

# MARIUS PACHITARIU

## APPOINTMENTS

2017- Group Leader at HHMI Janelia Ashburn, VA

## POSTDOCTORAL EXPERIENCE

2014-2017 UCL London  
with Kenneth Harris and Matteo Carandini

## EDUCATION

2014 Gatsby Unit, UCL London  
PhD, Computational Neuroscience and Machine Learning

2010 Princeton University Princeton  
BA, Mathematics (full scholarship)

## SELECTED PUBLICATIONS

[Google scholar profile](#)

\* denotes equal first or last author contribution

- 2026 Stringer, Ki, DelGrosso, LaFosse, Zhang, **Pachitariu** *bioRxiv*  
[Extracting large-scale neural activity with Suite2p](#)
- O'Connell, Michaels, Wang, Mamidipaka, Venkatesh, Aresh, **Pachitariu**, Pruszynski, Sober, Pandarinath *eLife*  
[High performance sorting of motor unit action potentials with EMUsort](#)
- Syeda, Nunez-Ochoa, Zhong, **Pachitariu**, Stringer *bioRxiv*  
[Orofacial behaviors, not eye movements, govern neural activity in mouse visual cortex](#)
- Muralidharan, Leng, Orts, Trepka, Zhu, Panichello, Jonikaitis, Pennington, **Pachitariu**, Moore *bioRxiv*  
[A system for live sorting of neuronal spiking activity from large-scale recordings](#)
- Pachitariu**, Zhong, Gracias, Minisi, Lopez, Stringer *bioRxiv*  
[A critical initialization for biological neural networks](#)
- 2025 Zhang, Grodem, Gracias, Lensjo, Fyhn, Stringer\*, **Pachitariu\*** *bioRxiv*  
[Spatial predictive coding in visual cortical neurons](#)
- Stringer and **Pachitariu** *bioRxiv*  
[Cellpose-SAM: superhuman generalization for cellular segmentation](#)
- Du, Nunez-Ochoa, **Pachitariu\***, Stringer\* *Nat Comms*  
[A simplified minimodel of visual cortical neurons](#)
- Zhong, Baptista, Gattoni, Arnold, Flickinger, Stringer\*, **Pachitariu\*** *Nature*  
[Unsupervised pretraining in biological neural networks](#)
- Stringer and **Pachitariu** *Nat Methods*  
[Cellpose3: one-click image restoration improves cellular segmentation](#)

Trautmann, Hesse, ... , **Pachitariu**, ... , Harris *Nat Neuro*  
[Large-scale high-density brain-wide neural recording in nonhuman primates](#)

Keller, Kwak, Stark, **Pachitariu**, Branson, Dudman *bioRxiv*  
 Cortical control of innate behavior from subcortical demonstration

Stringer, Zhong, Syeda, Du, Kesa, **Pachitariu** *Nat Neuro*  
[Rastermap: a discovery method for neural population recordings](#)

2024 **Pachitariu** and Stringer *Science*  
[Analysis methods for large-scale neural recordings](#)

Syeda, Zhong, Tung, Long, **Pachitariu\***, Stringer\* *Nat Neuro*  
[Facemap: a framework for modelling neural activity based on orofacial tracking](#)

**Pachitariu**, Sridhar, Pennington and Stringer *Nat Methods*  
[Spike sorting with Kilosort4](#)

Miura, Kim, Jurjut, Kelley, Yang, Chen, Thete, Revah, Cui, **Pachitariu**, Pasca *bioRxiv*  
[Assembloid model to study loop circuits of the human nervous system](#)

Hoeller, Zhong, **Pachitariu**, Romani *bioRxiv*  
[Bridging tuning and invariance with equivariant neuronal representations](#)

Stringer, **Pachitariu** *bioRxiv*  
[Benchmarking cellular segmentation methods against Cellpose](#)

2023 Stagkourakis, Spigolon, Marks, Feydar, Kim, Perona, **Pachitariu\***, Andersen\* *bioRxiv*  
[Anatomically distributed representations of instinct in the hypothalamus](#)

2022 **Pachitariu** and Stringer *Nat Methods*  
[Cellpose 2.0: how to train your own model](#)

Gardner, Hermansen, **Pachitariu**, Burak, Baas, Dunn, Moser, Moser *Nature*  
[Toroidal topology of population activity in grid cells](#)

Hart, ... , **Pachitariu**, ... , Wallisch *Journal of Open Source Education*  
[Neuromatch Academy: a 3-week, online summer school in computational neuroscience](#)

Pandey, **Pachitariu**, Brunton, KD Harris *PLOS CB*  
[Structured random receptive fields enable informative sensory encodings](#)

2021 Stringer, Michaelos and **Pachitariu** *Cell*  
[High precision coding in mouse visual cortex](#)

Steinmetz\*, Aydin\*, Lebedeva\*, Okun\*, **Pachitariu\***, ... , Harris *Science*  
[Neuropixels 2.0: A miniaturized high-density probe for stable, long-term brain recordings](#)

Stringer, Wang, Michaelos and **Pachitariu** *Nature Methods*  
[Cellpose: a generalist algorithm for cellular segmentation](#)

- Siegle, ..., **Pachitariu**, ... , Olsen and Koch *Nature*  
[A survey of spiking activity reveals a functional hierarchy of mouse corticothalamic visual areas](#)
- Eiselt, Chen, Chen, Arnold, Kim, **Pachitariu** and Sternson *Nature Neuroscience*  
[Hunger or thirst state uncertainty is resolved by outcome evaluation in medial prefrontal cortex to guide decision-making](#)
- Lee, Ni, Colonell, Karsh, Putzeys, **Pachitariu**, Harris, Meister *Nature Communications*  
[Electrode pooling can boost the yield of extracellular recordings with switchable silicon probes](#)
- Van Viegen, ..., **Pachitariu**, ..., Peters *Trends in Cognitive Sciences*  
[Neuromatch Academy: Teaching computational neuroscience with global accessibility](#)
- 2020 Schroder, Steinmetz, Krumin, **Pachitariu**, Rizzi, Lagnado, Harris and Carandini *Neuron*  
[Arousal modulates retinal output](#)
- 2019 Stringer and **Pachitariu** *Curr Opin Neurobiol*  
[Computational processing of neural recordings from calcium imaging data](#)
- Stringer\*, **Pachitariu**\*, Steinmetz, Reddy, Carandini and Harris *Science*  
[Spontaneous behaviors drive multidimensional, brainwide activity](#)
- Stringer\*, **Pachitariu**\*, Steinmetz, Carandini and Harris *Nature*  
[High-dimensional geometry of population responses in visual cortex](#)
- Allen, Chen, Pichamoorthy, Tien, **Pachitariu**, Luo and Deisseroth *Science*  
[Thirst regulates motivated behavior through modulation of brainwide neural population dynamics](#)
- 2018 Dipoppa, Ranson, Krumin, **Pachitariu**, Carandini and Harris *Neuron*  
[Vision and locomotion shape the interactions between neuron types in mouse visual cortex](#)
- Berens, Freeman, ..., **Pachitariu**, ... and Bethge *PLOS CB*  
[Community-based benchmarking improves spike rate inference from two-photon calcium imaging data](#)
- Pachitariu**, Stringer and Harris *J Neuroscience*  
[Robustness of spike deconvolution for neuronal calcium imaging](#)
- 2017 Jun, Steinmetz, ...**Pachitariu**, ... and Harris T *Nature*  
[Fully integrated silicon probes for high-density recording of neural activity](#)
- Pachitariu** and Sahani *bioRxiv*  
[Visual motion computation in recurrent neural networks](#)
- 2016 Stringer\*, **Pachitariu**\*, Okun, Bartho, Harris, Sahani and Lesica *eLife*  
[Inhibitory control of shared variability in cortical networks](#)
- Pachitariu**, Steinmetz, Kadir, Carandini and Harris *Neurips*  
[Fast and accurate spike sorting of high-channel count probes with Kilosort](#)
- Pachitariu**, Stringer, Schroder, Dipoppa, Rossi, Carandini and Harris *bioRxiv*  
[Suite2p: beyond 10,000 neurons with standard two-photon microscopy](#)
- 2015 Poort\*, Khan\*, **Pachitariu**, ..., Sahani, Keller, Mrsic-Flogel and Hofer *Neuron*  
[Learning enhances sensory and multiple non-sensory representations in primary visual cortex](#)

- Pachitariu**, Lyamzin, Sahani and Lesica *J Neuroscience*  
[State-dependent population coding in primary auditory cortex](#)
- Pachitariu** *PhD thesis, UCL*  
[Neural dynamics in cortical populations](#)
- 2013 **Pachitariu**, Petreska and Sahani *Neurips*  
[Recurrent linear models of simultaneously-recorded neural populations](#)
- Pachitariu**, Pettit, Dagleish, Packer, Hausser and Sahani *Neurips*  
[Extracting regions of interest from biological images with convolutional sparse block coding](#)
- Pachitariu** and Sahani *arXiv*  
[Regularization and nonlinearities for neural language models: when are they needed?](#)
- 2012 **Pachitariu** and Sahani *Neurips*  
[Learning visual motion in recurrent neural networks](#)
- 2010 **Pachitariu** *BA thesis, Princeton*  
[Spike train statistics](#)

## ANALYSIS SOFTWARE

- [Cellpose](#) (cellular segmentation)  
[Suite2p](#) (calcium imaging)  
[Kilosort4](#) (spike sorting)  
[Rastermap](#) (manifold embedding)  
[Facemap](#) (behavioral processing)

## TEACHING AT SUMMER SCHOOLS

- 2024 Neuromatch Academy CN & DL (chief group projects officer)
- 2023 Neuromatch Academy CN & DL (chief group projects officer)
- 2022 Neuromatch Academy CN & DL (chief group projects officer)
- 2021 Neuromatch Academy CN & DL (chief group projects officer)
- 2020 Neuromatch Academy CN (volunteer and projects mentor)
- 2019 Neural Data Science (organizer) *CSHL*  
 Interacting with neural circuits (lecturer) *Champalimaud*  
 Learning to use Suite2p and Kilosort2 (organizer) *Janelia*
- 2018 Neural Imaging Course (lecturer) *CSHL*  
 Junior Scientist Workshop on Theoretical Neuroscience (lecturer) *Janelia*
- 2017 Neural Data Analysis (lecturer) *CSHL*  
 Neural Imaging Course (lecturer) *CSHL*  
 TENSS (lecturer) *Romania*

2016 TENS (lecturer)

Romania

## WORKSHOPS

2023 *Neuropixels workshop* (lecturer)

UCL

2022 *Junior Scientist Workshop on Neural Circuits and Behavior* (organizer)

Janelia

2021 *Neuropixels workshop* (lecturer)

UCL

2020 *Allen Institute planning workshop*

Allen Institute

2020 *Neuropixels workshop* (lecturer)

UCL

2016 *Junior Scientist Workshop on Neural Circuits and Behavior*

Janelia

2012 *First deep learning summer school*

IPAM UCLA

2011 *Probabilistic models of cognition*

IPAM UCLA

## AWARDS

International Mathematics Olympiad '05, '06 - two bronze medals

Balkan Mathematics Olympiad '02, '04, '05, '06 - one gold, two silver, one bronze

International Mathematics Contest for university students '07, '08 - two second prizes

Romanian National Mathematics Olympiad and IMO Training Team '01-'06