

BENJAMIN SCHOLL

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ACADEMIC POSITIONS

Assistant Professor	University of Colorado, Denver	2024 –
Assistant Professor	University of Pennsylvania	2021 – 2023
Postdoctoral Researcher	Max Planck Florida Institute	2015 – 2021

EDUCATION

Neuroscience, PhD	University of Texas at Austin	2010 – 2015
Physics, BS	University of Oregon, Clark Honors College	2004 – 2008

RESEARCH ARTICLES

1. Thomas C, Ryan M, McNabb MC, Kamasawa N, and **Scholl B** (2024) Astrocyte coverage of excitatory synapse correlates to measures of synaptic structure and function in primary visual cortex. *bioRxiv*
2. Greenbridge D, Yates JL, **Scholl B**, Pillow JW (2024) Efficient decoding of large-scale neural population responses with gaussian-process multiclass regression. *Neural Computation*
3. Thomas C, Ryan M, Kamasawa N, and **Scholl B** (2023) Postsynaptic mitochondria are positioned to support functional diversity of dendritic spines. *eLife*
4. Gallinaro J, **Scholl B**, and Clopath C (2023) Synaptic weights correlate with presynaptic selectivity increase decoding performance. *PLoS Computational Biology*
5. Yates JL and **Scholl B** (2022) Unraveling functional diversity of cortical synaptic architecture through the lens of population coding. *Frontiers in Synaptic Neuroscience*
6. **Scholl B***, Tepohl C*, Thomas C, Ryan M, Kamasawa N and Fitzpatrick D (2022) A Binocular synaptic network supports interocular response alignment in visual cortical neurons. *Neuron*
7. **Scholl B***, Thomas C*, Ryan M, Kamasawa N and Fitzpatrick D (2021) Cortical neuron response selectivity derives from strength in numbers of synapses. *Nature*
8. Thomas C, Ryan M, **Scholl B**, Guerrero-Given D, Fitzpatrick D, and Kamasawa N (2021) Targeting functionally characterized synaptic architecture using inherent fiducials and 3D correlative microscopy. *Microscopy and Microanalysis*
9. **Scholl B** and Fitzpatrick D (2020) Cortical synaptic architecture supports flexible sensory computations. *Current Opinion in Neurobiology*
10. Laviv T, **Scholl B**, Parra-Bueno P, Foote B, Zhang C, Yan L, Hayano Y, Chu J and Yasuda R (2020) *In vivo* imaging of the coupling between neuronal and CREB activity in the mouse brain. *Neuron*
11. **Scholl B**, Wilson DE and Fitzpatrick D (2019) Functional logic of layer 2/3 inhibition in the ferret visual cortex. *Neuron*
12. Wilson DE*, **Scholl B*** and Fitzpatrick D (2018) Differential tuning of excitation and inhibition underlies direction selectivity in ferret visual cortex. *Nature*
13. Marvin JS, **Scholl B**, ... Looger LL (2018) Stability, affinity and chromatic variants of the glutamate sensor iGluSnFR. *Nature Methods*
14. **Scholl B**, Wilson DE and Fitzpatrick D (2017) Local order within global disorder: synaptic architecture of visual space. *Neuron*
15. **Scholl B**, Pattadkal JJ and Priebe NJ (2017). Binocular disparity selectivity weakened after monocular deprivation in mouse V1. *Journal of Neuroscience*
16. **Scholl B**, Rylee J, Luci JJ, NJ Priebe and J Padberg (2017). Orientation selectivity in the visual cortex of the nine-banded armadillo. *Journal of Neurophysiology*

17. **Scholl B**, Pattadkal JJ, Rowe A and Priebe NJ (2017). Functional characterization and spatial clustering of visual cortical neurons in the predatory grasshopper mouse *Onychomys arenicola*. *Journal of Neurophysiology*
18. Lu R, Sun W, Liang Y, Kerlin A, Bierfeld, Seelig JD, Wilson DE, **Scholl B**, ... Ji Na (2017). Video-rate volumetric functional imaging of the brain at synaptic resolution. *Nature Methods*
19. Wilson DE, Whitney DE, **Scholl B** and Fitzpatrick D (2016). Orientation selectivity and the functional clustering of synaptic inputs in primary visual cortex. *Nature Neuroscience*
20. **Scholl B**, Andoni SA and Priebe NJ (2015). Functional characterization of spikelet activity in the primary visual cortex. *Journal of Physiology*
21. **Scholl B**, Pattadkal JJ, Dilly GA, Priebe NJ and Zemelman BV (2015). Local integration accounts for weak selectivity of mouse neocortical parvalbumin interneurons. *Neuron*
22. Tan ATYY*, Yuhzi C*, **Scholl B***, Seidemann E and Priebe NJ (2014). Sensory stimulation shifts visual cortex from synchronous to asynchronous states. *Nature*
23. **Scholl B**, Tan ATYY and Priebe NJ (2013). Strabismus disrupts binocular synaptic integration in primary visual cortex. *Journal of Neuroscience*
24. **Scholl B**, Tan AYY, Corey J and Priebe NJ (2013). Emergence of orientation selectivity in the mammalian visual pathway. *Journal of Neuroscience*
25. **Scholl B**, Burge J and Priebe NJ (2013). Binocular integration in mouse primary visual cortex. *Journal of Neurophysiology*
26. **Scholl B**, Latimer KW and Priebe NJ (2012). A retinal origin for spatial invariance of contrast gain control. *Journal of Neuroscience*
27. Mohanty D, **Scholl B** and Priebe NJ (2012). The accuracy of membrane potential reconstruction based spiking receptive fields. *Journal of Neurophysiology*
28. Tan AYY, Brown BD, **Scholl B**, Mohanty D and Priebe NJ (2011). Orientation selectivity of synaptic input to neurons in mouse and cat primary visual cortex. *Journal of Neuroscience*
29. **Scholl B**, Gao X and Wehr M (2010). Non-overlapping sets of synapses drive on-responses and off-responses in auditory cortex. *Neuron*
30. **Scholl B**, Liu HY, Long BR, McCarty OJ, O'Hare T, Druker BJ and Vu TQ (2009). Single particle quantum dot imaging achieves ultrasensitive detection capabilities for Western immunoblot analysis. *ACS Nano*
31. **Scholl B** and Wehr M (2008). Disruption of balanced cortical excitation and inhibition by acoustic trauma. *Journal of Neurophysiology*
32. **Scholl B**, Gao X and Wehr M (2008). Level dependence modulation in auditory cortex. *Journal of Neurophysiology*

*Authors contributed equally

FUNDING

Principles of presynaptic networks for single layer 2/3 neurons in ferret visual cortex
NIH NEI R00 (PI) 9/2021 – 07/2024

Development of local synaptic networks underlying cortical gain control
Whitehall Foundation (PI) 06/2022 – 05/2025

A scalable method for CRISPR/Cas9 gene manipulation of cells and circuits in the neocortex
University Research Foundation (PI) 03/2023 – 02/2024

Elucidating synapse dysfunction with CRISPR/Cas9 manipulations
BRF Seed Grant (PI) 3/2023 – 02/2024

Deciphering the dynamics, development, and dysfunction of functional synaptic clusters
Sloan Foundation (PI) 09/2023 – 09/2024

A genetic approach to elucidate the role of NMDA in the development and function of horizontal connections in ferret visual cortex

NIH NEI R21 (PI) 07/2024 – 07/2026

A statistical approach to link synaptic population dynamics to single neuron computation

NIH NINDS CRCNS (Co-I) 07/2024 – 07/2030

AWARDS/HONORS

Alfred P. Sloan Research Fellow	2023
Brain Research Foundation Seed Grant Award	2023
IDDRC Program Development Award	2023
University Research Foundation Award	2023
Whitehall Foundation Award	2022
VRC Pilot Award	2021
McCabe Fund Award	2021
Allison Doupe Fellowship Award	2019
MPFI Scientific Achievement	2018
Neurizons Young Investigator	2016
NSF Graduate Research Fellowship Honors	2012
United States Representative to Nobel Laureate meeting for Physiology and Medicine	2011
Achievement Rewards for College Scientists Foundation	2008
Novick Award	2008
Departmental honors, physics	2008
University of Oregon Presidents Scholar, Society of College, Deans List	2007

PROFESSIONAL ACTIVITIES

TEACHING

CU Denver neuroscience graduate student lecturer	2024 -
U Penn undergraduate psychology and neuroscience lecturer	2021 - 2022
U Penn graduate neuroscience core 3 lecturer	2021 - 2022
Mentor, computational neuroscience summer course	2020
Teaching assistant- Max Planck Florida Institute winter imaging course	2016 - 2020
High school summer mentor	2016, 2018
Teaching assistant- <i>In vivo</i> intracellular physiology summer course	2015
Teaching assistant- principles of neuroscience	2014
Teaching assistant- neurophysiology undergraduate lab course	2013 - 2014

COMMITTEES

NSP Faculty Membership (CU Denver)	2024 -
Postdoc Recruitment Initiative (CU Denver)	2024 -

MENTORING

Graduate Student Mentorship

Evan Lliakis	PhD Student (Penn)	2022 – 2023
Clara Tepohl	PhD Student (MPFI)	2017 – 2021

Graduate Student Advisory Committees

Claudia Heymach	MD/PhD Student (Penn)	2023
Alexandra Nikish	PhD NGG Student (Penn)	2023
Long Ni	PhD Psychology Student (Penn)	2021
Sophie Lieberghall	MD/PhD Student (CHOP/Penn)	2022

Undergraduate Students

Sebin Lee, (2022), Matthew Kilgman (2022), Joe Baretto (2022 - 2023), Melissa Ryan (2018 – 2020), Amelia Demopoulos (2023)

OTHER

NIH Study Section Early Career Reviewer	2022
NIH NBVP Study Section Ad Hoc Reviewer	2023 -
NIH NBVP Study Section Ad Hoc Reviewer	2024 -

Reviewer: *Nature Neuroscience, Journal of Neuroscience, Journal of Neurophysiology, eNeuro, PloS Computational Biology, eNeuro, Scientific Reports, Cerebral Cortex*

Invited Seminars

CAESAR, Bonn Germany, Dr. Jason Kerr	Mar 2024
University of Bonn, Bonn Germany, Dr. Tobias Rosa	Mar 2024
University of Toronto, Toronto Canada, Dr. Graham Collingridge	Feb 2024
UCI International Learning and Memory, Huntington Beach CA, Dr. Megha Sehgal	April 2023
NIEHS, Durham NC, Dr. Oliver Goral	Feb 2023
VRC, U Penn, Philadelphia PA, Dr. Claire H. Mitchell	Jan 2023
Weizmann Institute, Rehovot Israel, Dr. Ilan Lampl	Dec 2022
ELSC, Jerusalem Israel, Dr. Yoav Adam	Dec 2022
Israeli SFN, Eliat Israel, Dr. Tal Laviv	Dec 2022
Horizontal Connectivity Workshop at NeuroPSI, Paris France, Dr. Alain Destexhe	Oct 2022
SfN Ferret Meeting, San Diego CA, Dr. Kristina Nielsen	Nov 2022
Newcastle University, Newcastle UK, Dr. Abhishek Banerjee	July 2021
18 th Advanced Imaging Methods Workshop, UC Berkeley, Dr. Holly Aaron	Feb 2021

Public Lectures

General public lecture at the Frost Science Museum, Miami, FL	2018
General public lecture on visual neuroscience at Jupiter High School, Jupiter, FL	2017
Neuroscience podcast creator and co-host (<i>Neurotransmissions</i>)	2015 – 2017
Public panelist for general public neuroscience outreach event	2015