Katrina P. Nguyen, PhD

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Postdoctoral research fellow at the University of Colorado Denver | Anschutz Medical Campus with over 6 years of research experience processing and analyzing neural, imaging, and behavioral data. Trained in basic science research and methodology with a passion in distilling large biomedical and neural data sets.

Education

Carnegie Mellon University — **Pittsburgh, PA**
Ph.D., Biomedical Engineering — *Aug 2016 – Sep 2022*
Center for the Neural Basis of Cognition
Thesis: Dissection of detailed motor behaviors and circuit functions of the basal ganglia in health and disease

George Mason University — **Fairfax, VA**
B.S., Bioengineering — *Aug 2010 – May 2014*

Technical Skills

Tools and Languages Matlab, Python (NumPy, SciPy, matplotlib, pandas), Git, LaTeX, HPC scheduler (SLURM), SolidWorks, Autodesk Inventor, Microsoft Office Suite, Adobe Illustrator, Affinity Designer

Quantitative Research Research Design, Research Dissemination, Project Management, Interpersonal and Collaborative Communication, Data Analysis and Visualization

Research Experience

University of Colorado Denver | Anschutz Medical Campus — **Aurora, CO**
Postdoctoral Fellow — *Nov 2022 – Present*
Advisors — Abigail Person, PhD and Diego Restrepo, PhD

- Study kinematic adjustments during an odor-guided forelimb reaching tasks in rodents.
- Build data pipelines to acquire videos and synchronize with 2-photon calcium imaging data during behavior.
- Present research regularly at international conferences and internal seminars.

Carnegie Mellon University — **Pittsburgh, PA**
Graduate Student Researcher — *Aug 2016 – Sep 2022*
Advisors — Aryn Gittis, PhD and Steven Chase, PhD

- Designed and constructed novel behavioral devices to study kinematic adjustments during motor learning tasks in rodents.
- Built data pipelines to acquire high frame rate video files (100s of GBs) and analyze data in MATLAB and Python using regression, time series analysis, and probabilistic frameworks.
- Mentored students (2 undergraduates, 2 masters) and collaborated with lab mates to apply my computational skills to their projects.

National Institutes of Health (NIDDK) — **Bethesda, MD**
Postbaccalaureate IRTA Fellow — *Jul 2014 – Aug 2016*
Advisor — Alexxai Kravitz, PhD

- Constructed a low-cost, home cage compatible automatic pellet dispensing device to obtain high temporal resolution data for feeding behavior and patterns. [web]
- Studied basal ganglia circuit behavior and changes in obesity and addition disease states using behavioral testing, optogenetics, and optical measurements

George Mason University **Fairfax, VA**
Undergraduate Research Scholar *Apr 2013 – Jul 2014*
Advisor — Wilsaan Joiner, PhD

- Designed and performed psychophysical studies on human subjects to study the retention of motor adaptation with different methods of applied perturbing force.
- Analyzed data sets (10s of GBs) in MATLAB to identify changes in reaching movements with motor adaptation.

Children's National Medical Center **Washington, D.C.**
Research Volunteer *Aug 2013 – May 2014*
Advisor — Kevin Cleary, PhD

- Worked with a team of medical doctors and researchers in the Sheikh Zayed Institute for Pediatric Surgical Innovation to construct a low-cost fetal EKG monitoring system.
- Recorded heart signals from ultrasound device and performed offline analysis to calculate heart rate.

INOVA Neuroscience Institute **Fairfax, VA**
Research Intern *Jan 2014 – May 2014*
Advisor — James Leiphart, MD

- Modified equipment such as amplifiers and data acquisition systems to record spinal electrical activity from patients suffering from chronic neuropathic pain.

Children's National Medical Center **Washington, D.C.**
Student Innovator Intern *Jun 2013 – Aug 2013*
Advisor — Janice LePlatte, MS, BSN, RN-BC

- Developed device to enhance seizure simulations on a manikin to improve quality of education.
- Assisted the Simulation Center with setting up and running daily scenarios to educate staff, evaluate processes, and identify gaps with the aim to promote patient safety and improve care.

Professional Experience

Pallidus Sensing [web] **St. Louis, MO**
Senior Engineer/Consultant *Jan 2023 – present*

Department of Biomedical Engineering (CMU) **Pittsburgh, PA**
Teaching Assistant

- Introduction to Neuroscience for Engineers *Jan 2017 – May 2017*
- Physiology *Jan 2018 – May 2018*
- Neural Data Analysis *Sep 2019 – Dec 2018*

Department of Bioengineering (GMU) **Fairfax, VA**
Teaching Assistant

- Physiology for Engineers Aug 2013 – Dec 2013

Schischek Incorporated **Fairfax, VA**
Intern/Assistant *Jun 2012 – Dec 2013*

Kumon Math and Reading Center **Chantilly, VA**
Tutor/Teaching Assistant *Jul 2007 – Dec 2012*

Leadership and Team Experience

Neuroscience Institute (CMU) **Pittsburgh, PA**
Bootcamp Teaching Assistant *Aug 2021*

- Developed an intensive 3-day "Computational Neuroscience Bootcamp" for incoming graduate students.
- Guided students in the acquisition and analysis of a sample data set to develop a broad foundation of computational tools.

Center for the Neural Basis of Cognition (CMU) **Pittsburgh, PA**
Committee Member *May 2018 – Dec 2021*

- Served as a liaison between faculty, administration, and students which led to critical student input in redesign of the Center for the Neural Basis of Cognition training program courses and requirements.

Volunteer and Service Experience

NINDS Training and Diversity Discussion Panel — **Bethesda, MD**
Panel Member — *Aug 2020*

Covestro Pittsburgh Regional Science and Engineering Fair — **Pittsburgh, PA**
Category Judge — *Apr 2019*

Biological Sciences Outreach Program — **Pittsburgh, PA**
Teaching Assistant — *Apr 2019*

Intel International Science and Engineering Fair — **Pittsburgh, PA**
Grand Award Judge — *May 2019*

The iNFORMER Fellows Newsletter — **Bethesda, MD**
Co-Editor — *Jun 2015 – Aug 2016*

NIDDK Fellows Advisory Board — **Pittsburgh, PA**
Postbaccalaureate Delegate — *Jun 2015 – Aug 2016*

Adventures in Science Program — **Bethesda, MD**
Session Leader — *Oct 2015 – Jun 2016*

NIDDK DSRTP for Undergraduate Students — **Bethesda, MD**
Mentor — *Jun 2015 – Aug 2016*

Presentations

Invited Talks

1. **Nguyen KP**. How I automated my job feeding mice. *Hackaday Superconference* (Pasadena, CA). 2-4 November 2018.

2. **Mini-symposium: Open-source hardware for neuroscience research**
   Nguyen KP. Feeding Experimentation Device (FED): an open-source system for measuring food intake in rodents. *Society for Neuroscience Annual Meeting* (Washington, D.C.). 13 November 2017.

Conference Presentations

1. **Nguyen KP***, Isett BR*, Schwenk JC, Gittis AH. Locomotor suppression via indirect pathway spiny projection neuron stimulation is not mediated through the globus pallidus externus. *Basal Ganglia Gordon Research Conference* (Ventura, CA). 20-25 March 2022.

2. **Nguyen KP**, Sharma A, Gittis AH*, Chase SM*. Mice learn to modulate intra- and inter-limb paw kinematics with training on a novel locomotor behavioral paradigm. *Society for Neuroscience Annual Meeting* (San Diego, CA). 3-7 November 2018.

3. **Nguyen KP**, Licholai JA, Kravitz AV. Why do mice over-eat palatable diets? A comparison of hedonic and homeostatic mechanisms. *Society for Neuroscience Annual Meeting* (San Diego, CA), 12-16 November 2016.

4. Licholia JA*, **Nguyen KP***, Kravitz AV. Wireless Feeding Experimentation Device (FED) to monitor home cage feeding behavior in rodents. *NIH Postbac Poster Day* (Bethesda, MD), 20 April 2016.

5. **Nguyen KP**, McKenna EL, Bray LC, Colucci K, Alhussein L, Hosseini EA, Joiner WM. The training duration influences the magnitude of motor adaptation retention, but not the magnitude of savings following a 24-hour break. *Society for Neuroscience Annual Meeting* (Chicago, IL), 17-21 October 2015.

6. **Nguyen KP**, Kravitz AV. Functional dissociations between striatal subregions: Activation of direct pathway neurons increases motor output in the dorsomedial, but not ventral, striatum. *NIH Research Festival* (Bethesda, MD), 16-18 September 2015.

7. **Nguyen KP**, Kravitz AV. Engineering a system to monitor home cage feeding behavior in rodents. *Society for the Study of Ingestive Behavior* (Denver, CO), 7 July 2015.

8. **Nguyen KP**, Hosseini EA, Joiner WM. The decay of motor adaptation to novel movement dynamics reveals hysteresis in motor primitive gain-space. *Society for Neuroscience Annual Meeting* (Washington, DC), 15-19 November 2014.

9. **Nguyen KP**, Hosseini EA, Joiner WM. The decay of task-relevant and task-irrelevant components of motor adaptation to novel movement dynamics. *OSCAR Celebration of Student Scholarship* (Fairfax, VA), 5 May 2014.

Publications

1. Isett BR*, **Nguyen KP***, Schwenk JC, Yurek JR, Snyder CN, Vounatsos MV, Adegbesan KA, Ziausyte U, Gittis AH. (accepted) The indirect pathway of the basal ganglia promotes transient punishment, but not motor suppression. *Neuron*.

2. **Nguyen KP**, Sharma A, Gil-Silva M, Gittis AH*, Chase SM*. (2021) Distinct kinematic adjustments over multiple timescales accompany locomotor skill development in mice. *Neuroscience*.

3. Matikainen-Ankney BA, Earnest T, Ali M, Casey E, Wang JG, Sutton AK, Legaria AA, Barclay KM, Murdaugh LB, Norris MR, Chang YH, **Nguyen KP**, Lin E, Reichenbach A, Clarke RE, Stark R, Conway SM, Carvalho F, Al-Hasani R, McCall JG, Creed MC, Cazares V, Buczynski MW, Krashes MJ, Andrews ZB, Kravitz AV. (2021) An open-source device for measuring food intake and operant behavior in rodent home-cages. *eLife*. 10, e66173.

4. Alhussein L, Hosseini EA, **Nguyen KP**, Smith MA, Joiner WM. (2019) Dissociating effects of error size, training duration, and amount of adaptation on the ability to retain motor memories. *J Neurophysiol*. 122(5), 2027-2042.

5. **Nguyen KP**, Zhou W, McKenna EL, Colucci-Chang K, Bray LC, Hosseini EA, Alhussein L, Rezazad M, Joiner MW. (2019) The 24-hour savings of motor adaptation to novel movement dynamics initially reflects the recall of previous performance. *J Neurphysiol*. doi:10.1152/jn.00569.2018

6. Licholai JA*, **Nguyen KP***, Fobbs WC, Schuster CJ, Kravitz AV. (2018) Why do mice overeat high-fat diets? How high-fat diet alters the regulation of daily caloric intake in mice. *Obesity*. 26, 1026-1033.

7. LeBlanc KH, London TD, Szczot I, Bocarsly ME, Friend DM, **Nguyen KP**, Mengesha MM, Rubinstein M, Alvarez VA, Kravitz AV (2018) Striatopallidal neurons control avoidance behavior in exploratory tasks. *Mol Psychiatry*. doi:10.1038/s41380-018-0051-3

8. Hosseini EA, **Nguyen KP**, Joiner WM. (2017) The decay of motor adaptation to novel movement dynamics reveals an asymmetry in the stability of motion state-dependent learning. *PLOS Comput Biol*. 13(5): e1005492.

9. **Nguyen KP**, Ali MA, O'Neal TJ, Szczot I, Licholai JA, Kravitz AV. (2017) Feeding Experimentation Device (FED): Construction and validation of an open-source device for measuring food intake. *J Vis Exp*. 120.

10. **Nguyen KP**, O'Neal TJ, Bolonduro OA, White E, Kravitz AV. (2016) Feeding Experimentation Device (FED): A flexible open-source device for measuring feeding behavior. *J Neurosci Meth*. 267:108-114.

11. Devarakonda K, **Nguyen KP**, Kravitz AV. (2015) ROBucket: a low cost operant chamber based on the Arduino microcontroller. *Behavior Research Methods*. 48(2): 503-509.

Honors and Awards

Journal Cover Artwork Nov 2021
Trends in Cognitive Sciences (Volume 25, Issue 11) [web]

Outstanding Poster Award Sep 2018
Forum on Biomedical Engineering (CMU)

Henry L. Hillman Presidential Fellowship Aug 2016
Carnegie Mellon University

NIDDK Innovation Award Aug 2016
National Institutes of Health

Outstanding Poster Award May 2016
Postbac Poster Day (NIH)

Graduate Research Fellowship Program Honorable Mention Mar 2016
National Science Foundation

Certificate of Appreciation Mar 2016
NIDDK - Office of Minority Health Research Coordination

Undergraduate Research Scholars Program Award Aug 2013, Jan 2014
George Mason University – Office of Student Scholarship, Creative Activities, and Research

Student Excellence Award May 2014
George Mason University – Office of Student Scholarship, Creative Activities, and Research