Nicholas A. Steinmetz

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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 in Bioengineering, *summa cum laude* University of Pennsylvania, Philadelphia, PA, USA

Employment

2019 – present	Assistant Professor, Department of Biological Structure, 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

Team Science Roles

2019 – present	Member, International Brain Laboratory
2017 – present	Program Coordinator, "Neuropixels 2" Wellcome Collaborative Award

Peer-Reviewed Publications

2019	Stringer C*, Pachitariu P*, Steinmetz NA, Carandini M, Harris KD High-Dimensional Geometry of Population Responses in Visual Cortex	*Nature*
	Pettine WW, Steinmetz NA, Moore T Laminar Segregation of Sensory Coding and Behavioral Readout in Macaque V4	*PNAS (in press)*
	Stringer C*, Pachitariu P*, Steinmetz NA, Reddy CB, Carandini M, Harris KD Spontaneous Behaviors Drive Multidimensional, Brain-Wide Population Activity	*Science*
	Shimaoka D, Steinmetz NA, Harris KD, Carandini M The Impact of Bilateral Ongoing Activity on Evoked Responses in Mouse Cortex	*eLife*
	Okun M, Steinmetz NA, Lak A, Dervinis M, Harris KD Distinct Structure of Cortical Population Activity on Fast and Infraslow Timescales	*Cerebral Cortex*
2017	Jun J*, **Steinmetz NA***, Siegle JH*, Denman DJ*, Bauza M*, Barbarits B*, Lee AK*, et al. Fully Integrated Silicon Probes for High-Density Recording of Neural Activity	*Nature*
	Burgess CP*, Lak A*, **Steinmetz NA***, Zatka-Haas P*, et al. High-Yield Methods for Accurate Two-Alternative Visual Psychophysics in Head-Fixed Mice	*Cell Reports*
	Steinmetz NA, Buetfering C, Lecoq J, Lee CR, et al. Aberrant Cortical Activity in Multiple GCaMP6-Expressing Transgenic Mouse Lines	*eNeuro*
	Sridharan D, Steinmetz NA, Moore T, Knudsen EI Does the Superior Colliculus Control Perceptual Sensitivity or Choice Bias during Attention? Evidence from a Multialternative Decision Framework	*J. of Neurosci*
2016	Engel TA*, **Steinmetz NA***, Gieselmann MA, Thiele A, Moore T, Boahen K Selective Modulation of Cortical State During Spatial Attention	*Science*
	Stringer C, Pachitariu M, Steinmetz NA, Okun M, Bartho P, Harris K, Sahani M, Lesica N Inhibitory Control of Correlated Intrinsic Variability in Cortical Networks	*eLife*

	Pachitariu M, Steinmetz NA, Kadir S, Carandini M, Harris KD Fast and Accurate Spike Sorting of High-Channel Count Probes with Kilosort	*NeurIPS*
2015	Okun M, Steinmetz NA, … Carandini M, Harris KD Diverse Coupling of Neurons to Populations in Sensory Cortex	*Nature*
2014	**Steinmetz NA**, Moore T Eye Movement Preparation Modulates Neuronal Responses in Area V4 When Dissociated from Attentional Demands	*Neuron*
	Zirnsak M, Steinmetz NA, Noudoost B, Xu K, Moore T Visual Space is Compressed in Prefrontal Cortex Before Eye Movements	*Nature*
	Sridharan D, Steinmetz NA, Moore T, Knudsen EI Distinguishing Bias from Sensitivity Effects in Multialternative Detection Tasks	*J. of Vision*
	Steinmetz NA Circuits Underlying Visual Attention in Primate Neocortex	*Ph.D. Thesis*
2010	**Steinmetz NA**, Moore T Changes in the Response Rate and Response Variability of Area V4 Neurons During the Preparation of Saccadic Eye Movements	*J. of Neurophys*
2009	Aton SJ, Seibt J, Dumoulin M, Jha SK, Steinmetz N, Coleman T, Naidoo N, Frank MG Mechanisms of Sleep-Dependent Consolidation of Cortical Plasticity	*Neuron*
2008	Liu X, Steinmetz NA, Farley AB, Smith CD, Joseph JE Mid-fusiform Activation During Object Discrimination Reflects the Process of Differentiating Structural Descriptions	*J. of Cog Neurosci*
2006	Joseph JE, Cerullo MA, Farley AB, Steinmetz NA, Mier CR fMRI Correlates of Cortical Specialization and Generalization for Letter Processing	*Neuroimage*
	Joseph JE, Powell DK, Andersen AH, …, Steinmetz NA, Zhang Z fMRI in Alert, Behaving Monkeys: An Adaptation of the Human Infant Familiarization Novelty Preference Procedure	*J. of Neurosci Methods*
2005	Jha SK, Jones BE, Coleman T, Steinmetz N, …, Frank MG Sleep-Dependent Plasticity Requires Cortical Activity	*J. of Neurosci*

Preprints

2019	Schröder S, Steinmetz NA, Krumin M, Pachitariu M, Rizzi M, Lagnado L, Harris KD, Carandini M Retinal Outputs Depend on Behavioural State	*bioRxiv*
2018	**Steinmetz NA**, Zatka-Haas P, Carandini M, Harris KD Distributed Correlates of Visually-Guided Behavior Across the Mouse Brain	*bioRxiv*
	Zatka-Haas P*, **Steinmetz NA***, Carandini M, Harris KD Distinct Contributions of Mouse Cortical Areas to Visual Discrimination	*bioRxiv*
	Jacobs EAK, Steinmetz NA, Carandini M, Harris KD Cortical State Fluctuations During Sensory Decision Making	*bioRxiv*
	Shamash P, Harris KD, Carandini M, **Steinmetz NA** A Tool for Analyzing Electrode Tracks From Slice Histology	*bioRxiv*

Reviews and Commentary

2018	**Steinmetz NA**, Koch C, Harris KD, Carandini M Challenges and opportunities for large-scale electrophysiology with Neuropixels probes	*Curr Op in Neurobiology*
2012	Squire RF*, **Steinmetz NA***, Moore T Frontal Eye Fields	*Scholarpedia*

Steinmetz NA, Moore T *Neuron*
Lumping and splitting the neural circuitry of visual attention

2010 Noudoost B, Chang MH, Steinmetz NA, Moore T *Curr Op in Neurobiology*
Top-down control of visual attention

Fellowships and Awards

2015 – 2018	Postdoctoral Fellowship from the Human Frontier Sciences Program. £93,789.
2016 – 2018	Postdoctoral Fellowship from the Marie Curie Action of the EU. €183,454.80.
2015	Newton Postdoctoral Fellowship from the Royal Society (awarded). £99,000.
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

Invited Talks

2019 May	Statistical Analysis of Neural Data, Keynote speaker, 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
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 Opthalmology, 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

2019	Course organizer and lecturer for Neuropixels Training Course 2019, University College London
2018	Course organizer and instructor for International Brain Laboratory "Neuropixels mini-course"
2018	Course instructor for Cajal Course "Linking Neural Circuits and Behavior", Bordeaux, France
2018	Course instructor for Paris Neuro, Paris, France
2018	Course organizer and lecturer for Neuropixels Training Course 2018, University College London
2017	Teaching Assistant for Cajal Course "Interacting with Neural Circuits", Champalimaud Centre, Lisbon, Portugal
2017	Course organizer and lecturer for Neuropixels Training Course 2017, University College London
2012	Teaching Assistant, *Large-scale neural models*, with Dr. Kwabena Boahen, Stanford University
2011	Teaching Assistant, *Computational Neuroscience*, with Dr. John Huguenard, Stanford University
2009	Teaching Assistant, *Information and Signaling in Neurons and Networks*, with Dr. Richard Tsien and Dr. Stephen Baccus, Stanford University
2008	Teaching Assistant, "Stanford Intensive Neuroscience" graduate program boot camp

Selected Conference Presentations

Chen S, Neto J, Pachitariu M, Kampff A, **Steinmetz NA.** On the shape and extent of extracellular action potential waveforms across the rodent brain. Poster at Society for Neuroscience 2018, San Diego, CA, USA

Steinmetz NA, Zatka-Haas P, Carandini M, Harris KD. Local and global neural correlates of a perceptual decision. Poster at Federation of European Neuroscience Societies (FENS) 2018, Berlin, Germany

Steinmetz NA, Zatka-Haas P, Carandini M, Harris KD. Local and global neural correlates of a perceptual decision. Poster at AREADNE 2018, Santorini, Greece

Steinmetz NA, Zatka-Haas P, Carandini M, Harris KD. Distributed neuronal populations underlying vision, action, and reward across the mouse brain. Poster at Computational and Systems Neuroscience (Cosyne) 2018, Denver, CO, USA

Steinmetz NA, Zatka-Haas P, Carandini M, Harris KD. Neuronal populations supporting vision, action, and reward across the mouse brain. Poster at Society for Neuroscience 2017, Washington, DC, USA

Steinmetz NA, Carandini M, Harris KD. Distributed neuronal populations supporting vision, action, and reward across the mouse brain. Poster at International Conference for Advanced Neurotechnology 2017, Freiburg, Germany.

Steinmetz NA, Pachitariu M, Burgess CP, Rossant C, Harris T, Carandini M, Harris KD. Recording large, distributed neuronal populations with next-generation electrode arrays in behaving mice. Poster at Society for Neuroscience 2016, San Diego, CA, USA

Steinmetz NA, Pachitariu M, Rossant C, Hunter MLD, Neto JP, Kampff A, Carandini M, Harris KD. Neuropixels and Kilosort: 384-channel recordings in awake mice and improved spike-sorting software. Poster at International Conference for Advanced Neurotechnology 2016, Ann Arbor, MI, USA

Steinmetz NA, Burgess CP, Kadir SN, Rossant C, Goodman DFM, Hunter MLD, Carandini M, Harris KD. Neural correlates of visually-guided behavior in mouse cingulate cortex. Poster at Society for Neuroscience 2015, Chicago, IL, USA

Steinmetz NA, Kadir SN, Rossant C, Goodman DFM, Hunter MLD, Carandini M, Harris KD. Next-generation microelectrode arrays for probing the neocortical circuits underlying visually-guided behavior. Poster at Brain Informatics and Health 2015, London, UK *** Awarded Best Poster**

Steinmetz NA, Moore T. Circuits underlying covert attention and saccade preparation within the primate frontal eye field. Poster at FENS Brain Conference on Controlling Neurons, Circuits, and Behavior 2014, Copenhagen, Denmark

Steinmetz NA, Moore T. Circuits underlying covert attention and saccade preparation within the primate frontal eye field. Poster at Society for Neuroscience 2014, Washington, D.C., USA

Engel T, **Steinmetz NA**, Moore T, Boahen K. Effects of attention on spatio-temporal correlations across layers of a single column in area V4. Poster at Computational and Systems Neuroscience (Cosyne) Conference 2013, Salt Lake City, UT, USA

Steinmetz NA, Benjamin BV, Boahen K. NMDA-mediated feedback accounts for effects of visual spatial attention in Neurogrid simulations. Poster at Computational and Systems Neuroscience (Cosyne) Conference 2013, Salt Lake City, UT, USA

Steinmetz NA, Moore T. Simultaneous measurement of visual response modulation across cortical layers in area V4 during covert attention and saccade preparation. Poster at Society for Neuroscience 2012, New Orleans, LA, USA

Steinmetz NA, Moore T. Pattern of attentional and presaccadic modulation of visual responses in macaque V4 measured simultaneously across cortical layers. Poster at Computational and Systems Neuroscience (Cosyne) Conference 2012, Salt Lake City, UT, USA

Steinmetz NA, Moore T. Pattern of attentional and presaccadic modulation of visual responses in macaque V4 measured simultaneously across cortical layers. Poster at FENS-IBRO Winter School: Neural Coding in Sensory Systems 2012, Obergurgl, Austria

Steinmetz NA, Moore T. Pattern of presaccadic modulation of visual responses in macaque V4 measured simultaneously across cortical layers. Poster at Society for Neuroscience 2011, Washington, D.C., USA

Benjamin B, McQuinn E, Gao P, Choudhary S, **Steinmetz NA**, Moore T, Boahen K. Simulating a Two-Cortical Area Model of Top-Down Attention on Neurogrid. Poster at NIH Pioneer Conference 2011, Washington, D.C., USA

Merolla P, Arthur J, Benjamin B, Neil D, Elassaad S, **Steinmetz NA**, Moore T, Boahen K. Simulating Cortical Neuron Populations in Real-Time on the Neurogrid Desktop Supercomputer. Poster at NIH Pioneer Conference 2010, Washington, D.C., USA

Steinmetz NA, Moore T. (2010) Changes in the Response Rate and Response Variability of Area V4 Neurons During the Preparation of Saccadic Eye Movements. Poster at Computational and Systems Neuroscience (Cosyne) Conference 2010, Salt Lake City, UT, USA

Steinmetz NA, Moore T. (2008) A Signature of Eye Movement Preparation in the Response Variability of Area V4 Neurons. Poster at Dynamical Neuroscience XVI, Washington D.C., USA