Virginia Commonwealth University

Aug 2016 – May 2019 **Biomedical Engineering Society**
Virginia Commonwealth University

Aug 2016 – May 2019 **Engineering Student Ambassadors**
Virginia Commonwealth University

Aug 2015 – May 2019 **Phi Sigma Rho Engineering Sorority (Omega)**
Virginia Commonwealth University

RELATED COURSEWORK

Graduate Introduction to Neural Systems Engineering, Neural Data Analysis, Systems Neuroscience, Applied Biostatistics, Cognitive Neuroscience, Advanced Cellular Neuroscience, Statistical Models of the Brain, Social, Political, and Ethical Issues in Biotechnology, Applied Regression Analysis

Undergraduate Rehabilitation Engineering and Prostheses, Human Factors Engineering, Human Performance Measurement Engineering, Assistive Technology, Robotics, Multivariate Calculus, Intro to Computing, Biotransport Processes, Biomedical Signal Processing, Computational Methods in Biomedical Engineering I/II, Finite Element Analysis in Solid Mechanics, Biomedical Instrumentation, Biomechanics, Biomaterials, Vertically Integrated Projects, Introduction to Programming, Introduction to Quantitative Physiology I/II