Quang Pham Hong Vu

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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*. Talk presented 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. Talk presented 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: 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 behavioral auditory tuning evidence
- Develop glass electrodes for extracellular multi-unit neural recordings
- Write up an R script 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
- Plot response behavioral heat maps using phototaxis index

Developmental outcomes of propagating Ormia ochracea with the house cricket Acheta domesticus
- Use general linear regression models to find significant difference in cricket morphology to hatching succces
- Analyze pupae 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: Jeremy Loebach, January 2024 - Present
Pupillometry and Auditory Cognition in Normal Hearing Listeners, Hearing Impaired Individuals and Cochlear Implant
- Investigate auditory and neurocognitive mechanisms that give rise to accurate speech perception in a variety of listening environments in normal hearing, hearing impaired and cochlear implant users
- Analyze data and statistical modeling of the data
- Use time series analysis to help build a better parameter for pupillometry data analysis
- 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: 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: 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 after the sorting algorithms

HONORS AND GRANTS

- 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

TEACHING EXPERIENCE

- 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,