Jennifer Mak

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EDUCATION

University of Pittsburgh
PhD Bioengineering, NSF GRFP Fellow   *Aug 2019 - Jul 2024 (expected)*
- Thesis work: Brain Mechanisms of Visuomotor Deficits After Stroke
- Additional program: Center for the Neural Basis of Cognition (CNBC) with Carnegie Mellon University

Virginia Commonwealth University (VCU)
B.S. Biomedical Engineering, Minor: Mathematics, cum laude   *Aug 2015 - May 2019*
- Study Abroad: Robotics Engineering in Barcelona, Spain (Summer 2017)

RESEARCH AND WORK EXPERIENCE

Rehab Neural Engineering Labs (RNEL), University of Pittsburgh (Pittsburgh, PA)
PhD Candidate (Advisor: Dr. George Wittenberg)   *Aug 2019 - Jul 2024 (expected)*
- Developing a portable, adaptable EEG-augmented reality (AR) system for the detection and assessment of post-stroke spatial neglect using statistical modeling and machine learning on EEG-derived features
  - **Patent pending** (PCT International Application No. WO2023192470A1 filed March 30, 2023)
- Investigating upper-limb motor control in stroke patients using kinematic analyses and TMS to probe motor cortex connectivity during reaching in order to improve motor function with personalized neuromodulation techniques
- Designed functional MRI task to investigate changes in motor planning behavior in stroke
- Built a neurofeedback system for affect-biased attention training for adolescents with major depressive disorder using EEG-derived steady-state visual evoked potentials (SSVEPs)
  - **Patent pending** (U.S. Patent Application No. US20240090810A1 filed September 19, 2023)

Pre-PhD Research Experience for Undergraduates (REU) Scholar (Advisor: Dr. Doug Weber)   *Jun 2018 - Jul 2018*
- Assessed stroke-related weakness by mapping forearm muscle synergies in stroke patients using high-density EMG

DuraSafe, LLC (Richmond, VA)
Co-Founder, Engineering Testing Officer   *Jul 2018 - Jul 2023*
- Designed pressure-sensing epidural needle to improve the efficiency and safety of epidural procedures
- Wrote the competitive analysis, product design controls, human factors considerations, and clinical testing protocols
- Identified stakeholder needs and pain points through focus groups and interviews with nurse anesthetists
- Placed 1st in the VCU Pre-X program with teammates which secured $10,000 in funding to form an LLC

Biomagnetics Lab, Virginia Commonwealth University (Richmond, VA)
Undergraduate Research Assistant (Advisor: Dr. Ravi Hadimani)   *May 2017 - May 2019*
- Improved TMS simulations by creating fiber tract models and 3D brain models from DTI for FEA and 3D printing

SKILLS

- **Research**: Brain stimulation and recording, Transcranial magnetic stimulation (TMS), electroencephalography (EEG), electromyography (EMG), magnetic resonance imaging (MRI), signal processing, kinematics, KINARM Exoskeleton robot, statistical modeling, machine learning, diffusion tensor imaging (DTI), finite element analysis (FEA) and simulation, 3D printing, technical writing, scientific communication, oral presentations
- **Programming**: MATLAB/Simulink, Python, Java
- **Software**: Stata, SPSS, JMP, FreeSurfer, E-Prime, Sim4Life, Autodesk Fusion 360, SOLIDWORKS, Adobe Illustrator
- **Medical Product Development**: design controls, human factors, customer discovery, intellectual property, pitching
- **Project Management**: cross-functional collaboration, interdisciplinary teamwork, attention to detail, organization, team management, documentation, study participant data management (REDCap)

PUBLICATIONS

1. 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. *Front Neurosci*, 17, p.350.
2. Huang, X., **Mak, J.**, Wears, A., Price, R.B., Akcakaya, M., Ostadabbas, S., Woody, M.L., 2022, July. Using Neurofeedback from Steady-State Visual Evoked Potentials to Target Affect-Biased Attention in Augmented Reality. *Annu Int Conf IEEE Eng Med Biol Soc (EMBC).* (pp. 2314-2318).

3. **Mak, J.**, Kocanaogullari, D., Huang, X., Kersey, J., Shih, M., Grattan, E.S., Skidmore, E.R., Wittenberg, G.F., Ostadabbas, S., Akcakaya, M., 2022. Detection of Stroke-Induced Visual Neglect and Target Response Prediction Using Augmented Reality and Electroencephalography. *IEEE Trans Neural Syst Rehabil Eng.*, 30, pp.1840-1850.
4. Kocanaogullari, D., Huang, X., **Mak, J.**, Shih, M., Skidmore, E.R., Wittenberg, G.F., Ostadabbas, S. and Akcakaya, M., 2021, November. Fine-tuning and personalization of EEG-based neglect detection in stroke patients. *Annu Int Conf IEEE Eng Med Biol Soc (EMBC)* (pp. 1096-1099).
5. Kocanaogullari, D., **Mak, J.,** Kersey, J., Khalaf, A., Ostadabbas, S., Wittenberg, G.F., Skidmore, E.R., Akcakaya, M., 2020, July. EEG-based neglect detection for stroke patients. *Annu Int Conf IEEE Eng Med Biol Soc (EMBC).* (pp. 264-267).

MANUSCRIPTS UNDER REVIEW

1. **Mak, J.,** Akcakaya, M., Wittenberg, G.F., Ostadabbas, S., Grattan, E.S. Stroke-Induced Spatial Neglect Biomarkers: A Systematic Review of Technology in Detection and Assessment.
2. **Mak, J.,** Kocanaogullari, D., Huang, X., Mullen, K. L., Grattan, E.S., Ostadabbas, S., Wittenberg., G.F., Akcakaya, M. A Scalable EEG-Based Spatial Neglect Detection System in Augmented Reality for Stroke Patients.
3. Kocanaogullari, D., Gall, R., **Mak, J.,** Huang, X., Mullen, K. L., Ostadabbas, S., Wittenberg, G. F., Grattan, E. S., Akcakaya, M. Patient-Specific Visual Neglect Severity Estimation for Stroke Patients with Neglect using EEG.

FELLOWSHIPS

National Science Foundation (NSF)

Graduate Research Fellowship Program (GRFP)   *Sep 2021 - Aug 2024*
- Three-year fellowship with a $34,000-$37,000/year stipend and $16,000/year cost of education allowance

Integrative Graduate Education and Research Traineeship (IGERT) Program: Interdisciplinary   *Sep 2019*
Research Training in Rehabilitation Engineering
- $10,000 stipend award

AWARDS

- **Neural Control of Movement Scholarship**, Society for the Neural Control of Movement (NCM)   *Jan 2024*
- **Career Development Award**, Center for Neural Basis of Cognition (CNBC)   *Jan 2024*
- **Young Investigator Poster Presentation Award**, Pittsburgh Veterans Affairs Medical Center   *May 2023*
- **George M. Bevier Scholarship**, University of Pittsburgh   *Oct 2019*
- **Pre-PhD Scholars Program Most Outstanding Mentee Award**, University of Pittsburgh   *Jul 2018*
- **Virginia Asian Foundation Scholarship Award**, Virginia Asian Chamber of Commerce   *Dec 2017*
- **Provost Scholarship**, Virginia Commonwealth University   *Aug 2015 - May 2019*

LEADERSHIP AND SERVICE

Center for the Neural Basis of Cognition

Vice President, Brain Bag Committee Member   *Sep 2021 - Aug 2023*
- Organized weekly student research presentations and ethics seminars
- Managed committee budget and organized the collective student council budgets
- Facilitated communication between student committees and faculty program directors in leadership meetings

Rehab Neural Engineering Labs, University of Pittsburgh

Founder of Undergraduate Summer Research Program   *Jul 2020 - Aug 2023*
- Created summer programming for ~10 undergraduate research assistants every summer which included weekly journal clubs and technical and professional development workshops
- Improved fairness in the hiring process with a redesigned applicant evaluation and personal statements to consider students with limited prior experience or academic achievements
- Advertised the program with outreach presentations to classes at Community College of Allegheny County and Point Park University and the local chapter of the National Society of Black Engineers

Ingenium (University of Pittsburgh Undergraduate Engineering Research Journal)

Graduate Student Review Board   *Sep 2021 - Present*
Co-Editor-in-Chief   *Sep 2020 - Apr 2021*
- Screened abstract and manuscript submissions from undergraduate engineering students for reviewer assignment
- Reviewed abstracts and manuscripts and finalized manuscripts with the publisher

Phi Sigma Rho Engineering Sorority (Omega Chapter), Virginia Commonwealth University

Vice President of Standards   *Sep 2017 - May 2018*
Chair of Risk Management   *Sep 2016 - May 2017*
President and Founder   *Sep 2015 - May 2019*

- Advised and led weekly chapter meetings with 30+ members and e-board meetings with the chapter leadership
- Drafted and enforced chapter bylaws and constitution with co-founders
- Corresponded between the national organization, university oversight bodies, and local Greek life chapters

Tau Beta Pi Engineering Honors Society, Virginia Commonwealth University

Chair of Membership and Initiation   *Aug 2017 - May 2018*

- Led recruitment meetings and initiation ceremonies of new members
- Assisted in organizing the annual Pi Day event which raised money for engineering faculties' charity of choice

Engineering Student Council, Virginia Commonwealth University

Secretary   *Aug 2017 - May 2018*

- Corresponded between the council, School of Engineering faculty and administration, and corporate sponsors of the annual Engineering Gala attended by 200+ students and faculty

Engineering Student Ambassadors, Virginia Commonwealth University

Ambassador   *Aug 2016 - May 2019*

- Led tour groups to labs and advertised engineering student organizations for prospective students

TALKS AND MEDIA

Neural Control of Movement 2024 Annual Meeting, Dubrovnik, Croatia
"Non-Primary Motor Area Involvement in Reaching Behavior after Subcortical Stroke"   *Apr 2024*

- Scientific panel discussion on "The underlying mechanisms of motor impairments after stroke"

***Where does your journey STEM From?* Podcast with Dr. Carina Minardi**
Episode: "Jennifer Mak at University of Pittsburgh"   *Nov 2023*

- Educational podcast discussing STEM career journeys, academic research, and interests in science

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

- Scientific podium talk in the "Imaging and Assessment of Stroke Damage" Nanosymposium session

Rehab Neural Engineering Labs, University of Pittsburgh
"How to Prelim: Professional and Technical Development Seminar Series"   *Jan 2022, Jan 2023*

- Information session for first- and second-year Bioengineering PhD students on how to successfully prepare for the PhD preliminary exam milestone

TEACHING

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

- Instructed 8-week coding course on basic programming logic using Python for 10+ adults in underserved communities

Rehab Neural Engineering Labs, University of Pittsburgh
Applying to Grad School Workshops   *Aug 2021, Jul 2022, Jul 2023*

- Summer workshop for undergraduates on the process of and tips for applying to graduate programs

Biosignals Processing Basics Workshops   *Jul 2021, Jul 2022, Jun 2023*

- Summer workshops for undergraduates on an introduction to signals processing for biological systems with hands-on examples in EMG, EEG, peripheral nerve, and intracortical brain recordings

University of Pittsburgh Swanson School of Engineering
Graduate Teaching Assistant, Medical Product Development   *Jan 2021 - Apr 2021*

- Advised 24 Masters of Medical Product Engineering students in homework, class activities, and discussions on FDA design controls, clinical strategies, human factors, competitive analyses, and risk management

Graduate Teaching Assistant, Managing Medical Product Innovation   *Aug 2020 - Dec 2020*

- Advised 18 Masters of Medical Product Engineering students in homework, class activities, and discussions on product management, design thinking, Lean startup, and market discovery

Virginia Commonwealth University Honors College
Head Teaching Assistant, Honors Rhetoric *Aug 2016 - May 2019*
- Assisted students in developing research questions and writing a technical literature review
- Managed 40+ undergraduate teaching assistants with breakout session schedules and review assignments

CONFERENCE POSTER PRESENTATIONS
- **11th International IEEE EMBS Conference on Neural Engineering,** Baltimore, MD *Apr 2023*
- **American Society for Neurorehabilitation Annual Meeting**, Charleston, SC *Mar 2023*
- **Society for Neuroscience Annual Meeting**, San Diego, CA *Nov 2022*
- **American Society for Neurorehabilitation Annual Meeting**, St. Louis, MO *Mar 2023*
- **Society for Neuroscience Annual Meeting**, Virtual *Nov 2021*
- **Biomedical Engineering Society Annual Meeting,** Atlanta, GA *Oct 2019*
- **14th IEEE Joint MMM-Intermag Conference**, Washington DC *Jan 2019*
- **IEEE 15th International Symposium on Biomedical Imaging** *Apr 2018*
- **National Conference for Undergraduate Research,** Memphis, TN *Nov 2017*

ORGANIZATIONS
- **Neural Control of Movement (NCM)** *Dec 2023 - Present*
- **American Society for Neurorehabilitation (ASNR)** *Mar 2022 - Present*
- **Society for Neuroscience (SfN)** *Nov 2021 - Present*
- **IEEE Engineering in Medicine and Biology Society** *Mar 2021 - Present*
- **Center for the Neural Basis of Cognition**, Carnegie Mellon University, University of Pittsburgh *Dec 2019 - Present*
- **Graduate Women in Engineering (GWEN)**, University of Pittsburgh *Sep 2019 - Present*
- **Tau Beta Pi Engineering Honors Society (VA-E)**, Virginia Commonwealth University *Nov 2016 - May 2019*
- **Biomedical Engineering Society**, Virginia Commonwealth University *Sep 2016 - May 2019*
- **Engineering Student Council**, Virginia Commonwealth University *Sep 2017 - May 2018*
- **Engineering Student Ambassadors**, Virginia Commonwealth University *Sep 2016 - May 2019*
- **Phi Sigma Rho Engineering Sorority (Omega)**, Virginia Commonwealth University *Sep 2015 - May 2019*