Sidney Rafilson

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EDUCATION

University of Oregon — *Eugene, OR*
B.S in Mathematics and Neuroscience: GPA 3.77
Graduated: June 2024

- **Relevant Coursework**: Stochastic Modeling, Dynamical Systems, Numerical & Real Analysis, Statistics, Linear Algebra, Neurobiology, Clinical and Cognitive Neuroscience, General Physics, Biology, and Chemistry

Central Oregon Community College – *Bend, OR*
High School Early College Program*: GPA 3.89*
June 2019 – June 2020

- **Relevant Coursework:** Differential Equations, Multivariable Calculus, Research Methods, Developmental and Physiological Psychology, Psychopharmacology

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PUBLICATIONS

- **Rafilson et al.,** (2025) *Challenges in inferring breathing rhythms from olfactory bulb local field potentials.* Chemical Senses
- Sterrett, Findley, **Rafilson,** et al., (eLife). *Olfactory bulb tracks breathing rhythms and place in freely behaving mice.*

PRESENTATIONS

- **Rafilson et al.,** (2025). *Neural correlates of sniffing and place in simultaneous recordings from the olfactory bulb and hippocampus.* Poster presented at the Association for Chemoreception Sciences conference
- **Rafilson et al.,** (2024). *Challenges in inferring breathing rhythms from olfactory bulb local field potentials.* Poster presented at the Society for Neuroscience conference.
- **Rafilson et al.,** (2024). *Olfactory bulb local field potentials track breathing rhythms at multiple time scales*. Poster presented at the Association for Chemoreception Sciences conference.
- **Rafilson et al.,** (2020). *Internet Addiction and its Correlates*. Abstract accepted for poster presentation at the annual American Psychological Association conference.

RESEARCH EXPERIENCE

Research Assistant — *Smear Lab, University of Oregon*
February 2023 – August 2025

- First authorship publication exploring the relationship between LFPs and behavior through time and frequency representations, and predictive algorithms from signal processing. Developed novel statistics, analyzed all data, wrote manuscript.
- Co-authored publication where I conducted the spatial location decoding analysis and wrote program for video tracking pipeline.
- Co-launched project studying sniffing in Shank-3 mice where I performed implant surgeries and wrote code for analysis (github.com/Sid-Rafilson-1617/Shank3-analysis).
- Co-launched project studying behavior and neuronal dynamics in Anosmic mice. Worked with tetrodes, set up experimental design, and compiled all analyses to submit a grant request (github.com/Sid-Rafilson-1617/anosmia).
- Performed surgeries, worked with neural-implanted tetrodes and carried out histological verification of electrode placement.
- Built custom recording devices. Set up hardware and data acquisition software in Bonsai. Ran experiments.

SKILLS

- **Programming Languages**
  - Python (NumPy, Pandas, SciPy, scikit-learn, PyTorch)
  - MATLAB
- **Data Analysis**
  - Local field potentials and single-unit spiking
  - Video tracking and behavioral modeling
  - Signal processing
  - Statistical and dynamical systems modeling
  - Support vector machines and deep neural networks
- **Research Techniques**
  - Electrophysiology
  - Recording implant surgery
  - Respiratory data collection
  - Spike sorting
  - Data acquisition in Bonsai and OpenEphys
- **Other Software**
  - Kilosort, Phy2, SLEAP, DeepLabCut

TEACHING

Course Grader – Dynamical Systems and Control, University of Oregon
September 2024 – Present

- Carefully graded and provided feedback for graduate level applied mathematics course with programming (python).

AWARDS & HONORS

- **MacCracken Fellowship** – *New York University, 2025*
- **Undergraduate Research Award** — *Association for Chemoreception Sciences Conference, 2025*
- **Undergraduate Research Award** — *Association for Chemoreception Sciences Conference, 2024*
- **Apex Scholarship** — *University of Oregon, 2020*