Benjamin James Lansdell

Email: ben.lansdell@gmail.com
URL: http://benlansdell.github.io
Nationality: Australian

Current position

Postdoctoral Researcher
Department of Bioengineering
University of Pennsylvania, Philadelphia
Advisor: Konrad Kording

Areas of specialization

Computational neuroscience • Stochastic processes • Dynamical systems

Education

2017 **PhD in Applied Mathematics** (GPA: 3.84/4.0)
University of Washington, Seattle
Advisor: Adrienne Fairhall

2012 **MPhil in Mathematics** (GPA: 84/100)
University of Melbourne, Australia
Advisors: Terence Speed, Kerry Landman

2008 **BSc (Hons) major in Mathematics** (GPA: 89/100)
University of Melbourne, Australia
Advisors: Anthony Papenfuss, Terence Speed

Summer schools & Workshops

2018 **Visiting Scholar**
MILA, University of Montreal, Montreal, CAN
Deep learning and reinforcement learning summer school
University of Toronto, Toronto, Canada

2016 **Graduate Summer School – The Mathematics of Data**
Park City Mathematics Institute/Institute for Advanced Study, Utah

2015 **Summer Institute in Statistics and Modeling in Infectious Diseases**
Department of Biostatistics, University of Washington, Seattle

2014 **OIST Computational neuroscience course**
Okinawa Institute of Science and Technology, Okinawa, Japan

Positions held

2017-2018 University of Pennsylvania, Philadelphia, USA
Postdoctoral Researcher
Kording lab, Department of Bioengineering

2017 University of Washington, Seattle, USA
Senior Fellow
Fairhall lab, Department of Physiology and Biophysics

2009 Walter and Eliza Hall Institute for Medical Research, Australia
Research Technician
Speed lab, Bioinformatics division

2007 Walter and Eliza Hall Institute for Medical Research, Australia
Undergraduate Research Opportunities Program Student
Speed lab, Bioinformatics division

Honors & awards

Major

2008 Dwight's Prize in Mathematical Statistics, University of Melbourne

2008 Alan W. Harris Scholarship, Walter and Eliza Hall Institute

2003 Australian Students Prize, Australian government

2003 Dux (Valedictorian), Ballarat Clarendon College

Selected smaller

2016 Travel grant to attend Graduate Summer School, Park City Mathematics Institute

2014 Travel grant to attend Okinawa Computational neuroscience course, OIST

2010 Top Scholar Award, University of Washington, Department of Applied Mathematics

2006 Melbourne Abroad Scholarship (University of Nottingham)

2006 MacFarland Scholarship, Ormond College

2004-2006 Ormond College Scholar, Ormond College

Publications & talks

Preprints & in preparation

Lansdell B, Triantafillou S, Kording K, "Conservative bandits: exploration through extrapolation", *in preparation*

Lansdell B, Kluck R, Hockings C, Fairlie D, Lee E, Landman K, Frascoli F, Speed T, "Computational model of Bcl-2 family pro-apoptotic Bak activation through BH3-only stimulation: activation efficacies and dynamic regulation mechanisms", *in preparation*

2018 Farhoodi R, **Lansdell B**, Kording K, "Quantifying how staining methods bias measurements of neuron morphologies", *submitted*

Lansdell B, Kording K, "Spiking allows neurons to estimate their causal effect", *bioRxiv https://doi.org/10.1101/253351*

Lagache T, **Lansdell B**, Tang J, Yuste R, Fairhall A, "Tracking Activity In A Deformable Nervous System With Motion Correction And Point-Set Registration", *bioRxiv https://doi.org/10.1101/373035*

2017 **Lansdell B**, Milovanovic I, Mellema C, Fetz E, Fairhall A, Moritz C, "Reconfiguring motor circuits for a joint manual and BCI task", *arXiv arXiv:1702.07368*

Journal articles

2016 Aljadeff Y, **Lansdell B**, Fairhall A, Kleinfeld D, "Analysis of neuronal spike trains, deconstructed," *Neuron* 2016, 91(2), http://dx.doi.org/10.1016/j.neuron.2016.05.039

Pang R, **Lansdell B**, Fairhall A, "Dimensionality Reduction in Neuroscience", *Current Biology* 2016, 26: R1-R5

2014 **Lansdell B**, Ford K, Kutz J N, "A reaction-diffusion model of cholinergic retinal waves", *PLoS Computational Biology* 2014, 10(12): e1003953. doi:10.1371/journal.pcbi.1003953

Garsed DW, Marshall OJ, Corbin VDA, Hsu A, Stefano LD, Schröder J, Li J, Feng Z, Kim BW, Kowarsky M, **Lansdell B**, Brookwell R, Myklebost O, Meza-Zepeda L, Holloway AJ, Pedeutour F, Choo KH, Damore MA, Deans AJ, Papenfuss AT, Thomas DM, "The Architecture and Evolution of Cancer Neochromosomes," *Cancer Cell* 2014, 26:653-667

2011 Renfree MB, Papenfuss AT, Deakin JE, Lindsay J, Heider T, Belov K, Rens W, Waters PD, Pharo EA, Shaw G, Wong ES, Lefèvre CM, Nicholas KR, Kuroki Y, Wakefield MJ, Zenger KR, Wang C, Ferguson-Smith M, Nicholas FW, Hickford D, Yu H, Short KR, Siddle HV, Frankenberg SR, Chew KY, Menzies BR, Stringer JM, Suzuki S, Hore TA, Delbridge ML, Mohammadi A, Schneider NY, Hu Y, O'Hara W, Al Nadaf S, Wu C, Feng ZP, Cocks BG, Wang J, Flicek P, Searle SM, Fairley S, Beal K, Herrero J, Carone DM, Suzuki Y, Sugano S, Toyoda A, Sakaki Y, Kondo S, Nishida Y, Tatsumoto S, Mandiou I, Hsu A, McColl KA, **Lansdell B**, Weinstock G, Kuczek E, McGrath A, Wilson P, Men A, Hazar-Rethinam M, Hall A, Davis J, Wood D, Williams S, Sundaravadanam Y, Muzny DM, Jhangiani SN, Lewis LR, Morgan MB, Okwuonu GO, Ruiz SJ, Santibanez J, Nazareth L, Cree A, Fowler G, Kovar CL, Dinh HH, Joshi V, Jing C, Lara F, Thornton R, Chen L, Deng J, Liu Y, Shen JY, Song XZ, Edson J, Troon C, Thomas D, Stephens A, Yapa L, Levchenko T, Gibbs RA, Cooper DW, Speed TP, Fujiyama A, Graves JA, O'Neill RJ, Pask AJ, Forrest SM, Worley KC, "Genome sequence of an Australian kangaroo, Macropus eugenii, provides insight into the evolution of mammalian reproduction and development.", *Genome Biology* 2011, 12:R81.

Conference proceedings

2018 Farhoodi R*, **Lansdell B***, Kording K, "Quantifying the effect of staining methods on extracted neuron morphology", CCN Meeting 2018, Philadelphia, PA, USA (equal first author)

Lansdell B, Kording K, "Spiking allows neurons to estimate their causal effect", Cosyne Meeting 2018, Denver, CO, USA

2016 **Lansdell B**, Milovanovic I, Fairhall A, Fetz E, Moritz C, "Neural activity in a simultaneous BCI and manual task", BCI Society Meeting 2016, CA, USA. doi:10.3217/978-3-85125-467-9-118

Conference posters

2018 Farhoodi R, **Lansdell B**, Kording K, "Quantifying the effect of staining methods on extracted neuron morphology", INCF Meeting 2018, Montreal, QC, CA

Lansdell B, Kording K, "Spiking allows neurons to estimate their causal effect", Deep Learning Reinforcement Learning Summer School 2018, CIFAR, Toronto, CAN

2016 **Lansdell B**, Milovanovic I, Fairhall A, Fetz E, Moritz C, "Neural activity in a simultaneous BCI and manual task", Neurofutures Meeting 2016, Allen Institute for Brain Science, WA, USA.

2013 **Lansdell B**, Kutz JN (September, 2013), "The spatio-temporal dynamics of spontaneous activity in the developing retina", *BMES 2013*, Seattle, USA.

Lansdell B, Kutz JN (September, 2013), "A computational model of Bcl-2 regulated apoptosis: bistability revisited", *BMES 2013*, Seattle, USA.

Lansdell B, Kutz JN (September, 2013), "The spatio-temporal dynamics of spontaneous activity in

the developing retina", *University of Washington Computational Neursocience connection 2013*, Seattle, USA.

Lansdell B, Kutz JN (July, 2013), "Cholinergic Retinal Waves and Self-Organized Criticality", *CNS 2013*, Paris, France.

2012 **Lansdell B**, Kutz JN, Ford K (September, 2012), "Modeling Retinal Waves in Starburst Amacrine Cells", *Neuroinformatics 2012*, Munich, Germany.

2008 **Lansdell B**, Papenfuss AT, Speed TP, (December 2008) "Incorporating Tiling Array Expression Data into a Gene Predictor", *Genome Informatics Workshop*, Gold Coast, Australia.

Talks

2019 **Lansdell B** (March 22, 2019), "Causal inference in neural networks", AMS Sectional Meeting, University of Hawaii. (Invited)

Lansdell B (August 21, 2018), "Causality and reinforcement learning: considerations for smarter agents", Neuro+ML theory talk, MILA, University of Montreal.

2017 **Lansdell B** (June 5, 2017), "Neural population dynamics in motor control and development", Geffen lab talk, University of Pennsylvania. (Invited)

Lansdell B (May 30, 2017), "Neural population dynamics in motor control and development", Shirley Ryan Ability lab, Chicago. (Invited)

Lansdell B (March 24, 2017), "Moving models of motor control forward, in theory and application", *Special seminar*, Flatiron Institute, Simons Foundation, New York. (Invited)

Lansdell B (January 24, 2017), "Unraveling principles of motor control: from nerve nets to neural prosthetics", *Neurotheory group talk*, Columbia University, New York. (Invited)

Lansdell B (January 23, 2017), "Unraveling principles of motor control: from nerve nets to neural prosthetics", *Special seminar*, Janelia Research Campus, Ashburn VA. (Invited)

2012 **Lansdell B** (June 12, 2012), "Modeling Retinal Waves in Starburst Amacrine Cells", *SIAM Conference on Non-linear Waves and Coherent Structures*, University of Washington, Seattle. (Invited)

2012 **Lansdell B** (February 11, 2012), "Continuum Model of Retinal Waves in Starburst Amacrine Cells", *Frontiers in Biophysics*, Simon Frasier University, Vancouver. (Contributed)

Presentations

2010 **Lansdell B** (December 9, 2010), "The Hirota Method in Soliton Theory", *Master's completion seminar*, University of Washington, Seattle.

Lansdell B (July 13, 2010), "Understanding the Bcl2 family through computational modelling", *Bioinformatics seminar*, Walter and Eliza Hall Institute, Melbourne, Australia.

2009 **Lansdell B** (May 26, 2009), "Improving the Mosquito Genome Annotation", *Bioinformatics seminar*, Walter and Eliza Hall Institute, Melbourne, Australia.

Unpublished works

2012 **Lansdell B**, *Understanding the Bcl-2 family through computational modelling*, Masters thesis, Department of Mathematics and Statistics, University of Melbourne, 2012.

2008 **Lansdell B**, *Computational gene prediction using generalised hidden Markov models and tiling arrays*, Honours thesis, Department of Mathematics and Statistics, University of Melbourne, December 2008.

Teaching

2013,2015 University of Washington
Department of Applied Mathematics
Guest Lecturer:

- Winter 2015– AMATH 402/502, Introduction to Nonlinear Dynamics and Chaos
- Fall 2013 – AMATH 532, Mathematics of genome analysis and molecular modeling

2012 University of Washington
Department of Applied Mathematics
Teaching Assistant:

- Spring 2012 – AMATH 353, Fourier Analysis and Partial Differential Equations
- Winter 2012 – AMATH 402/502, Introduction to Nonlinear Dynamics and Chaos

2010-2011 University of Washington
Department of Mathematics
Teaching Assistant:

- Fall 2011 – MATH 111, Algebra in Business and Economics
- Winter 2011 – Assistant in first year Math Study Center
- Fall 2010 – MATH 125, Calculus with Analytic Geometry II

2006-2007 University of Melbourne
Queen's College
Non-resident physics tutor

2006 University of Melbourne
Ormond College
Resident student tutor:

- Semester 1 2006: 620-232 – Vector Calculus

Affiliations & responsibilities

Affiliations

2013 - present OCNS member

2013 - present BMES member

2011 - present SIAM member

2011 - present AMS member

Service & Responsibilities

Refereed for: Nature Communications, Neuron

2015 - 2017 UAW Student Union Steward, Department of Applied Mathematics representative, University of Washington

2012 - 2016 Computer Systems Administrator, Department of Applied Mathematics, University of Washington

2011 - 2013 Graduate student representative for computing, Department of Applied Mathematics, University of Washington

Volunteer & outreach

2014 Fossil technician, Burke Museum of Natural History and Culture, University of Washington

2013-2014 Co-organizer of SIAM UW chapter sponsored math fair at Lockwood Elementary School

2013 Volunteer for UW STEM Bridge program for incoming engineering and science students

Professional skills

Computing

Proficient in Python, MATLAB, Maple, LaTeX, AUTO, git version control, WordPress CMS, MySQL
Working knowledge of C, C++, R, HTML, shell script, PHP, OpenGL, OpenCV, CUDA

References

Adrienne Fairhall	J. Nathan Kutz	Chet Moritz
Associate Professor	Professor	Associate Professor
Physiology and Biophysics	Applied Mathematics	Rehabilitation Medicine
University of Washington	University of Washington	University of Washington
Seattle	Seattle	Seattle
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fairhall@uw.edu	kutz@uw.edu	ctmoritz@uw.edu