

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.

total cites h index i10 index peer reviews



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*
 - Helping to lead an international collaboration with Prof. Wei-Chung Allen Lee ↗, flywire ↗ and a set of international groups on the first whole fly central nervous system connectome, open-access

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, organised international collaborators

Media

- ✉ alexander_bates @hms.harvard.edu ↗
- ☁ @asbates.bsky.social ↗
- 🐦 as_bates ↗
- 👤 alexanderbates ↗
- 🔗 asbates.com ↗
- 👤 linkedIn ↗
- ✉ google scholar ↗
- 📞 0000-0002-1195-0445 ↗
- ✉ researchgate ↗
- ✉ GQQ-6852-2022 ↗

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

Skills

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

Software

- natverse ↗
- neuromorph ↗
- neuronbridger ↗
- neupintr ↗
- hemibrain ↗
- mouselight ↗
- insectbrain ↗
- crantr ↗
- bancr ↗

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 ↗

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

01/09/2012
|
01/09/2010

- A levels
Woodbridge High School
London, UK
- 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
|
01/09/2008

- GCSEs
Woodbridge High School
London, UK
- 13 A*s: 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 ↗	AS Bates , G Jefferis	Curr. Biology	2022	1
Neuronal cell types in the fly: single-cell anatomy meets single-cell genomics ↗	AS Bates , 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, AS Bates , 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, AS Bates , T Stürner, SR Jagannathan, N Drummond, J Hsu, ...	eLife	2021	124
Complete connectomic reconstruction of olfactory projection neurons in the fly brain ↗	AS Bates , P Schlegel, RJV Roberts, N Drummond, IFM Tamini, ...	Curr. Biology	2020	179
The natverse, a versatile toolbox for combining and analysing neuroanatomical data ↗	AS Bates , 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, AS Bates , 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, A Bates , A Marshall, S Callier, N Chambwe, T Janowitz	J. of Clinical Oncology	2023	0
Analysis of methods to improve engagement of under-represented and socioeconomically deprived patients in clinical research ↗	H Lee, AS Bates , R Dima, S Nadella, N Jordan-Martin, C Brennan, ...	Cancer Res.	2022	0
Functional and anatomical specificity in a higher olfactory centre ↗	S Frechter, AS Bates , 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, AS Bates , S Dorkenwald, K Eichler, P Brooks, DS Han, ...	Nature	2024	152
Quantitative Attributions with Counterfactuals ↗	DY Adjavon, N Eckstein, AS Bates , GSXE Jefferis, J Funke	bioRxiv	2024	0
Discriminative attribution from paired images ↗	N Eckstein, H Bukhari, AS Bates , GSXE Jefferis, J Funke	Euro. Conf. on Computer Vision	2022	7
BACTrace, a tool for retrograde tracing of neuronal circuits in <i>Drosophila</i> ↗	S Cachero, M Gkantia, AS Bates , 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, A Bates , QX Vanderbeck, LS Capdevila, ...	bioRxiv	2020	68
BACTrace a new tool for retrograde tracing of neuronal circuits ↗	S Cachero, M Gkantia, AS Bates , 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, AS Bates , 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, AS Bates , 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, AS Bates , 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	33
A Lin, R Yang, S Dorkenwald, A Matsliah, AR Sterling, P Schlegel, S Yu, ...				
Network statistics of the whole-brain connectome of <i>Drosophila</i> ↗	S Dorkenwald, A Matsliah, AR Sterling, P Schlegel, SC Yu, CE McKellar, ...	Nature	2024	53
Neuronal wiring diagram of an adult brain ↗	T Stürner, P Brooks, LS Capdevila, BJ Morris, A Javier, S Fang, M Gkantia, ...	bioRxiv	2024	9
Comparative connectomics of the descending and ascending neurons of the <i>Drosophila</i> nervous system: stereotypy and sexual dimorphism ↗	F Li, JW Lindsey, EC Marin, N Otto, M Dreher, G Dempsey, I Stark, ...	eLife	2020	336
The connectome of the adult <i>Drosophila</i> mushroom body provides insights into function ↗	LK Scheffer, CS Xu, M Januszewski, Z Lu, S Takemura, KJ Hayworth, ...	eLife	2020	955
A connectome and analysis of the adult <i>Drosophila</i> central brain ↗	EC Marin, L Büld, M Theiss, T Sarkissian, RJV Roberts, R Turnbull, ...	Curr. Biology	2020	94
Connectomics analysis reveals first-, second-, and third-order thermosensory and hygrosensory neurons in the adult <i>Drosophila</i> brain ↗	N Otto, MW Pleijzier, IC Morgan, AJ Edmondson-Stait, KJ Heinz, I Stark, ...	Curr. Biology	2020	73
Input connectivity reveals additional heterogeneity of dopaminergic reinforcement in <i>Drosophila</i> ↗	P Huoviala, MJ Dolan, FM Love, P Myers, S Frechter, S Namiki, ...	bioRxiv	2018	44
Neural circuit basis of aversive odour processing in <i>Drosophila</i> from sensory input to descending output ↗	P Singh, S Goyal, S Gupta, S Garg, A Tiwari, V Rajput, AS Bates , ...	Nature Comm.	2023	11
Combinatorial encoding of odors in the mosquito antennal lobe ↗				

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
⑧ Much of my work comes with open source R code

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 · Lead BlueSci ↗, the University of Cambridge's science media society, through 15 issues of the magazine ↗	 London, UK
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 · Student won best thesis in year award and two authorships	 Cambridge, UK
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 medallist	 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 <i>L1</i> 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 ↗
- 2014
Amgen Scholarship ↗
Dept. Zoology, University of Cambridge
· Worked on neuronal structural plasticity in *D. melanogaster* larvae, Dr. Landgraf's group ↗
- 2013
UCL iGEM 2013 ↗ team member
University College London
· Team member, cloning, cell culture, project planning
· Gold medallist
- 2013
Summer student in the biomolecular modelling laboratory
Cancer Research UK, London Research Institute
· Student Placement with Dr. Tammy Cheng ↗, python programming

📍 Brisbane, Australia

📍 Cambridge, UK

📍 London, UK

📍 London, UK

⌚ PEER REVIEWS

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

Updated on DD-MM-YYYY