

## Leo R. Scholl, PhD

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Seattle, WA <https://leoscholl.github.io>

### Professional Experience

**Postdoctoral Researcher**, Orsborn Lab 2020 – present  
University of Washington, Seattle WA

**Teaching Assistant**, Department of Cognitive Sciences 2014 – 2019  
University of California Irvine, Irvine CA

**Scientist Intern**, Protein Expression Group 2013

**Scientist Intern**, Biotherapeutics Group 2012  
Boehringer Ingelheim, Ridgefield CT

### Education

**Ph.D. in Psychology** 2019  
University of California, Irvine CA  
Title: Pulvinar contributions to visual cortical processing in the rat  
Advisor: David Lyon

**M.S. in Cognitive Neuroscience** 2017  
University of California, Irvine CA

**B.S. in Biological Sciences** 2014  
Carnegie Mellon University, Pittsburgh PA  
Minor: Computer Science

### Publications

\*Ouchi T, \*Scholl LR, \*Rajeswaran P, Canfield R, Smith LI, and Orsborn AL. Mapping eye, arm, and reward information in frontal motor cortices using electrocorticography in non-human primates. *Biorxiv*. 2024

Li J, Scholl LR, Le T, Rajeswaran P, Orsborn AL, Shlizerman E. AMAG: Additive, Multiplicative and Adaptive Graph Neural Network For Forecasting Neuron Activity. *Advances in Neural Information Processing Systems* 36. 2024

Scholl LR, Zhang L, Foik AT, and Lyon DC. Novel rabies virus variant for bi-directional optical control reveals modulatory influence of the pulvinar on visual cortex in rat. *bioRxiv*, 2020.

**Scholl LR**, Foik A, and Lyon DC. Projections between visual cortex and lateral posterior nucleus in the rat. *Journal of Comparative Neurology*, 2020.

Foik AT, **Scholl LR**, Lean GA, and Lyon DC. Visual response characteristics in lateral and medial subdivisions of the rat pulvinar. *Neuroscience*, 2020.

**Scholl LR**. Pulvinar contributions to visual cortical processing in the rat (Doctoral dissertation). 2019.

Foik A, Lean GA, **Scholl LR**, et al. Detailed visual cortical responses generated by retinal sheet transplants in rats with severe retinal degeneration. *Journal of Neuroscience*, 2018.

Pope WH, et al. Whole genome comparison of a large collection of mycobacteriophages reveals a continuum of phage genetic diversity. *Elife*, 2015.

### Submitted Abstracts

\***Scholl LR**, \*Rajeswaran P, Smith LI, Orsborn AL. Adaptation and de novo learning of 3D perturbations in a 2D reaching task. *Advances in Motor Learning and Motor Control 2024*.

Canfield R, Ouchi T, **Scholl LR**, Rajeswaran P, Orsborn AL. Spatially distributed sampling of motor cortex during reaching. *Society for Neuroscience 50*. 2024

Rasgaitis C, Smith LI, Perks K, Lilley P, **Scholl LR**, Orsborn AL. Developing an automatic in-cage touch screen system to optimize high throughput experiments in non-human primates. *Society for Neuroscience 50*. 2024

**Scholl LR**, Canfield R, Rajeswaran P, Orsborn AL. Measuring functional connectivity across days using optogenetic stimulation. *Society for Neuroscience 50*. 2024

Borchelt B, Pierce V, **Scholl LR**, Rajeswaran P, Orsborn AL. Learning and Adaptation to 3D Visuomotor Rotations in a 2D Cursor Task. *Summer Undergraduate Research Symposium*. 2024

Sarti M, Rajeswaran M, **Scholl LR**, Orsborn AL. Observing Motor Exploration in Primates during a 3D Center Out Task. *Summer Undergraduate Research Symposium*. 2024

Rasgaitis C, Smith LI, Perks K, Lilley P, **Scholl LR**, Orsborn AL. Streamlining Task Complexity Adaptation in Non-Human Primate Training. *Women in NeuroAI*. 2024

Peterson L, Li SJ, **Scholl LR**, Rajeswaran P, Orsborn AL. Using convex feature selection to improve offline feature decoding. *A3D3 High-Throughput AI Methods and Infrastructure Workshop*. 2023

**Scholl LR**, Rajeswaran P, Smith LI, Asfour J, Quintanilla JC, Orsborn AL. How eye movements contribute to motor learning in macaque monkeys. *Neural Control of Movement*. 2023

Canfield R, **Scholl LR**, Rajeswaran P, Smith LI, Orsborn AL. Neural population dynamics in largescale electrocorticography (ECoG) during reaching. *Neural Control of Movement*. 2023

Ouchi T, **Scholl LR**, Rajeswaran P, Smith LI, Orsborn AL. Arm and eye movement information of electrocorticographic signals in monkeys. *Neural Control of Movement*. 2023

Rajeswaran P, **Scholl LR**, Smith LI, Orsborn AL. A novel manual control perturbation task to study formation and adaptation of internal models. *Neural Control of Movement*. 2023

**Scholl LR**, et al. Measuring functional connectivity across days using optogenetic stimulation. *Simons Collaboration on the Global Brain*. 2022

Foik AT, **Scholl LR**, et al. Comparison of single neuron responses between two rostral subdivisions in the rat pulvinar / lateral posterior thalamic nucleus. *Society for Neuroscience* 45. 2019

Foik AT, Lean GA, **Scholl LR**, et al. Restoration of visual cortical responses after retinal sheet transplantation in rats with retinal degeneration. *Society for Neuroscience* 42. 2016

### Department presentations

Measuring network connectivity during learning. UW Graduate Program in Neuroscience, 2024

Restoration of vision by retinal sheet transplants in rats with retinal degeneration. UC Irvine Department of Cognitive Science, 2016

### Unpublished work

Scholl LR, Rajeswaran P, and Orsborn AL. Measuring functional connectivity across days using optogenetic stimulation. Manuscript in prep.

Zhang L, Scholl LR, and Lyon DC. Experica: a distributed software system for closed loop vision experiments. Manuscript in prep.

### Awards and honors

Weill Neurohub Postdoctoral Fellowship	2024-2025
\$150,000 Total Costs (PI)	
1st place Poster Award, NSF A3D3 workshop	2023

<i>Using convex feature selection to improve offline feature decoding</i>	2022
NINDS F32 Application scored	
<i>Title: Network-inspired brain-computer interfaces for efficient treatment of motor disabilities</i>	
NIH R21 (NS113264)	2020
\$432,000 Total Costs (Key personnel)	
<i>Title: Viral strategies for bi-directional optogenetic control of specific cell types in neocortex of non-transgenic animals</i>	
1st place Poster Award, UCI Postdoctoral Scholar Poster Session	2016
<i>Restoration of visual cortical responses after retinal sheet transplantation in rats with retinal degeneration</i>	
University Honors, Carnegie Mellon University, Pittsburgh, PA	2014
HHMI Phage Genomics Research Initiative Student	2010

### Research experience

**University of Washington** Seattle, WA  
**Postdoctoral Fellow with Dr. Amy Orsborn** 2020 – present

- Created brain-computer-interfaces using electrocorticography in two non-human primates, to test theories of how the brain learns new motor skills
- Designed and prototyped hardware for simultaneous optogenetics and electrocorticography in long-term implanted experiments in behaving monkeys
- Set up experiment rigs for closed-loop experiments and optogenetics, working closely with acquisition hardware vendors to achieve low latency and reliable timing
- Performed and assisted sterile surgical procedures in macaques to implant titanium chambers, inject optogenetic virus, implant chronic electrodes, and daily cleaning
- Ran experiments to measure functional connectivity across macaque motor cortices using optogenetic laser stimulation and electrocorticography
- Designed and coordinated human subject psychophysics experiments in virtual reality as a rapid test-bed for non-human primate studies.
- Created and managed an open-source repository of python code for neural data processing and analysis, including modules such as Fourier analysis, Kalman filters, and eye tracking

**University of California, Irvine** Irvine, CA  
**Graduate Student Researcher with Dr. David Lyon** 2014 – 2019

- Designed and tested novel rabies virus variant for bi-directional optical control of neuronal activity in non-transgenic animals
- Discovered suppression of visual responses in the cortex following optogenetic pulvinar activation
- Identified weak thalamocortical projection from the pulvinar to primary visual cortex
- Measured receptive field properties of the pulvinar through subnucleus-specific *in vivo* recordings
- Created software to improve imaging and electrophysiology pipelines, speeding up experiment turnaround time and allowing increased focus on data analysis

- Contributed to the advancement of retinal sheet transplants as a treatment of blindness by demonstrating cortical visual processing in transplanted rats

**Carnegie Mellon University** Pittsburgh, PA  
**Research Assistant with Dr. Tim Verstynen** 2013 – 2014

- Managed psychophysics study addressing Bayesian learning in the context of response inhibition.

**Student Researcher, Phage Genomics Research Lab** 2011

- Correlated the presence of tRNA in several bacteriophages with their codon usage using data from GenBank.

**Boehringer Ingelheim** Ridgefield, CT  
**Scientist Intern, Protein Expression Group** 2013

- Optimized transfection yield of initial protein material for functional testing and characterization of new projects.

**Scientist Intern, Biotherapeutics Group** 2012

- Confirmed in vitro function of a receptor-Fc fusion protein, utilizing immunostaining techniques and flow cytometry.

### Service and leadership

#### **Academic Service**

Volunteer Graduate Applicant Support Program (GASP) 2023  
 Seminar Organizer, Neural Engineer Seminar, University of Washington 2020 – 2022  
 Guest Reviewer, Neuroscience Letters 2019

#### **Guest Lecturer**

UW Department of Electrical and Computer Engineering  
 • Undergraduate Research Exploration Seminar, Dr. Richard Shi Winter 2022  
 UW Department of Psychology  
 • Neurobiology of Learning and Memory, Dr. Sheri Mizumori Spring 2022  
 UC Irvine Department of Cognitive Sciences  
 • Introduction to Psychology: Sensation and Perception 2016  
 • Abnormal Psychology: Schizophrenia and Psychotic disorders 2015

#### **Trainings and Workshops Attended**

SURFiN Mentor Training 2024  
 Mentoring Enrichment and Leadership Development Institute (MELDI) 2023  
 PR2ISM “Writing a diversity, inclusion, and equity statement” workshop 2022  
 4-Part Mentoring Workshop Series for SURF Mentors 2022

#### **Mentorship**

NIH UW ENDURE Mentor to Brady Borchelt 2024  
 NSF REU Mentor to undergraduate Mathew Sarti 2024

SURFiN Mentor, Shenoy Undergrad Research Fellowship in Neuro	2023 – 2024
SURF Mentor, Simons Undergraduate Research Fellowship	2022 – 2023
NSF REU Mentor to undergraduate Joseph Asfour	2022
Peer Mentor, UW K99 Peer mentoring group	2020 – present
Mentor to undergraduate Luis Zambrano, Winner of 2019 Opportunities Program grant at UCI	2018 – 2019

**Cellist**

Campus Philharmonic Orchestra, <i>Principal cello</i> , UW	2021 – 2022
UCI Orchestra, University of California, Irvine	2018 – 2019
University Orchestra, <i>Principal cello</i> , Carnegie Mellon University	2012 – 2014
Cambiando Quartet, Pittsburgh, PA	2011 – 2014
Pre-College Orchestra, <i>Principal cello</i> , The Juilliard School	2008 – 2010