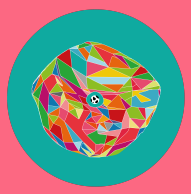
DR. ALEXANDER SHAKEEL BATES

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
3256	20	21



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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*

present | 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

GRANTS

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

01/06/2022 | 01/04/2021

EMBO fellow

European Molecular Biology Organization — Europe

2021

Life Science Research Foundation Fellowship

Life Science Research Foundation — US

- Did not pursue

2021

Human Frontiers Fellowship

International Human Frontier Science Program — International

- Did not pursue

Media

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0000-0002-1195-0445
researchgate
GQQ-6852-2022

Software

natverse - co-author

neuromorphr - author

neuronbridger - author

neuprintr - author

hemibrainr - author

mouselightr - author

insectbrainr - author

crantr - author

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

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
2	Systems neuroscience: Auditory processing at synaptic resolution	AS Bates, G Jefferis	Current Biology	2022	1
6	Neuronal cell types in the fly: single-cell anatomy meets single-cell genomics	AS Bates, J Janssens, GS Jefferis, S Aerts	Current opinion in neurobiology	2019	65

Skills

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

Peer Reviews

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

PAPERS

title	author	journal	year
Neurotransmitter classification from electron microscopy images at synaptic sites in Drosophila melanogaster	N Eckstein, AS Bates, A Champion, M Du, Y Yin, P Schlegel, AKY Lu, ...	Cell	2024
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
Complete connectomic reconstruction of olfactory projection neurons in the fly brain	AS Bates, P Schlegel, RJV Roberts, N Drummond, IFM Tamimi, ...	Current Biology	2020
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
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
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	Journal of Clinical Oncology	2023
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 Research	2022
Functional and anatomical specificity in a higher olfactory centre	S Frechter, AS Bates, S Tootoonian, MJ Dolan, J Manton, AR Jamasb, ...	elife	2019
Whole-brain annotation and multi-connectome cell typing of Drosophila	P Schlegel, Y Yin, AS Bates, S Dorkenwald, K Eichler, P Brooks, DS Han, ...	Nature	2024
Quantitative Attributions with Counterfactuals	DY Adjavon, N Eckstein, AS Bates, GSXE Jefferis, J Funke	bioRxiv	2024
Discriminative attribution from paired images	N Eckstein, H Bukhari, AS Bates, GSXE Jefferis, J Funke	European Conference on Computer Vision	2022
BAcTrace, a tool for retrograde tracing of neuronal circuits in Drosophila	S Cachero, M Gkantia, AS Bates, S Frechter, L Blackie, A McCarthy, ...	Nature methods	2020
Neural circuit mechanisms for steering control in walking Drosophila	A Rayshubskiy, SL Holtz, A Bates, QX Vanderbeck, LS Capdevila, ...	bioRxiv	2020
BAcTrace a new tool for retrograde tracing of neuronal circuits	S Cachero, M Gkantia, AS Bates, S Frechter, L Blackie, A McCarthy, ...	bioRxiv	2020
Neurogenetic dissection of the Drosophila 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

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

℞ Most of my work has first been published on bioRxiv

∂ Much of my work comes with open source R code

	title	author	journal	year	cites
16	Communication from learned to innate olfactory processing centers is required for memory retrieval in Drosophila	MJ Dolan, G Belliart-Guérin, **AS Bates**, S Frechter, A Lampin-Saint-Amaux, ...	Neuron	2018	112
17	Automated reconstruction of a serial-section EM Drosophila 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
18	A Drosophila computational brain model reveals sensorimotor processing	PK Shiu, GR Sterne, N Spiller, R Franconville, A Sandoval, J Zhou, ...	Nature	2024	33
19	Network statistics of the whole-brain connectome of Drosophila	A Lin, R Yang, S Dorkenwald, A Matsliah, AR Sterling, P Schlegel, S Yu, ...	Nature	2024	53
20	Neuronal wiring diagram of an adult brain	S Dorkenwald, A Matsliah, AR Sterling, P Schlegel, SC Yu, CE McKellar, ...	Nature	2024	218
21	Comparative connectomics of the descending and ascending neurons of the Drosophila nervous system: stereotypy and sexual dimorphism	T Stürner, P Brooks, LS Capdevila, BJ Morris, A Javier, S Fang, M Gkantia, ...	bioRxiv	2024	9
22	The connectome of the adult Drosophila mushroom body provides insights into function	F Li, JW Lindsey, EC Marin, N Otto, M Dreher, G Dempsey, I Stark, ...	Elife	2020	336
23	A connectome and analysis of the adult Drosophila central brain	LK Scheffer, CS Xu, M Januszewski, Z Lu, S Takemura, KJ Hayworth, ...	elife	2020	955
24	Connectomics analysis reveals first-, second-, and third-order thermosensory and hygrosensory neurons in the adult Drosophila brain	EC Marin, L Büld, M Theiss, T Sarkissian, RJV Roberts, R Turnbull, ...	Current Biology	2020	94
25	Input connectivity reveals additional heterogeneity of dopaminergic reinforcement in Drosophila	N Otto, MW Pleijzier, IC Morgan, AJ Edmondson-Stait, KJ Heinz, I Stark, ...	Current Biology	2020	73
26	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
27	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

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,

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, throguh 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 — London, UK

- Project planning, oversight, team slection and management
- Gold medallist

OTHER

2019 — **Visiting Scholar**
Janelia Research Campus — Ashburn, US

- Worked in FlyEM, Dr. Gerry Rubin's Group
- Worked on the hemibrain connectome

2018 — **Paris Spring School in Neuroscience Techniques**
Paris Descartes University — Paris, France

- A course in Optical Imaging and Electrophysiological Recording in Neuroscience

2016 — **Visiting Scholar**
Janelia Research Campus — Ashburn, US

- Worked with Dr. Albert Cardona's Group
- Worked on the L1 larval connectome

2015 — **University of Queensland Winter Scholarship**
University of Queensland — Brisbane, Australia

- Worked on tectal activity in zebrafish larvae, light sheet imaging, Dr. Ethan Scott's Group

2014 — **Amgen Scholarship**
Dept. Zoology, University of Cambridge — Cambridge, UK

- Worked on neuronal structural plasticity in D. melanogaster larvae, Dr. Landgraf's group

2013

UCL iGEM 2013 team member

University College London

London, UK

- Team member, cloning, cell culture, project planning
- Gold medallist

2013

Summer student in the biomolecular modelling laboratory

Cancer Research UK, London Research Institute

London, UK

- Student Placement with Dr. Tammy Cheng, python programming