

Jesse Geerts

+44 7534 845455 ♦ jessegeerts@gmail.com

Sainsbury Wellcome Centre ♦ www.jessegeerts.com

25 Howland St ♦ London W1T 4JG

Education

PhD Systems & Theoretical Neuroscience

2016 - Present

Sainsbury Wellcome Centre, University College London (UCL)

London, UK

My project is about hippocampal state representations and how these support learning and planning. I focus on a probabilistic version of the successor representation, trajectory dependent place cell firing and how this relates to hierarchical reinforcement learning. Supervised by Prof Neil Burgess

MSc Brain and Mind Sciences

2014 - 2016

UCL / Ecole Normale Supérieure / Sorbonne Université

London, UK / Paris, FR

BSc Natural Sciences

BSc Neuroscience

2010 - 2014

University of Amsterdam

Amsterdam, NL

Research Experience

Sainsbury Wellcome Centre / UCL

2017 - Present

PhD Candidate

London, UK

Supervised by Prof Neil Burgess

Gatsby Computational Neuroscience Unit / UCL

2017

Rotation student

London, UK

Supervised by Prof Maneesh Sahani

Sainsbury Wellcome Centre / UCL

2017

Rotation student

London, UK

Supervised by Dr Adam Kampff

Institut du Cerveau et de la Moelle Epinière / Brain and Spine Institute

2016

Research Intern

Paris, FR

Supervised by Dr Jean Daunizeau

Theoretical Neurobiology Group / Wellcome Trust Centre for Neuroimaging

2015

Masters Student

London, UK

Supervised by Dr Dimitris Pinotsis and Prof Karl Friston

Department of Brain and Cognition / University of Amsterdam

2014

Undergraduate Student Intern

Amsterdam, NL

Supervised by Dr Simon van Gaal

Talks & Posters

- March 2019 – Jesse Geerts, Fabian Chersi, Kimberly Stachenfeld, Neil Burgess
Hippocampal and striatal localisation and navigation strategies.
Talk at HBP Neural SLAM Workshop, Paris, France
- March 2019 – Jesse Geerts, Fabian Chersi, Kimberly Stachenfeld, Neil Burgess
Spatial reinforcement learning using allocentric and egocentric basis functions.
Talk at Cosyne Workshop, Lisbon, Portugal
- January 2019 – Jesse Geerts, Kimberly Stachenfeld, Neil Burgess
Using Splitter Cell Representations for Reinforcement Learning.
Talk at DeepMind Experimental Neuroscience Meeting, London, UK
- November 2018 – Kimberly Stachenfeld, Jesse Geerts, Neil Burgess, Timothy Behrens, Matthew Botvinick, Sam Gershman
Representation learning for exploration and generalization in RL.
Talk at SfN 2018 Nanosymposium, San Diego, CA, USA
- June 2018 – Jesse Geerts, Fabian Chersi, Kimberly Stachenfeld, Neil Burgess
Modelling hippocampal and striatal contributions to reward-based navigation.
Poster at iNav Symposium, Mont Tremblant, QC, Canada
- June 2018 – Jesse Geerts, Kimberly Stachenfeld, Neil Burgess
Splitter cells for reinforcement learning.
Talk at Data Club, Sainsbury Wellcome Centre, London, UK

Publications

- George Dimitriadis, Joana P. Neto ..., Jesse P. Geerts, ...Adam R. Kampff. (2018). **Why not record from every channel with a CMOS scanning probe?.** *BioRxiv*. [\[DOI\]](#)
- Matthew G. Phillips, Stephen C. Lenzi, Jesse P. Geerts. (2018). **Cortical predictive mechanisms of auditory response attenuation to self-generated sounds.** *Journal of Neuroscience*, 37(22). [\[DOI\]](#)
- Dimitris A. Pinotsis, Jesse P. Geerts, Lucas Pinto, Thomas H.B. Fitzgerald, Vladimir Litvak, Ryszard Auksztulewicz, Karl J. Friston. (2017). **Linking canonical microcircuits and neuronal activity: Dynamic causal modelling of laminar recordings.** *NeuroImage*. [\[DOI\]](#)
- Jun Jiang, Camille M. Correa, Jesse P. Geerts, Simon van Gaal. (2018). **The relationship between conflict awareness and behavioral and oscillatory signatures of immediate and delayed cognitive control.** *NeuroImage*, 177, 11–19. [\[DOI\]](#)

Teaching

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|---|----------------|
| Teaching Assistant / PyStarters / SWC, UCL
Pythonic programming course for students and postdocs at the SWC and Gatsby Unit
Course website | 2017 - Present |
| Teaching Assistant / Systems & Theoretical Neuroscience / SWC & GCNU
Taught by SWC and Gatsby Unit faculty
Course website | 2017 |
| Teaching Assistant / Statistics in R / University of Amsterdam | 2013 - 2014 |
| Teaching Assistant / Mathematics for Neuroscience / University of Amsterdam | 2014 |

Skills

Programming Languages	Python, R, Matlab, JavaScript, \LaTeX
Tools	TensorFlow, Cython, Cuda, scikit-learn
Data Analysis Experience	Electrophysiology, Behaviour, fMRI, EEG
Languages	English, Dutch, French, German

Awards

- 2016 – **Sainsbury Wellcome PhD Grant** Gatsby Charitable Foundation & The Wellcome Trust, UK
- 2015 – **Descartes Excellence Scholarship** French embassy in The Hague, NL
- 2015 – **Winter School Grant** Berlin School of Mind and Brain, DE
- 2013 – **2nd Place Undergraduate Project Prize** Natural Sciences, University of Amsterdam, NL

Volunteering, Outreach & Other

Public Engagement Network / SWC, London, UK 2017 - Present

As part of the Public Engagement Network, I have participated in projects presenting neuroscience and the SWC to school children and the wider public.

[Project website](#)

PyClub / SWC, London, UK 2017 - Present

I co-organise a pythonic programmatic club at SWC and Gatsby. In this context, I have given tutorials on a variety of coding topics such as testing, plotting libraries and TensorFlow.

[Project website](#)

Committee Member / Systems Seminars Series / SWC, London, UK 2017 - Present

I co-organise an annual student-led symposium open to all neuroscientists in London.

[Event website](#)

Teaching at BrainCamp / Instituti Atomi, Pristina, Kosovo 2018

I took part in a volunteering project teaching introductory neuroscience to gifted young students in Kosovo.

[Project website](#)

Presenter / New Scientist Live Festival, London, UK 2017, 2018

I represented the Sainsbury Wellcome Centre at the New Scientist's yearly festival, interacting with a wider audience to make neuroscience more accessible.

[Event website](#)

Committee Member / BetaBreak, Amsterdam, NL 2011 - 2014

I co-organised lunch-time events and discussions at the University of Amsterdam.

[Organisation website](#)

Personal

- **Music.** I am passionate about both making and listening to music. I play piano and more recently I have started playing guitar.
- **Running and climbing.** I enjoy sports outdoors. Ideally this takes place in the mountains or by the sea, but more frequently I run through the greener parts of London.
- **Travelling.** I like discovering new places, cultures and languages. In summer, I am also often found in Italy, helping my parents renovate their farmhouse.