Quang Pham Hong Vu

vu8@stolaf.edu 507-581-7618 https://quangvumathneuro.github.io/

EDUCATION

BA **St. Olaf College**, Mathematics and Neuroscience — Aug 2021 – May 2025

- GPA: 3.6/4.0, Major GPA: 3.7/4.0
- **Coursework:** Measure Theory, Dynamical System and Markov Chain, Quantum Computing and Logic, Computational Mathematics/algorithms, Combinatorics, Topology, Complex Analysis, Probability Theory, Computational Neuroscience, Neurobiology, Cellular and Molecular Neuroscience, Graph Theory, Statistical Modeling, Neuroethology.

PUBLICATIONS

- A. Wikle, D. Broder, J. Gallagher, J. Dominguez, M. Carlson, **Q. Vu**, R. Tinghitella, N. Lee. Neural and behavioral evolution in an eavesdropper with a rapidly evolving host. Curr Biol. Under review.
- J. Dominguez, B. Latham, L. Mongui, A. Rossinow, Y. Xiong, B. Schmidt, **Q. Vu**, B. Torres-Lopez, P. Henderson, A. Mason, N. Lee. Resource competition affects the developmental outcome of the acoustic parasitoid fly Ormia ochracea. J Anim Physiol. In Revision.
- L. Mongui, J. Gilbert, J. Dominguez, **Q. Vu**, B. Torres-Lopez, N. Lee. Interaural Distance Affects Localization Accuracy in the Acoustic Parasitoid Fly *Ormia ochracea.* In Preparation.
- L. Bitner, A. Rossinow, C. Green, A. Whalen, **Q. Vu**, B. Torres-Lopez, N. Lee. Effects of Gravid Status on Auditory Tuning. In Preparation.

PRESENTATIONS AND OUTREACH

Oral

- Wikle, A. W., Broder, E. D., Gallagher, J. H., Dominguez, J., Carlson, M., **Vu, Q.**, Tinghitella, R. M., & Lee, N. (August 2024). Neural and behavioral evolution in an eavesdropper with a rapidly evolving host. Oral presentation at the International Society for Neuroethology Conference, Berlin, Germany.
- Dominguez, J. A., **Vu, Q.**, Gyaltsen, T., Morgan, J., Bemish, L., Bitner, L., Gray, D. A., Mason, A. C., & Lee, N. (August 2023). Cricket song temporal pattern recognition across populations of *Ormia ochracea*. Oral presentation at the 61st Animal Behaviour Society Conference, Toronto, Canada.
- **Vu, Q.**, Dominguez, J., Wikle, A., Broder, D., Tinghitella, R. M., & Lee, N. (July 2023). The behavioral and neural auditory tuning of *Ormia ochracea* in Florida and across Hawaii. Oral presentation at the 60th Animal Behaviour Society Conference, Portland, OR.

Posters

- **Vu, Q.**, Morgan, J., Dominguez, J. A., Bitner, L., Gyaltsen, T., Bemish, L., & Lee, N. (October 2024). Does developmental plasticity allow Ormia ochracea to attend to novel signals? Poster presented at the St. Olaf College CURI/McNair Symposia, Northfield, MN.
- Bemish, L., Gyaltsen, T., Dominguez, J. A., Bitner, L., **Vu, Q.**, Morgan, J., & Lee, N. (October 2024). Host cricket song pattern recognition across populations of Ormia ochracea. Poster presented at the St. Olaf College CURI/McNair Symposia, Northfield, MN.
- Wikle, A. W., Broder, D., Gallagher, J. H., Dominguez, J., Carlson, M., **Vu, Q.**, Tinghitella, R. M., & Lee, N. (August 2024). Neural and behavioral evolution in an eavesdropper with a rapidly evolving host. Poster presented at the International Society for Neuroethology Conference, Berlin, Germany.
- Dominguez, J. A., **Vu, Q.**, Gyaltsen, T., Morgan, J., Bemish, L., Bitner, L., Gray, D. A., Mason, A. C., & Lee, N. (August 2024). Cricket song temporal pattern recognition across populations of *Ormia ochracea*. Poster presented at the International Society for Neuroethology Conference, Berlin, Germany.
- Xiong, Y., Dominguez, J. A., Latham, B., Monguí, L. C., Rossinow, A., Schmidt, B. V., **Vu, Q.**, Torres-Lopez, B. L., Henderson, P. A., Mason, A. C., & Lee, N. (August 2023). Resource competition affects the developmental outcome of the

acoustic parasitoid fly *Ormia ochracea*. Poster presented at the 61st Animal Behaviour Society Conference, Toronto, Canada.

- Torres, B., Qarabsa, R., **Vu, Q.**, Dominguez, J., Wikle, A., Broder, D., Tinghitella, R. M., & Lee, N. (October 2023). Population differences in auditory sensitivity of *Ormia ochracea*. Poster presented at the St. Olaf College CURI/McNair Symposia, Northfield, MN.

Outreach

- The Science of Sound, Ear of the Beholder [Outreach]. Bell Museum, University of Minnesota, St. Paul, MN (January 2024).
- Animal Behavior Society Outreach Fair, Ear of the Beholder [Outreach]. Portland Convention Center, Portland, OR (July 2023).

Research Experience

Lee Lab of Neural Systems and Behavior, St. Olaf College

Principal Investigator: Dr. Norman Lee, July 2022 - Present

***Ormia ochracea* auditory tuning in Hawaiian island**

- Determine the auditory frequency sensitivity of Hawaiian and Floridian *O. ochracea*
- Use signal detection theory analysis and extracellular neurophysiological recordings for auditory tuning evidence
- Develop glass electrodes for extracellular multi-unit neural recordings
- Write up an R notebook to show randomness in researcher behavioral experiment collection
- Develop MATLAB GUI for analyze and collect data using

Cricket song temporal pattern recognition of Ormia ochracea

- Evaluate different temporal parameters for host cricket song recognition
- Determine temporal selectivity across a range of pulse duration and interpulse interval combinations
- Use glass electrodes for extracellular single neuron neural recordings
- Create a phototaxis index to plot behavioral heat maps

Developmental outcomes of propagating Ormia ochracea with the house cricket Acheta domesticus

- Use general linear regression models to find correlation between cricket morphology and hatching succces
- Analyze pupae eclosion success through morphological properties
- Data entry using ImageJ for morphology data

Effects of gravid status Ormia ochracea auditory tuning

- Utilize DeepLabCut to anaylse free flying behavioral
- Record multi-unit neural recordings using glass electrode
- Analyze frequency tuning curve differences between flies at different developmental stages

ScogLab, St. Olaf College

Principal Investigator: Dr. Jeremy Loebach, January 2024 - Present

Pupillometry and Auditory Cognition in Normal Hearing Listeners, Hearing Impaired Individuals, and Cochlear Implant Patient

- Investigate auditory and neurocognitive mechanisms that give rise to accurate speech perception in a variety of listeners normal hearing, hearing impaired and cochlear implant users
- Analyze data and statistical modeling of the data
- Build a better parameter for pupillometry data analysis using Bayesian statistics
- Use clique topology to identify retina characteristics from patient to patient from pupillometry data

St. Olaf College Mathematics Department

Higher Rank Graphs and Cartan Subalgebras

Principal Investigator: Dr. Rachel Norton, February 2024 - May 2024

- Worked with theorem to classify which graphs can be considered higher rank graph
- Found specific properties to relief some conditions for higher rank graph

Preimages Under the Bubblesort Operator

Principal Investigator: Dr. Adam Schultze, February 2023 - May 2023

- Discovered sorting algorithms called “Shuffle Sorts”
- Used graph theory in Sage to generate tree of preimages using bubblesort operator
- Explored relationship between objects in the codomain after the sorting algorithms

TEACHING EXPERIENCE

- Calculus Teaching Assistant, St. Olaf College — May 2022 - May 2024
- Cellular Biology Teaching Assistant, St. Olaf College — September 2022 - May 2023
- Probably Theory Teaching Assistant, St. Olaf College — February 2023 - May 2023
- Abstract Algebra, Calculus, Real Analysis, and Mathematics Algorithms Personal Tutor, St. Olaf College — May 2024 - Present

HONORS AND GRANTS

- Dean’s List, St. Olaf College — Fall, Spring 2022
- Pi Mu Epsilon Mathematical Honor Society — Spring 2023
- Nu Rho Psi Neuroscience Honor Society — Spring 2024

EMPLOYMENT & COMMUNITY INVOLVEMENT

- Biology & Physics Stockroom Technician, St. Olaf College — May 2022 - September 2022
- Advancement Services Worker, St. Olaf College — November 2021 - September 2022
- Football Team Video Coordinator and Manager, St. Olaf college — August 2022 - Present

SKILLS

Languages: Qiskit, MATLAB, C++, Rstudio, Python, Mathematica, LaTeX, HTML5, and CSS, Jupyter Notebook

Technologies: Linux, Circuit Design, XCode, Interface Builder,