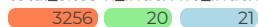


# DR. ALEXANDER SHAKEEL BATES

I am a neuroscientist and programmer on open-source projects. I work on insect brains. I am interested in how neurons wire together, and how they work together to build complex, innate behaviours. D.O.B. 23/09/1993.

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## PROFESSIONAL RESEARCH

- present | 01/10/2020
- Postdoctoral Fellow in Neurobiology ↗  
Harvard Medical School 📍 Boston, US
    - Member of the laboratory of Prof. Rachel Wilson ↗
    - Working on navigational circuitry, using calcium imaging, neurophysiology and behavioural studies involving virtual reality with *D. melanogaster*
    - Collaborating with Wei Lee ↗ on the first whole fly central nervous system connectome
- 01/03/2024 | 01/10/2020
- Visiting Scientist  
Dept. Zoology, University of Cambridge 📍 remote
    - Neuroinformatics work with the Drosophila Connectomics Group ↗
    - Developed R tools for neuroanatomy and connectomics

## # FELLOWSHIPS

- 01/06/2025 | 01/06/2022
- Sir Henry Wellcome Fellowship ↗  
Wellcome Trust & University of Oxford 📍 UK
    - 30,000 GBP towards my current research
    - Collaboration between groups of Rachel Wilson, Wei Lee, Scott Waddell and Shaul Druckmann
    - Also accepted as Life Science Research Foundation fellow
- 01/06/2022 | 01/04/2021
- EMBO fellow ↗  
European Molecular Biology Organization 📍 Europe
    - Also accepted as a International Human Frontier Science Program fellow
- 30/09/2019 | 01/08/2015
- Herchel Smith PhD Scholarship ↗  
Herchel Smith Foundation 📍 Cambridge, UK
- 01/08/2018 | 01/08/2016
- Boehringer Ingelheim PhD Scholarship ↗  
Boehringer Ingelheim Foundation 📍 European

## EDUCATION

- 30/09/2020 | 01/09/2015
- Neuroscience PhD  
MRC LMB ↗, University of Cambridge 📍 Cambridge, UK
    - PhD student with Dr. Greg Jefferis ↗
    - Thesis ↗:** The lateral horn, a brain region in the fly, primes innate olfactory behaviours by combining patterns of second-order olfactory projection neuron activity. In my work, I developed tools and analyses, and reconstructed neural networks from electron microscopy data, in order to better understand this brain region and how memory systems interact with it
    - Neuroinformatics, data science, R programming
    - Awards:** Honorary Vice Chancellor's Award ↗, MRC LMB Max Perutz Prize 2019 ↗, Winner of the British Neuroscience Association Postgraduate Prize 2020 ↗
- 01/07/2015 | 01/09/2012
- Neuroscience BSc  
University College London 📍 London, UK
    - 1st class degree with honours
    - Modules taken listed on linkedin ↗
    - Awards:** Burnstock Sessional Prize in Neuroscience BSc ↗ (ranked first in year) (2012–2013) (2013-2014) (2014-2015), Dean's list for the Faculty of Life Sciences (2013-2014) (2014-2015), Rob Clarke Award ↗ from the Society of Physiology

### Media

- ✉ alexander\_bates @hms.harvard.edu
- 🐦 as\_bates
- 👤 alexanderbates
- 🔗 asbates.com
- 🔗 linkedin
- 🔗 google scholar
- 📞 0000-0002-1195-0445

✉ researchgate  
✉ GQQ-6852-2022

### Skills

- 💻 R
- 💻 python
- ✓ MATLAB
- 💻 github
- 💻 git
- 💻 markdown
- 💻 Illustrator
- 💻 InDesign
- 💻 communication
- 💻 text editing
- 💻 journalistic writing
- 💻 creative writing
- 💻 open access

### Software

- 💻 natverse - co-author
- ✗ neuromorpho - author
- ✗ neuronbridger - author
- ✗ neuprintr - author
- ✗ hemibrain - author
- ✗ mouselightr - author
- ✗ insectbrainr - author
- ✗ crantr - author
- ✗ bancr - author

### Referees

- 🎓 PhD Supervisor:  
Dr. Gregory Jefferis, MRC Laboratory of Molecular Biology, Cambridge,  
jefferis@mrc-lmb.cam.ac.uk

- 🎓 Current Supervisor:  
Prof. Rachel Wilson,  
Harvard Medical School,  
Rachel\_Wilson@hms.harvard.edu

- 🎓 BSc Tutor at UCL:  
Dr. Marco Beato, UCL Neuroscience, Physiology and Pharmacology,  
m.beato@ucl.ac.uk

- 🎓 Supervisor: Serene Dhawan, Princeton, PhD student, serenedhawan@gmail.com

01/09/2012	A levels		
	Woodbridge High School		📍 London, UK
01/09/2010		• 6 A*s at A-level, comprising: Physics, Chemistry, Mathematics, English Literature, Philosophy and Russian, and in a history related EPQ (level 3) project	
31/08/2010	GCSEs		📍 London, UK
	Woodbridge High School		
01/09/2008		• 13 A*: English Literature, English Language, Mathematics, Statistics, Core Science, Additional Science, History, Philosophy, Geography, French, Italian, Russian and Expressive Arts. Jack Petchey Achievement Award ↗	

## ◎ REVIEWS

title	author	journal	year	cites
Systems neuroscience: Auditory processing at synaptic resolution ↗	<b>AS Bates</b> , G Jefferis	Curr. Biology	2022	1
Neuronal cell types in the fly: single-cell anatomy meets single-cell genomics ↗	<b>AS Bates</b> , J Janssens, GS Jefferis, S Aerts	Curr. opinion in neurobiology	2019	65

## ■ PAPERS

title	author	journal	year	cites
Neurotransmitter classification from electron microscopy images at synaptic sites in <i>Drosophila melanogaster</i> ↗	N Eckstein, <b>AS Bates</b> , A Champion, M Du, Y Yin, P Schlegel, AKY Lu, ...	Cell	2024	138
Information flow, cell types and stereotypy in a full olfactory connectome ↗	P Schlegel, <b>AS Bates</b> , T Stürner, SR Jagannathan, N Drummond, J Hsu, ...	Elife	2021	124
Complete connectomic reconstruction of olfactory projection neurons in the fly brain ↗	<b>AS Bates</b> , P Schlegel, RJV Roberts, N Drummond, IFM Tamimi, ...	Curr. Biology	2020	179
The natverse, a versatile toolbox for combining and analysing neuroanatomical data ↗	<b>AS Bates</b> , JD Manton, SR Jagannathan, M Costa, P Schlegel, T Rohlfing, ...	Elife	2020	173
Analysis and optimization of equitable US cancer clinical trial center access by travel time ↗	H Lee, <b>AS Bates</b> , S Callier, M Chan, N Chambwe, A Marshall, MB Terry, ...	JAMA oncology	2024	8
Analysis and optimization of equitable US cancer clinical trial center access by travel time. ↗	H Lee, <b>A Bates</b> , A Marshall, S Callier, N Chambwe, T Janowitz	Journal of Clinical Oncology	2023	0
Analysis of methods to improve engagement of under-represented and socioeconomically deprived patients in clinical research ↗	H Lee, <b>AS Bates</b> , R Dima, S Nadella, N Jordan-Martin, C Brennan, ...	Cancer Research	2022	0
Functional and anatomical specificity in a higher olfactory centre ↗	S Frechter, <b>AS Bates</b> , S Tootoonian, MJ Dolan, J Manton, AR Jamasb, ...	Elife	2019	105
Whole-brain annotation and multi-connectome cell typing of <i>Drosophila</i> ↗	P Schlegel, Y Yin, <b>AS Bates</b> , S Dorkenwald, K Eichler, P Brooks, DS Han, ...	Nature	2024	152
Quantitative Attributions with Counterfactuals ↗	DY Adjavon, N Eckstein, <b>AS Bates</b> , GSXE Jefferis, J Funke	bioRxiv	2024	0
Discriminative attribution from paired images ↗	N Eckstein, H Bukhari, <b>AS Bates</b> , GSXE Jefferis, J Funke	European Conf. on Computer Vision	2022	7
BACTrace, a tool for retrograde tracing of neuronal circuits in <i>Drosophila</i> ↗	S Cachero, M Gkantia, <b>AS Bates</b> , S Frechter, L Blackie, A McCarthy, ...	Nature methods	2020	35
Neural circuit mechanisms for steering control in walking <i>Drosophila</i> ↗	A Rayshubskiy, SL Holtz, <b>A Bates</b> , QX Vanderbeck, LS Capdevila, ...	bioRxiv	2020	68
BACTrace a new tool for retrograde tracing of neuronal circuits ↗	S Cachero, M Gkantia, <b>AS Bates</b> , S Frechter, L Blackie, A McCarthy, ...	bioRxiv	2020	6
Neurogenetic dissection of the <i>Drosophila</i> lateral horn reveals major outputs, diverse behavioural functions, and interactions with the mushroom body ↗	MJ Dolan, S Frechter, <b>AS Bates</b> , C Dan, P Huoviala, RJ Roberts, ...	Elife	2019	158
Communication from learned to innate olfactory processing centers is required for memory retrieval in <i>Drosophila</i> ↗	MJ Dolan, G Belliard-Guerin, <b>AS Bates</b> , S Frechter, A Lampin-Saint-Amaux, ...	Neuron	2018	112
Automated reconstruction of a serial-section EM <i>Drosophila</i> brain with flood-filling networks and local realignment ↗	PH Li, LF Lindsey, M Januszewski, Z Zheng, <b>AS Bates</b> , I Taisz, M Tyka, ...	bioRxiv	2019	98
A <i>Drosophila</i> computational brain model reveals sensorimotor processing ↗	PK Shiu, GR Sterne, N Spiller, R Franconville, A Sandoval, J Zhou, ...	Nature	2024	53
Network statistics of the whole-brain connectome of <i>Drosophila</i> ↗	A Lin, R Yang, S Dorkenwald, A Matsliah, AR Sterling, P Schlegel, S Yu, ...	Nature	2024	53
Neuronal wiring diagram of an adult brain ↗	S Dorkenwald, A Matsliah, AR Sterling, P Schlegel, SC Yu, CE McKellar, ...	Nature	2024	218
Comparative connectomics of the descending and ascending neurons of the <i>Drosophila</i> nervous system: stereotypy and sexual dimorphism ↗	T Stürner, P Brooks, LS Capdevila, BJ Morris, A Javier, S Fang, M Gkantia, ...	bioRxiv	2024	9
The connectome of the adult <i>Drosophila</i> mushroom body provides insights into function ↗	F Li, JW Lindsey, EC Marin, N Otto, M Dreher, G Dempsey, I Stark, ...	Elife	2020	336
A connectome and analysis of the adult <i>Drosophila</i> central brain ↗	LK Scheffer, CS Xu, M Januszewski, Z Lu, S Takemura, KJ Hayworth, ...	Elife	2020	955
Connectomics analysis reveals first-, second-, and third-order thermosensory and hygrosensory neurons in the adult <i>Drosophila</i> brain ↗	EC Marin, L Büld, M Theiss, T Sarkissian, RJV Roberts, R Turnbull, ...	Curr. Biology	2020	94

This table shows all of my work, searchable on pubmed. Author list displays first six. My name in bold, underlining indicates first (co)authorship. Get in contact for information on recent projects.

Rx Most of my work has first been published on bioRxiv

Ø Much of my work comes with open source R code

	title	author	journal	year	cites
	Neural circuit basis of aversive odour processing in Drosophila from sensory input to descending output ↗	P Huoviala, MJ Dolan, FM Love, P Myers, S Frechter, S Namiki, ...	bioRxiv	2018	44
	Combinatorial encoding of odors in the mosquito antennal lobe ↗	P Singh, S Goyal, S Gupta, S Garg, A Tiwari, V Rajput, AS Bates, ...	Nature communications	2023	11

## [selected talks]

- 2019 ECRO meeting European Chemoreception Research Organization Trieste, Italy
- 2018 Boehringer Ingelheim Meeting Boehringer Ingelheim Fonds Hirschegg, Austria
- 2017 MPI Connectomics meeting Max Planck Institute Berlin, Germany
- 2017 ECRO meeting European Chemoreception Research Organization Cambridge, UK
- 2017 Boehringer Ingelheim Meeting Boehringer Ingelheim Fonds Hirschegg, Austria
- 2016 Brains and Roses Schaeffer and Datta group organised Montserrat, Catalonia

## selected posters

- 2023 HHMI Investigators' Meeting HHMI HQ Chevy Chase
- 2019 UK Neural Computation University of Nottingham Nottingham, UK
- 2017 Boehringer Ingelheim Fonds communication workshop Boehringer Ingelheim Foundation Mainz, Germany
- 2016 Maggot Meeting Janelia Research Campus Ashburn, US
- 2016 High-resolution circuit reconstruction meeting Janelia Research Campus Ashburn, US
- 2016 LMB GSA Symposium MRC LMB, University of Cambridge Cambridge, UK

## leadership

- 01/10/2019 | 01/01/2016 President of BlueSci ↗ University College London London, UK
  - Lead BlueSci ↗, the University of Cambridge's science media society, through 15 issues of the magazine ↗
- 2018 Mentored summer student MRC LMB, University of Cambridge Cambridge, UK
- 01/05/2018 | 01/09/2017 Mentored undergraduate student Dept. Zoology, University of Cambridge Cambridge, UK
  - Student won best thesis in year award and two authorships
- 2017 Mentored summer student MRC LMB, University of Cambridge Cambridge, UK

2017	LMB graduate symposium lead organiser ↗ MRC LMB, University of Cambridge	 Cambridge, UK
2016	LMB graduate symposium organiser ↗ MRC LMB, University of Cambridge	 Cambridge, UK
01/10/2015   01/10/2014	President of the UCLU Writer's Society ↗ University College London	 London, UK
01/10/2015   01/10/2014	Science Editor, Pi Magazine ↗ University College London	 London, UK
2014	UCL iGEM 2014 ↗ Advisor University College London • Project planning, oversight, team selection and management • Gold medalist	 London, UK

## OTHER

2019	Visiting Scholar Janelia Research Campus • Worked in FlyEM, Dr. Gerry Rubin's Group ↗ • Worked on the hemibrain connectome	 Ashburn, US
2018	Paris Spring School in Neuroscience Techniques Paris Descartes University • A course in ↗ Optical Imaging and Electrophysiological Recording in Neuroscience	 Paris, France
2016	Visiting Scholar Janelia Research Campus • Worked with Dr. Albert Cardona's Group ↗ • Worked on the L1 larval connectome	 Ashburn, US
2015	University of Queensland Winter Scholarship University of Queensland • Worked on tectal activity in zebrafish larvae, light sheet imaging, Dr. Ethan Scott's Group ↗	 Brisbane, Australia
2014	Amgen Scholarship ↗ Dept. Zoology, University of Cambridge • Worked on neuronal structural plasticity in D. melanogaster larvae, Dr. Landgraf's group ↗	 Cambridge, UK
2013	UCL iGEM 2013 ↗ team member University College London • Team member, cloning, cell culture, project planning • Gold medallist	 London, UK
2013	Summer student in the biomolecular modelling laboratory Cancer Research UK, London Research Institute • Student Placement with Dr. Tammy Cheng ↗, python programming	 London, UK

## PEER REVIEWS

### journal reviews

PLoS Comp. Bio.	3
eLife	3
Nature Comm.	1

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Code available on  GitHub.  
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