DR. ALEXANDER SHAKEEL BATES

I am a neuroscientist and computational biologist specialising in neuroanatomy, neurophysiology and connectomics of the insect brain. My research focuses on understanding how neural circuits wire together to generate complex, innate behaviours. I develop open-source tools for neuroanatomical analysis and collaborate internationally on connectomics projects.

total cites	h index	i10 index	peer reviews
3910	21	23	7

PROFESSIONAL RESEARCH

present | 01/10/2020
Postdoctoral Fellow in Neurobiology
Harvard Medical School — Boston, US
- Member of the laboratory of Prof. Rachel Wilson
- Investigating navigational circuitry using calcium imaging, neurophysiology and behavioural studies involving virtual reality with *Drosophila melanogaster*
- Co-leading an international collaboration with Prof. Wei-Chung Allen Lee, flywire and a network of international research 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

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

30/02/2021 | 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

PRIMARY RESEARCH

title	author	journal	year	cites
Distributed control circuits across a brain-and-cord connectome	**AS Bates**, JS Phelps, M Kim, HH Yang, A Matsliah, Z Ajabi, E Perlman, ...	bioRxiv	2025	0
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	181
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	142
Complete connectomic reconstruction of olfactory projection neurons in the fly brain	**AS Bates**, P Schlegel, RJV Roberts, N Drummond, IFM Tamimi, ...	Curr. Biology	2020	194
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	194
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	12
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

Media

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GQQ-6852-2022

Skills

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

Software

natverse
neuromorphr
neuronbridger
neuprintr
hemibrainr
mouselightr
insectbrainr
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

Supervisee: Serene Dhawan, Princeton, PhD student, serenedhawan@gmail.com

Publication table displays first six authors, my name in bold, underlining indicates (co-)first authorship

title	author	journal	year	cites
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	107
Neural circuit mechanisms for steering control in walking Drosophila	A Rayshubskiy, SL Holtz, AS Bates, QX Vanderbeck, LS Capdevila, ...	ELife	2025	96
Quantitative Attributions with Counterfactuals	DY Adjavon, N Eckstein, AS Bates, GSXE Jefferis, J Funke	bioRxiv	2024	0
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	271
Discriminative attribution from paired images	N Eckstein, H Bukhari, AS Bates, GSXE Jefferis, J Funke	Euro. Conf. on Computer Vision	2022	8
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	43
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	161
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	109
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	103
Comparative connectomics of Drosophila descending and ascending neurons	T Stürner, P Brooks, L Serratosa Capdevila, BJ Morris, A Javier, S Fang, ...	Nature	2025	23
A Drosophila computational brain model reveals sensorimotor processing	PK Shiu, GR Sterne, N Spiller, R Franconville, A Sandoval, J Zhou, ...	Nature	2024	61
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	88
Neuronal wiring diagram of an adult brain	S Dorkenwald, A Matsliah, AR Sterling, P Schlegel, SC Yu, CE McKellar, ...	Nature	2024	390
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	358
A connectome and analysis of the adult Drosophila central brain	LK Scheffer, CS Xu, M Januszewski, Z Lu, S Takemura, KJ Hayworth, ...	eLife	2020	1053
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, ...	Curr. Biology	2020	104
Input connectivity reveals additional heterogeneity of dopaminergic reinforcement in Drosophila	N Otto, MW Pleijzier, IC Morgan, AJ Edmondson-Stait, KJ Heinz, I Stark, ...	Curr. Biology	2020	77
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	47
Combinatorial encoding of odors in the mosquito antennal lobe	P Singh, S Goyal, S Gupta, S Garg, A Tiwari, V Rajput, AS Bates, ...	Nature Comm.	2023	15

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	70

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

Peer Review

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

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 — 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 *Drosophila 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

℞ Most of my work has first been published on bioRxiv

∂ Much of my work comes with open source R code

Updated on 01/09/2025