

# Nicholas A. Steinmetz

Assistant Professor, University of Washington  
nick.steinmetz@gmail.com | www.steinmetzlab.net

## Education

2007 – 2014	Ph.D., Neurosciences Stanford University, Stanford, CA, USA Supervisors: Prof. Tirin Moore and Prof. Kwabena Boahen
2003 – 2007	Bachelor of Science and Engineering, Bioengineering, <i>summa cum laude</i> University of Pennsylvania, Philadelphia, PA, USA

## Employment

2019 – present	Assistant Professor, Department of Neurobiology & Biophysics, University of Washington
2017 – 2018	Senior Research Associate, University College London, London, UK
2014 – 2017	Research Associate, University College London, London, UK Supervisors: Prof. Matteo Carandini and Prof. Kenneth D. Harris

## Large-scale Collaborations

2019 – present	<a href="#">International Brain Laboratory</a> member
2017 – 2022	Program Coordinator, Neuropixels Consortium

## Fellowships and Awards

2022	NSF CAREER award
2020	Pew Biomedical Scholar
2020	Klingenstein-Simons Neuroscience Fellow
2019 – present	Simons Foundation Investigator
2019 – 2022	Next Generation Leader, Allen Institute for Brain Science
2015 – 2018	Postdoctoral Fellowship from the Human Frontier Sciences Program
2016 – 2018	Postdoctoral Fellowship from the Marie Curie Action of the EU
2015	Newton Postdoctoral Fellowship from the Royal Society (awarded)
2011 – 2014	Graduate Research Fellowship from National Science Foundation (NSF GRFP)
2009 – 2011	Graduate Research Fellowship from the Stanford Center for Mind, Brain, and Computation, National Science Foundation, Integrative Graduate Education Research Traineeship (NSF IGERT)
2006 – 2007	Blair Fellowship for Undergraduate Research in Bioengineering/Biomedical Sciences from the University of Pennsylvania
2005 – 2007	University Scholars Fellowship for Undergraduate Research from the University of Pennsylvania

## First- and senior-author publications (Peer-reviewed except where noted.)

2023	Ye, Bull, Li, Birman, Daigle, Tasic, Zeng, <b>Steinmetz</b> <a href="#">Brain-wide Topographic Coordination of Traveling Spiral Waves</a>   preprint	bioRxiv
	Ye*, Shelton*, Shaker, Boussard, Colonell, ..., Koch, Olsen, Harris, <b>Steinmetz</b> <a href="#">Ultra-high Density Electrodes Improve Detection, Yield, and Cell Type Specificity of Brain Recordings</a>   preprint	bioRxiv
	Birman, Yang, West, Karsh, Browning, IBL, Siegle, <b>Steinmetz</b> <a href="#">Pinpoint: Trajectory Planning for Multi-probe Electrophysiology and Injections in an Interactive Web-based 3D Environment</a>   reviewed preprint	eLife

	Ottenheimer, Hjort, Bowen, <b>Steinmetz*</b> , Stuber*	eLife
	<a href="#">A Stable, Distributed Code for Cue Value in Mouse Cortex During Reward Learning</a>	
2022	Recanatesi, Bradde, Balasubramanian*, <b>Steinmetz*</b> , Shea-Brown*	Patterns
	<a href="#">A Scale-dependent Measure of System Dimensionality</a>	
	The International Brain Laboratory, ..., <b>Steinmetz</b> , et al.	bioRxiv
	<a href="#">Reproducibility of In-vivo Electrophysiological Measurements in Mice</a>   preprint	
2021	<b>Steinmetz*</b> , Aydin*, Lebedeva*, Okun*, Pachitariu*, et al.	Science
	<a href="#">Neuropixels 2.0: A Miniaturized High-density Probe for Stable, Long-term Brain Recordings</a>	
	Zatka-Haas*, <b>Steinmetz*</b> , Carandini, Harris	eLife
	<a href="#">Sensory Coding and the Causal Impact of Mouse Cortex in a Visual Decision</a>	
2019	<b>Steinmetz</b> , Zatka-Haas, Carandini, Harris	Nature
	<a href="#">Distributed Coding of Choice, Action, and Engagement Across the Mouse Brain</a>	
	Engel, <b>Steinmetz</b>	Curr Op in Neurobio
	<a href="#">New Perspectives on Dimensionality and Variability from Large-scale Cortical Dynamics</a>   review	
2018	<b>Steinmetz</b> , Koch, Harris, Carandini	Curr Op in Neurobio
	<a href="#">Challenges and Opportunities for Large-Scale Electrophysiology with Neuropixels Probes</a>   review	
	Shamash, Harris, Carandini, <b>Steinmetz</b>	bioRxiv
	<a href="#">A Tool for Analyzing Electrode Tracks From Slice Histology</a>   preprint	
2017	Jun*, <b>Steinmetz*</b> , Siegle*, Denman*, Bauza*, Barbarits*, Lee*, et al.	Nature
	<a href="#">Fully Integrated Silicon Probes for High-Density Recording of Neural Activity</a>	
	Burgess*, Lak*, <b>Steinmetz*</b> , Zatka-Haas*, et al.	Cell Reports
	<a href="#">High-Yield Methods for Accurate Two-Alternative Visual Psychophysics in Head-Fixed Mice</a>	
	<b>Steinmetz</b> , Buetfering, Lecoq, Lee, et al.	eNeuro
	<a href="#">Aberrant Cortical Activity in Multiple GCaMP6-Expressing Transgenic Mouse Lines</a>	
2016	Engel*, <b>Steinmetz*</b> , Gieselmann, Thiele, Moore, Boahen	Science
	<a href="#">Selective Modulation of Cortical State During Spatial Attention</a>	
2014	<b>Steinmetz</b> , Moore	Neuron
	<a href="#">Eye Movement Preparation Modulates Neuronal Responses in Area V4 When Dissociated from Attentional Demands</a>	
	<b>Steinmetz</b>	Ph.D. Thesis, Stanford Univ.
	<a href="#">Circuits Underlying Visual Attention in Primate Neocortex</a>	
2012	Squire*, <b>Steinmetz*</b> , Moore	Scholarpedia
	<a href="#">Frontal Eye Field</a>   review	
	<b>Steinmetz</b> , Moore	Neuron
	<a href="#">Lumping and Splitting the Neural Circuitry of Visual Attention</a>   commentary	
2010	<b>Steinmetz</b> , Moore	J Neurophys
	<a href="#">Changes in the Response Rate and Response Variability of Area V4 Neurons During the Preparation of Saccadic Eye Movements</a>	

*Other publications (Peer-reviewed except where noted.)*

2024	Chandrasekaran, Vermani, Gupta, <b>Steinmetz</b> , Moore, Sridharan	Science Advances
	<a href="#">Dissociable components of attention exhibit distinct neuronal signatures in primate visual cortex</a>	

- Lewis, Suarez, Rigolli, **Steinmetz**, Gire *bioRxiv*  
[The Spiking Output of The Mouse Olfactory Bulb Encodes Large-Scale Temporal Features of Natural Odor Environments](#) | *preprint*
- Deveau, Zhou, LaFosse, Deng, Mirbagheri, **Steinmetz**, Histed *bioRxiv*  
[Active Filtering of Sequences of Neural Activity by Recurrent Circuits of Sensory Cortex](#) | *preprint*
- Zhang, He, Boussard, Windolf, Winter, Trautmann, Roth, Barrell, Churchland, **Steinmetz**, IBL, Varol, Hurwitz, Paninski *NeurIPS*  
[Bypassing spike sorting: Density-based Decoding Using Spike Localization from Dense Multielectrode Probes](#)
- 2023 The International Brain Laboratory, ..., **Steinmetz**, et al. *bioRxiv*  
[A Brain-Wide Map of Neural Activity during Complex Behaviour](#) | *preprint*
- Findling, Hubert, The International Brain Laboratory, ... **Steinmetz**, ..., Dayan, Pouget *bioRxiv*  
[Brain-wide Representations of Prior Information in Mouse Decision-making](#) | *preprint*
- Zeraati, Shi, **Steinmetz**, Gieselmann, Thiele, Moore, Levina, Engel *Nature Comm*  
[Intrinsic Timescales in the Visual Cortex Change With Selective Attention and Reflect Spatial Connectivity](#)
- Windolf, ..., **Steinmetz**, ..., Paninski *bioRxiv*  
[DREDge: Robust Motion Correction for High-density Extracellular Recordings Across Species](#) | *preprint*
- Song, Shin, Seo, Soltani, **Steinmetz**, Lee, Jung, Paik *bioRxiv*  
[Hierarchical Gradient of Timescales in the Mammalian Forebrain](#) | *preprint*
- 2022 The International Brain Laboratory, ..., **Steinmetz**, et al. *Nature Methods*  
[Data Architecture for a Large-scale Neuroscience Collaboration](#)
- Zagha, Erlich, Lee, Lur, O'Connor, **Steinmetz**, Stringer, Yang *J Neurosci*  
[The Importance of Accounting for Movement When Relating Neuronal Activity to Sensory and Cognitive Processes](#) | *review*
- Shi, **Steinmetz**, Moore, Boahen, Engel *Nature Comm*  
[Cortical State Dynamics and Selective Attention Define the Spatial Pattern of Correlated Variability in Neocortex](#)
- 't Hart, ..., **Steinmetz**, et al. *J Open Science Education*  
[Neuromatch Academy: a 3-week, Online Summer School in Computational Neuroscience](#)
- 2021 Peters, Fabre, **Steinmetz**, Harris, Carandini *Nature*  
[Striatal Activity Topographically Reflects Cortical Activity](#)
- Van Kempen, Gieselmann, Boyd, **Steinmetz**, Moore, Engel, Thiele *Neuron*  
[Top-down Coordination of Local Cortical State During Selective Attention](#)
- Petersen, Siegle, **Steinmetz**, Mahallati, Buzsáki *Neuron*  
[CellExplorer: A Framework for Visualizing and Characterizing Single Neurons](#)
- Benjamin, **Steinmetz**, Oza, Aguayo, Boahen *Neuromorphic Comp and Eng*  
[Neurogrid Simulates Cortical Cell-types, Active Dendrites, and Top-down Attention](#)
- Linden, Tabuena, **Steinmetz**, Moody, Brunton S, Brunton B *J Royal Society Interface*  
[Go with the FLOW: Visualizing Spatiotemporal Dynamics in Optical Widefield Calcium Imaging](#)
- 2020 Schröder, **Steinmetz**, Krumin, Pachitariu, Rizzi, Lagnado, Harris, Carandini *Neuron*  
[Arousal Modulates Retinal Output](#)

	Jacobs, <b>Steinmetz</b> , Carandini, Harris	<i>Current Biology</i>
	<a href="#">Cortical State Fluctuations During Sensory Decision Making</a>	
	Dimitriadis, Neto, ..., <b>Steinmetz</b> , et al.	<i>bioRxiv</i>
	<a href="#">Why Not Record from Every Electrode with a CMOS Scanning Probe?</a>   preprint	
2019	Stringer*, Pachitariu*, <b>Steinmetz</b> , Carandini, Harris	<i>Nature</i>
	<a href="#">High-Dimensional Geometry of Population Responses in Visual Cortex</a>	
	Stringer*, Pachitariu*, <b>Steinmetz</b> , Reddy, Carandini, Harris	<i>Science</i>
	<a href="#">Spontaneous Behaviors Drive Multidimensional, Brain-Wide Population Activity</a>	
	Shimaoka, <b>Steinmetz</b> , Harris, Carandini	<i>eLife</i>
	<a href="#">The Impact of Bilateral Ongoing Activity on Evoked Responses in Mouse Cortex</a>	
	Okun, <b>Steinmetz</b> , Lak, Dervinis, Harris	<i>Cerebral Cortex</i>
	<a href="#">Distinct Structure of Cortical Population Activity on Fast and Intraslow Timescales</a>	
	Pettine, <b>Steinmetz</b> , Moore	<i>PNAS</i>
	<a href="#">Laminar Segregation of Sensory Coding and Behavioral Readout in Macaque V4</a>	
2017	Sridharan, <b>Steinmetz</b> , Moore, Knudsen	<i>J Neurosci</i>
	<a href="#">Does the Superior Colliculus Control Perceptual Sensitivity or Choice Bias during Attention? Evidence from a Multialternative Decision Framework</a>	
2016	Stringer, Pachitariu, <b>Steinmetz</b> , Okun, Bartho, Harris, Sahani, Lesica	<i>eLife</i>
	<a href="#">Inhibitory Control of Correlated Intrinsic Variability in Cortical Networks</a>	
	Pachitariu, <b>Steinmetz</b> , Kadir, Carandini, Harris	<i>NeurIPS</i>
	<a href="#">Fast and Accurate Spike Sorting of High-Channel Count Probes with Kilosort</a>	
2015	Okun, <b>Steinmetz</b> , ... Carandini, Harris	<i>Nature</i>
	<a href="#">Diverse Coupling of Neurons to Populations in Sensory Cortex</a>	
2014	Zirnsak, <b>Steinmetz</b> , Noudoost, Xu, Moore	<i>Nature</i>
	<a href="#">Visual Space is Compressed in Prefrontal Cortex Before Eye Movements</a>	
	Sridharan, <b>Steinmetz</b> , Moore, Knudsen	<i>J Vision</i>
	<a href="#">Distinguishing Bias from Sensitivity Effects in Multialternative Detection Tasks</a>	
2010	Noudoost, Chang, <b>Steinmetz</b> , Moore	<i>Curr Op in Neurobio</i>
	<a href="#">Top-Down Control of Visual Attention</a>   review	
2009	Aton, Seibt, Dumoulin, Jha, <b>Steinmetz</b> , Coleman, Naidoo, Frank	<i>Neuron</i>
	<a href="#">Mechanisms of Sleep-Dependent Consolidation of Cortical Plasticity</a>	
2008	Liu, <b>Steinmetz</b> , Farley, Smith, Joseph	<i>J Cog Neuro</i>
	<a href="#">Mid-fusiform Activation During Object Discrimination Reflects the Process of Differentiating Structural Descriptions</a>	
2006	Joseph, Cerullo, Farley, <b>Steinmetz</b> , Mier	<i>Neuroimage</i>
	<a href="#">fMRI Correlates of Cortical Specialization and Generalization for Letter Processing</a>	
	Joseph, Powell, Andersen, ..., <b>Steinmetz</b> , Zhang	<i>J Neurosci Methods</i>
	<a href="#">fMRI in Alert, Behaving Monkeys: An Adaptation of the Human Infant Familiarization Novelty Preference Procedure</a>	
2005	Jha, Jones, Coleman, <b>Steinmetz</b> , ..., Frank	<i>J Neurosci</i>
	<a href="#">Sleep-Dependent Plasticity Requires Cortical Activity</a>	

## Professional Service

2019 – pres. Editorial Board, *Scientific Data*

## Nicholas A. Steinmetz

2014 – pres. Peer reviewer for journals including *Nature*, *Science*, *eLife*, *Neuron*, *Current Biology*, *J. of Neuroscience*, *J. of Neurophysiology*, and *Cerebral Cortex*

### *Invited Talks*

---

2024 Mar	University of British Columbia, Vancouver, BC, Canada
2024 Feb	Seattle Children's Research Institute, Seattle, WA, USA
2024 Feb	Thalamocortical Gordon Research Conference, Ventura, CA, USA
2024 Feb	Baylor University, Houston, TX, USA
2023 Dec	Keynote: Statistical Analysis of Neural Data, Pittsburgh, PA, USA
2023 Oct	University of Utah, Salt Lake City, UT, USA
2023 Jun	Champalimaud Centre for the Unknown, Lisbon, Portugal ( <i>virtual</i> )
2023 May	Klingenstein-Simons Fellowship Meeting, New York, NY, USA
2023 Apr	NeuroTEC Symposium, UW, Seattle, WA, USA
2023 Feb	DFG Research Unit 5159, Hamburg, Germany ( <i>virtual</i> )
2023 Feb	Johns Hopkins University, Baltimore, MD, USA
2022 Nov	International Network for Bio-Inspired Computing Workshop, UW, Seattle, WA, USA
2022 Oct	A3D3: Accelerated Artificial Intelligence Algorithms for Data-Driven Discovery ( <i>virtual</i> )
2022 Sept	NeuroAI, Seattle, WA, USA
2022 June	Champalimaud Centre for the Unknown, Lisbon, Portugal ( <i>virtual</i> )
2022 Mar	University of Texas, Austin, TX, USA ( <i>virtual</i> )
2022 Mar	Columbia University, New York, NY, USA
2022 Mar	Princeton University, Princeton, NJ, USA
2022 Feb	University of California, San Diego, CA, USA ( <i>virtual</i> )
2021 Oct	University of Sussex, England, UK ( <i>virtual</i> )
2021 Sept	Karolinska Institute, Sweden ( <i>virtual</i> )
2021 Mar	University of Geneva, Geneva, Switzerland ( <i>virtual</i> )
2021 Mar	Medical University of South Carolina, Charleston, SC, USA ( <i>virtual</i> )
2020 Dec	University of Texas Health Science Center, Houston, TX, USA ( <i>virtual</i> )
2020 Nov	Hebrew University, Jerusalem, Israel ( <i>virtual</i> )
2020 Sept	Simons Foundation Workshop on Spike Sorting, New York, NY, USA ( <i>virtual</i> )
2020 July	FENS Workshop "Measuring activity at brain-wide scale", Glasgow, UK ( <i>virtual</i> )
2020 May	Netherlands Institute for Neuroscience, Amsterdam, NL ( <i>virtual</i> )
2020 Mar	Cosyne Workshop on "Modules in the Brain", Breckenridge, CO, USA
2020 Jan	Albert Einstein College of Medicine, New York, NY, USA
2020 Jan	University of Oslo, Oslo, Norway
2019 Nov	Allen Institute for Brain Science, Seattle, WA, USA
2019 Oct	Society for Neuroscience, Minisymposium, Chicago, IL, USA
2019 Sept	Next-generation Neurotech Symposium, IBRO 2019, Daegu, South Korea
2019 Sept	Allen Institute Workshop on the Dynamic Brain, Friday Harbor, WA, USA
2019 July	Champalimaud Centre for the Unknown, Lisbon, Portugal
2019 July	Neural Data Science course, Cold Spring Harbor Labs, New York, NY, USA
2019 May	Keynote: Statistical Analysis of Neural Data, Pittsburgh, PA, USA
2019 Apr	University of Washington, Seattle, WA, USA
2019 Mar	University of Oregon, Eugene, OR, USA
2019 Jan	Neural Computation and Engineering Connection, University of Washington, Seattle, WA, USA
2018 Nov	Society for Neuroscience, Nanosymposium, San Diego, CA, USA
2018 Oct	'Neureka' Symposium, Kings College London, London, UK
2018 Sept	Cardiff University, Cardiff, Wales, UK
2018 May	International Brain Laboratory, First Science Meeting, Paris, France

## Nicholas A. Steinmetz

2018 May	International Conference for Advanced Neurotechnology, Ann Arbor, MI, USA
2018 Mar	Cosyne Workshop on "Brain-wide neuronal dynamics", Breckenridge, CO, USA
2018 Feb	Neuralink, San Francisco, CA, USA
2017 Nov	SfN Neuropixels Satellite Session, Washington, DC, USA
2017 Oct	Kavli Futures Symposium: Neurotechnology, Santa Monica, CA, USA
2017 Sept	NIH Neurotechnology Seminar, Bethesda, MD, USA
2017 July	Computational Neuroscience Society, Antwerp, Belgium
2017 July	Champalimaud Centre for the Unknown, Lisbon, Portugal
2017 June	International Conference for Advanced Neurotechnology, Freiburg, Germany
2016 Nov	Institute of Ophthalmology, University College London, London, UK
2015 Nov	Neuroseeker Data Workshop, Nijmegen, Netherlands

### *Other Training*

---

2012	FENS-IBRO-Hertie Winter School on "Neural Coding in Sensory Systems", Obergurgl, Austria
2009	"Methods in Computational Neuroscience", Woods Hole, MA, USA

### *Teaching Activities*

---

2023 - 2024	Lecturer, "Neurobiology" (NEURO502), UW
2020 - 2024	Course organizer and lecturer, "Seminar in Computational Neuroscience" (NEUSCI490), UW
2019 - 2023	Lecturer, "Current Topics in Neurobiology and Behavior" (NEURO527), UW
2020, 2022	Lecturer, "Computational Neuroscience" (CSE/NEUBEH 528), UW
2019 - 2024	Course organizer and lecturer for <a href="#">Neuropixels Workshop</a> , Allen Institute for Brain Science & UW
2018	Course organizer and instructor for International Brain Laboratory "Neuropixels mini-course"
2018	Course instructor for Cajal Course " <a href="#">Linking Neural Circuits and Behavior</a> ", Bordeaux, France
2018	Course instructor for <a href="#">Paris Neuro</a> , Paris, France
2017	Teaching Assistant for Cajal Course " <a href="#">Interacting with Neural Circuits</a> ", Champalimaud Centre, Lisbon, Portugal
2017 - 2023	Course organizer and/or lecturer for <a href="#">Neuropixels Training Course</a> , University College London
2012	Teaching Assistant, <i>Large-scale neural models</i> , with Dr. Kwabena Boahen, Stanford University
2011	Teaching Assistant, <i>Computational Neuroscience</i> , with Dr. John Huguenard, Stanford University
2009	Teaching Assistant, <i>Information and Signaling in Neurons and Networks</i> , with Dr. Richard Tsien and Dr. Stephen Baccus, Stanford University
2008	Teaching Assistant, "Stanford Intensive Neuroscience" graduate program boot camp