Stephen M Pederson

Post-Doctoral Bioinformatician

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Profile

- A keen interest of mine is *Transcriptomics and Gene Regulatory Networks*. As part of my PhD (2018), whilst training in the context of the immune dysregulation of T cells, I developed a novel, Bayesian statistical methodology for the analysis of Whole Transcript Microarray data, focussing on the detection of alternate isoform usage. As a consequence, a potential role for ncRNA in the activation of T cells was revealed for the first time.
- As the inaugural co-ordinator of the Bioinformatics Hub at the University of Adelaide (2014-2020), *I oversaw the growth of this facility from a sole employee in 2014 to 4 full-time core staff by 2020*, along with a further 12 contract and casual staff. Collectively, our team were named investigators on $8.5m in research funding across all Faculties, and I gained considerable experience in a broad range of high-throughput data types.
- Bioinformatics education and training have always been an important interest. In 2015 I attended the *Master R Developer Workshop* with Dr Hadley Wickham (RStudio). Locally *I have delivered bioinformatics training workshops to over 1500 staff and students*, as well as delivering training at national events. From the years 2016-2018, I ran the *largest training event in the language R held in Australia*, attracting attendees from around the country, and have also run corporate R training for both Sugar Research Australia (QLD) and SARDI
- I played an active role in the *establishment of an Undergraduate Major in Bioinformatics* (B.Sc), acting as Course Convenor for Transcriptomics Applications III in 2020, writing and delivering nearly all lecture and practical material.
- I am an enthusiastic supporter of open source software and am the senior author/developer of *two Bioconductor packages*. From 2016-2019, I played a key leadership role in establishing the international event *BiocAsia*, bringing the training and networking opportunities of the Bioconductor community to our local region.

Employment History

2020- **Post-Doctoral Bioinformatician**, *Dame Roma Mitchell Cancer Research Laboratories, Univerrsity of Adelaide*, Adelaide, South Australia.

2014-2020 **Co-ordinator**, *Bioinformatics Hub, University of Adelaide*, Adelaide, South Australia.

2011-2014 **Casual Tutor**, *School of Mathematical Sciences, University of Adelaide*, Adelaide, South Australia.

1992-2014 **Self-Employed Musician**, Adelaide, South Australia.

Education

2008-2018 **Doctor of Philosophy (Medicine)**, *University of Adelaide*, South Australia, Australia.

2006-2007 **Bachelor of Mathematics & Comp. Sc. (Hons)**, *University of Adelaide*, South Australia, Australia.

2002-2005 **Bachelor of Science**, *University of Adelaide*, South Australia, Australia.

1989-1991 **Bachelor of Music**, *University of Adelaide*, South Australia, Australia.

Presentations

2019 **Bioconductor**, *New York, NY*, Short Talk & Poster - ngsReports and strandCheckR: Two new packages for quality control of NGS data.

2019 **BiocAsia/BioinfoSummer**, *Sydney*, Short Talk - Experiences of a First-Time Package Submitter.

2017 **BioinfoSummer**, *Adelaide*, Training Workshop - Data Visualisation in R.

2016 **ABACBS**, *Brisbane*, Poster - Use of a weighted bootstrap for indentifying the regulatory role of genomic repeat elements.

2015 **NCBI**, *Bethesda, MD*, Presentation - Bioinformatics from Down Under.

2015 **BioinfoSummer**, *Sydney*, Training Workshop - Introduction to R.

Community Engagement

2018-2021 Ordinary Member. Australian Bioinformatics And Computational Biology Society

2016-2019 BiocAsia Conference Committee. Bioconductor

2017 Conference Committee. Australian Bioinformatics And Computational Biology Society

2016 BioinfoSummer Conference Committee. Australian Mathematical Sciences Institute

2014-2016 Ordinary Member. Australasian Genomics Technologies Association

2014-2015 Ordinary Member. International Society for Computational Biology

Technical Skills

- Highly fluent in the language `R` and using High-Performance Computing systems
- Experienced with `linux` (Ubuntu), `bash`, `Git` for version control, `markdown` and LaTeX, along with `snakemake` for HPC pipeline management
- Expertise in statistics, RNA-Seq, scRNA-Seq, ChIP-Seq, RAD/GBS-Seq, HiC-Seq and microarray data
- A working familiarity with `python` and `C/C++`

Publications Since 2018

34 since 2018, 41 in total. First or senior author publications are indicated with an asterisk. My h-index is currently 11.

1.* CM Ward, TH To, **SM Pederson** (2020) *ngsReports: a Bioconductor package for managing FastQC reports and other NGS related log files* **Bioinformatics** 36 (8), 2587-2588

2. N Hin, M Newman, J Kaslin, AM Douek, A Lumsden, SH M Nik, Y Dong, Xin-F Zhou, NB Manucat-Tan, A Ludington, DL Adelson, **SM Pederson**, M Lardelli (2020) *Accelerated brain aging towards transcriptional inversion in a zebrafish model of the K115fs mutation of human PSEN2* **PLOS One** 15 (1), e0227258

3. CE Whyte, M Osman, EE Kara, C Abbott, J Foeng, DR McKenzie, KA Fenix, Y Harata-Lee, KL

Foyle, ST Boyle, M Kochetkova, AR Aguilera, J Hou, Xian-Y Li, MA Armstrong, **SM Pederson**, I Comerford, MJ Smyth, SR McColl (2020) *ACKR4 restrains antitumor immunity by regulating CCL21* **Journal Of Experimental Medicine** 217 (6)

4. G Singhal, J Morgan, MC Jawahar, F Corrigan, EJ Jaehne, C Toben, J Breen, **SM Pederson**, J Manavis, AJ Hannan, BT Baune (2020) *Effects of aging on the motor, cognitive and affective behaviors, neuroimmune responses and hippocampal gene expression* **Behavioural Brain Research** 383, 112501
5. K Barthelson, **SM Pederson**, M Newman, M Lardelli (2020) *Brain transcriptome analysis reveals subtle effects on mitochondrial function and iron homeostasis of mutations in the SORL1 gene implicated in early onset familial Alzheimer's Disease* **Molecular Brain** 13 (1), 1-19
6. SK Sanyal, J Brugger, B Etschmann, **SM Pederson**, PWJ Delport, R Dixon, R Tearle, A Ludington, F Reith, J Shuster (2020) *Metal resistant bacteria on gold particles: Implications of how anthropogenic contaminants could affect natural gold biogeochemical cycling* **Science Of The Total Environment** 727, 138698
7. H Jiang, **SM Pederson**, M Newman, Y Dong, K Barthelson, M Lardelli (2020) *Transcriptome analysis indicates dominant effects on ribosome and mitochondrial function of a premature termination codon mutation in the zebrafish gene psen2* **PLOS One** 15 (7), e0232559
8. N Liu, T Sadlon, YY Wong, **SM Pederson**, J Breen, SC Barry (2020) *3DFAACTS-SNP: Using regulatory T cell-specific epigenomics data to uncover candidate mechanisms of Type-1 Diabetes (T1D) risk* **bioRxiv**
9. N Hin, M Newman, **SM Pederson**, MM Lardelli (2020) *Iron Responsive Element (IRE)-mediated responses to iron dyshomeostasis in Alzheimer's disease* **bioRxiv**
10. K Barthelson, **SM Pederson**, M Newman, M Lardelli (2020) *Brain Transcriptome Analysis of a Protein-Truncating Mutation in Sortilin-Related Receptor 1 Associated With Early-Onset Familial Alzheimer's Disease Indicates Early Effects on Mitochondrial and Ribosome Function* **Journal Of Alzheimer's Disease** 1-15
11. N Schwensow, **SM Pederson**, D Peacock, B Cooke, P Cassey (2020) *Adaptive changes in the genomes of wild rabbits after 16 years of viral epidemics* **Molecular Ecology** 29 (19), 3777-3794
12. CY Brown, T Sadlon, CM Hope, YY Wong, S Wong, N Liu, H Withers, K Brown, V Bandara, B Gundsambuu, **SM Pederson**, J Breen, SA Robertson, A Forrest, M Beyer, SC Barry (2020) *Molecular Insights Into Regulatory T-Cell Adaptation to Self, Environment, and Host Tissues: Plasticity or Loss of Function in Autoimmune Disease* **Frontiers In Immunology** 11, 1269
13. N Liu, WY Low, H Alinejad-Rokny, **SM Pederson**, T Sadlon, S Barry, J Breen (2020) *Seeing the forest through the trees: Identifying functional interactions from Hi-C* **bioRxiv**
14. K Barthelson, **SM Pederson**, M Newman, H Jiang, M Lardelli (2020) *Frameshift and frame-preserving mutations in zebrafish presenilin 2 affect different cellular functions in young adult brains* **bioRxiv**
15. J Breen, D McAninch, T Jankovic-Karasoulos, D McCullough, MD Smith, KJ Bogias, Q Wan, A Choudhry, N Hin, **SM Pederson**, T Bianco-Miotto, CT Roberts (2020) *Temporal placental genome wide expression profiles reflect three phases of utero-placental blood flow during early to mid human gestation* **medRxiv**
16. Y Dong, M Newman, **SM Pederson**, N Hin, M Lardelli (2020) *Transcriptome analyses of 7-day-old zebrafish larvae possessing a familial Alzheimer's disease-like mutation in psen1 indicate effects on oxidative phosphorylation, mcm functions, and iron homeostasis* **bioRxiv**
17. PJ Fabres, N Sai, **SM Pederson**, F Zheng, J Breen, M Gilliham, PJ Tricker, CR Lopez, R David (2020) *Dicistronic tRNA-mRNA transcripts in grapevine (Vitis vinifera) display distinct, regional expression patterns that correlate with tRNA expression* **bioRxiv**
18. M Newman, N Hin, **SM Pederson**, M Lardelli (2019) *Brain transcriptome analysis of a familial Alzheimer's disease-like mutation in the zebrafish presenilin 1 gene implies effects on energy production* **Molecular Brain** 12 (1), 1-5
19. JA Morgan, G Singhal, F Corrigan, EJ Jaehne, MC Jawahar, J Breen, **SM Pederson**, BT Baune (2019) *Ceasing exercise induces depression-like, anxiety-like, and impaired cognitive-like behaviours and altered hippocampal gene expression* **Brain Research Bulletin** 148, 118-130
20. CM Hope, J Welch, A Mohandas, **SM Pederson**, D Hill, B Gundsambuu, N EastaffnnnLeung, R

Grosse, S Bresatz, G Ang, M Papademetrios, H Zola, T Duhen, D Campbell, CY Brown, D Krumbiegel, T Sadlon, JJ Couper, SC Barry (2019) *Peptidase inhibitor 16 identifies a human regulatory T-cell subset with reduced FOXP3 expression over the first year of recent onset type 1 diabetes* **European Journal Of Immunology** 49 (8), 1235-1250

21. G Singhal, J Morgan, MC Jawahar, F Corrigan, EJ Jaehne, C Toben, J Breen, **SM Pederson**, AJ Hannan, BT Baune (2019) *The effects of short-term and long-term environmental enrichment on locomotion, mood-like behavior, cognition and hippocampal gene expression* **Behavioural Brain Research** 368, 111917
22. G Singhal, J Morgan, MC Jawahar, F Corrigan, EJ Jaehne, C Toben, J Breen, **SM Pederson**, AJ Hannan, BT Baune (2019) *Short-term environmental enrichment, and not physical exercise, alleviate cognitive decline and anxiety from middle age onwards without affecting hippocampal gene expression* **Cognitive, Affective, & Behavioral Neuroscience** 19 (5), 1143-1169
23. Q Wan, S Yiner-L Leemaqz, **SM Pederson**, D McCullough, DC McAninch, T Jankovic-Karasoulos, MD Smith, KJ Bogias, N Liu, J Breen, CT Roberts, T Bianco-Miotto (2019) *Quality control measures for placental sample purity in DNA methylation array analyses* **Placenta** 88, 8-11
24.* TH To, **SM Pederson** (2019) *strandCheckR: An R package for quantifying and removing double strand sequences for strand-specific RNA-seq* **The Journal Of Open Source Software** 4 (34), 1145
25. D Yang, AR Wijenayaka, LB Solomon, **SM Pederson**, DM Findlay, SP Kidd, GJ Atkins (2018) *Novel insights into Staphylococcus aureus deep bone infections: the involvement of osteocytes* **mBio** 9 (2)
26. CC Homan, **SM Pederson**, Thu-H To, C Tan, S Piltz, MA Corbett, E Wolvetang, PQ Thomas, LA Jolly, J Gecz (2018) *PCDH19 regulation of neural progenitor cell differentiation suggests asynchrony of neurogenesis as a mechanism contributing to PCDH19 Girls Clustering Epilepsy* **Neurobiology Of Disease** 116, 106-119
27.* L Zeng, **SM Pederson**, RD Kortschak, DL Adelson (2018) *Transposable elements and gene expression during the evolution of amniotes* **Mobile DNA** 9 (1), 1-9
28. CY Brown, S Dayan, SW Wong, A Kaczmarek, CM Hope, **SM Pederson**, V Arnet, GJ Goodall, D Russell, TJ Sadlon, SC Barry (2018) *FOXP3 and miR-155 cooperate to control the invasive potential of human breast cancer cells by down regulating ZEB2 independently of ZEB1* **Oncotarget** 9 (45), 27708
29. T Sadlon, CY Brown, V Bandara, CM Hope, JE Schjenken, **SM Pederson**, J Breen, A Forrest, M Beyer, S Robertson, SC Barry (2018) *Unravelling the molecular basis for regulatory T-cell plasticity and loss of function in disease* **Clinical & Translational Immunology** 7 (2), e1011
30. TJ Gonda, KZY Maung, PJ Leo, M Bassal, DA Casolari, JX Gray, SC Bray, **SM Pederson**, D Singhal, SE Samaraweera, T Nguyen, G Cildir, M Marshall, A Ewing, EL Duncan, MA Brown, R Saal, V Tergaonkar, LB To, P Marlton, D Gill, I Lewis, AJ Deans, AL Brown, RJ D'Andrea (2018) *Rare variants in Fanconi anemia genes are enriched in acute myeloid leukemia* **Blood Cancer Journal** 8 (6), 1-5
31. M Konate, MJ Wilkinson, BT Mayne, **SM Pederson**, ES Scott, B Berger, CM R Lopez (2018) *Salt stress induces non-CG methylation in coding regions of barley seedlings (Hordeum vulgare)* **Epigenomes** 2 (2), 12
32. L Zeng, **SM Pederson**, D Cao, Z Qu, Z Hu, DL Adelson, C Wei (2018) *Genome-Wide Analysis of the Association of Transposable Elements with Gene Regulation Suggests that Alu Elements Have the Largest Overall Regulatory Impact* **Journal Of Computational Biology** 25 (6), 551-562
33. A Tikhomirova, C Trappetti, AJ Standish, Y Zhou, J Breen, **SM Pederson**, PS Zilm, JC Paton, SP Kidd (2018) *Specific growth conditions induce a Streptococcus pneumoniae non-mucoidal, small colony variant and determine the outcome of its co-culture with Haemophilus influenzae* **Pathogens And Disease** 76 (7), fty074
34. S Delacroix, RG Chokka, AJ Nelson, DT Wong, **SM Pederson**, J Nimmo, A Rajwani, K Williams, KS Teo, SG Worthley (2018) *Effects of renal sympathetic denervation on myocardial structure, function and perfusion: A serial CMR study* **Atherosclerosis** 272, 207-215