QUANG PHAM HONG VU

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EDUCATION

Bachelor of Arts, St. Olaf College, MN, Sep 2021 - May 2025
Budapest Semester of Mathematics, Budapest, Hungary, Fall 2023
Major(s): Mathematics, Neuroscience. *Cumulative GPA: 3.6/4.00, Major GPA: 3.7/4.00*
Language(s): English (fluent), Vietnamese (fluent), German (Beginner)
Coursework: Measure Theory Probability, Dynamical System and Markov Chain, Quantum Computing and Logic, Computational Mathematics, Combinatorics, Topology, Complex Analysis, Probability Theory Computational Neuroscience, Biopsychology, Molecular Neuroscience, Graph Theory, Statistical Modeling.

PUBLICATION

Dominguez, J.A., Latham, B., Mongui, L.C., Rossinow, A., Xiong, Y., Schmidt, B.V., **Vu, Q.**, Torres-Lopez, B.L., Henderson, P.A., Mason, A.C., and N. Lee. (under review). Resource competition affects the developmental outcome of the acoustic parasitoid fly *Ormia ochracea*.

PRESENTATIONS AND OUTREACH

- **Vu, Q.**, Dominguez, J., Wikle, A., Broder, D., Tinghitella, R.M., and N. Lee (July 2023) The behavioral and neural auditory tuning of *Ormia ochracea* in Florida and across Hawaii. Talk given at the 60th Animal Behaviour Society Conference, Portland, OR.
- Torres, B., Qarabsa, R., **Vu, Q.,** Dominguez, J., Wikle, A., Broder, D., Tinghitella, R.M., and N. Lee (October 2023) Population Differences In Auditory Sensitivity of *Ormia ochracea.* Poster presented at the St. Olaf College CURI/McNair Symposia, Northfield, MN.
- The Science of Sound, Ear of the Beholder, Bell Museum, University of Minnesota, St. Paul, MN (January 2024)
- Animal Behavior Society Outreach Fair, Ear of the Beholder, Portland Convention Center, Portland, OR (July 2023)

REASEARCH EXPERIENCE

St. Olaf College Mathematics Department
Principal Investigator: Rachael Norton
Higher Rank Graphs and Cartan Subalgebras Feb 2024-May 2024

- Higher rank graphs are generalized of a directed graph to higher dimensions. Higher rank graphs are a useful tool for understand complicated networks
- Working with theorem to classify which graphs can be considered higher rank graph
- Finding specific properties to relief some conditions for higher rank graph

Principal Investigator: Adam Schultze
Preimages Under The Bubblesort Operator Feb 2023-May 2023

- Sorting algorithms are used to take a randomly sorted list of numbers and, after a few iterations of the algorithm, sort them into increasing order. Discovered sorting algorithms called "Shuffle Sorts"
- Using elementary graph theory in Sage to generate tree of preimages using bubblesort operator
- Explore relationship between objects after the sorting algorithms

ScogLab, St. Olaf College Jan 2024-Present
Principal Investigator: Jeremy Loebach
Pupillometry and Auditory Cognition in Normal Hearing Listeners, Hearing Impaired Individuals and Cochlear Implant

- Project investigating 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

- Helped condition and analyze data, will be more heavily involved in data analysis and statistical modeling of the data
- Using time series analysis to help build a better parameter for pupillometry data analysis

Lee Lab of Neural Systems and Behavior, St. Olaf College Jul 2022-Present

Principal Investigator: Norman Lee

Ormia ochracea Auditory Tuning in Hawaiian Island

- Determined the auditory frequency sensitivity of Hawaiian and Floridian *O. ochracea*
- Using signal detection theory analysis and extracellular neurophysiological recordings for behavioral auditory tuning evidence
- Developing glass electrodes for intracellular neural recordings
- Written up an R script to show randomness in researcher behavioral experiment collection. Analyzed and collected data using MATLAB

Cricket Song Temporal Pattern Recognition of Ormia ochracea

- Evaluate different temporal parameters for host cricket song recognition
- Determined temporal selectivity across a range of pulse duration and interpulse interval combinations
- plotted response behavioral heat maps using phonotaxis index

SKILLS

- **Programming:** MATLAB, C#, C++, R, Python, Mathematica, LaTeX, HTML5, and CSS, Jupyter Notebook
- **Engineering:** circuit design, Autodesk, 3D-printing

PERSONAL PROJECTS

Stochastic Calculus for Risk-neutral Pricing Model

- Implement Girsanov and Martingale Representation theorems to analyze asset pricing.

Monte Carlo simulation for portfolio assets allocation

- Using Monte Carlo and Simulated annealing to assess the changes of a retirement portfolio for 30 years.

HONORS AND GRANTS

- Dean's Scholarship, St. Olaf College (2021 - 2025)
- 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

TEACHING EXPERIENCE

- **Cellular Biology & Calculus Supplemental Instructor,** St. Olaf College May 2022-May 2024
- **Cellular Biology Teaching Assistant,** St. Olaf College Sep 2022-May 2023
- **Probably Theory Teaching Assistant,** St. Olaf College Feb 2023-May 2023

WORK EXPERIENCE

- **Biology & Physics Stockroom Technician,** St. Olaf College May 2022-Sep 2022
- **Advancement Services Worker,** St. Olaf College Nov 2021-Sep 2022

LEADERSHIP & INVOLVEMENT

- **Football Team Video Coordinator and Manager,** St. Olaf college Aug 2022-Present
- **Badminton Club Treasurer,** St. Olaf college May 2022-Jan 2023