

ABRAHAM NUNES

5909 Veterans' Memorial Lane, 8th Floor
Abbie J. Lane Memorial Building
QEII Health Sciences Centre
Halifax, NS, B3H 2E2, Canada

DALHOUSIE UNIVERSITY · NUNES@DAL.CA · WWW.ABRAHAMNUNES.COM

EDUCATION

- 2014-Present **FRCP(C), Psychiatry (Clinician Investigator Program)**
Dalhousie University, Halifax, NS, Canada
- 2017-2020 **Doctor of Philosophy (Computer Science)**
Dalhousie University, Halifax, NS, Canada
Supervisors: Profs. Thomas Trappenberg & Martin Alda
Thesis: [Measurement of Heterogeneity in Computational Psychiatry](#)
- 2009-2014 **Doctor of Medicine**
University of Alberta, Edmonton, AB, Canada
Combined MD/MBA program
- 2009-2014 **Master of Business Administration**
University of Alberta, Edmonton, AB, Canada
Combined MD/MBA program
- 2005-2009 **Bachelor of Science (Hons.)**
University of Western Ontario, London, ON, Canada
Honours Thesis: Fatigue induced tremor in the tibialis anterior

ACADEMIC AND CLINICAL POSITIONS

- 2017-Present **Physician (Locum Tenens with Admitting Privileges)**
Department of Psychiatry, Colchester East Hants Health Centre, Truro, NS, Canada
- 2014-Present **Resident Physician**
Department of Psychiatry, Dalhousie University

ADMINISTRATIVE AND VOLUNTEER POSITIONS

- 2017-Present **Residency Postgraduate Committee Member**
Clinician Investigator Program, Dalhousie University
Represented clinician investigator program trainees on the program's governing committee.
- 2017-2018 **Dalhousie Representative**
Clinician Investigator Trainee Association of Canada (CITAC)
Liaising between the national association of clinician scientist trainees and learners at Dalhousie.
- 2017-2019 **Resident Resesarch Representative (also 2014-2015)**
Department of Psychiatry, Dalhousie University
Represented the Dalhousie Psychiatry Residents' association on the departmental research committee

2016-2017 **CaRMS Interviewer**
Department of Psychiatry, Dalhousie University
Served as an interviewer for applicants to the Dalhousie Psychiatry residency program

AWARDS

2018 **Scotia Scholars PhD Scholarship**
Nova Scotia Health Research Foundation

2018 **Killam Postgraduate Scholarship**
Killam Trusts & Faculty of Medicine, Dalhousie University

2017 **Clerks' Choice Award**
Department of Psychiatry, Dalhousie University
"In recognition of the outstanding teaching contributions by a Resident"

2016 **Best Presentation Award, Psychiatry Resident**
Department of Psychiatry, Dalhousie University
Dalhousie Department of Psychiatry 26th Annual Research Day

2016 **Dr. Charles J. David Prize in Psychiatry**
Department of Psychiatry, Dalhousie University
"In recognition for outstanding display of compassion, sensitivity and a high degree of competence in patient care during PGY-2"

2016 **Clerks' Choice Award**
Department of Psychiatry, Dalhousie University
"In recognition of the outstanding teaching contributions by a Resident"

2015 **Horizon Health Network PGY-1 Resident of the Year**
Department of Psychiatry, Dalhousie University
"In recognition for exemplary academic and clinical attributes during core PGY-1 psychiatry rotations in Saint John, NB"

2014 **E. William Kuder Memorial Prize in Surgery**
Faculty of Medicine and Dentistry, University of Alberta
For highest standing during surgical rotations of medical training

2013 **Top 40 Under 40, Edmonton**
Avenue Magazine, Edmonton

2011 **Queen Elizabeth II Graduate Scholarship, Master's Level**
University of Alberta

2011 **Dr. A.R. Oakley Prize in Anatomy**
Division of Anatomy, University of Alberta

2011 **AIHS Summer Studentship**
Alberta Innovates, Health Solutions
For clinical outcomes and health economics research in Division of Cardiac Surgery, University of Alberta

2010 **Dr. Elliot Gelfand Award for Cardiovascular Research**
Division of Cardiac Surgery, University of Alberta
For research pertaining to clinical outcomes of mechanical circulatory support

2009 **CREATE Award for Biomedical Engineering**
Natural Science and Engineering Research Council of Canada
For research into motor control of human grasping at University of Calgary

FUNDED PROJECTS

- 2019-2024 **Clinical and genetic factors in response to treatment of bipolar disorder**
Canadian Institutes of Health Research (CIHR #418254) (\$ 753,526; PI: Dr. Martin Alda)
Machine learning analyses of clinical and genomic data for understanding the response to lithium in bipolar disorder.
- 2018-2022 **Early detection of bipolar disorder and optimized selection of long-term treatment**
Genome Canada (\$ 975,000; PIs: Drs. Martin Alda & Rudolf Uher)
I lead the machine learning arm of this study, which aims to study the capacity of clinical and genomic data for the prediction of lithium response in bipolar disorder.
- 2017-2020 **Feasibility of Lisdexamfetamine Dimesylate for Treatment of Bulimia Nervosa**
NSHA Research Fund (\$ 100,000; PI: Dr. Aaron Keshen)
Along side this feasibility study, we will be using computational modeling to determine the effects of lisdexamfetamine dimesylate on reinforcement learning in patients with bulimia nervosa.
- 2018-2022 **Binge Focused Therapy: Examining an accessible, cost-effective, guided self-help, group-based approach for the treatment of Binge Eating Disorder**
Nova Scotia Health Authority Research Fund (\$5,000; PI: Ms. Laura Dixon & Dr. Aaron Keshen)
I provide statistical guidance on this clinical project.
- 2016-2017 **Instrumental Control in Binge-Eating Disorder and Bulimia Nervosa**
NSHA Research Fund (\$ 4,995); Dalhousie Psychiatry Resident Research Fund (\$ 2,500)
Using reinforcement learning models to study the balance of goal-directed and habitual control in patients with bulimia nervosa and binge-eating disorder

PUBLICATIONS

Peer-Reviewed

- 2020 **Nunes A**, Alda M, and Trappenberg T. Multiplicative Decomposition of Heterogeneity in Mixtures of Continuous Distributions. *Entropy*. 2020, 22(8), 858 [PDF]
- 2020 Ching CRK, Hibar DP, Gurholt TP, **Nunes A**, . . ., ENIGMA Bipolar Disorder Working Group. What we learn about bipolar disorder from large-scale neuroimaging: Findings and future directions from the ENIGMA Bipolar Disorder Working Group. *Human Brain Mapping* 2020. In Press [PDF]
- 2020 **Nunes A**, Trappenberg T, and Alda M. The Definition and Measurement of Heterogeneity. *Translational Psychiatry*. 2020;10:299 [PDF]
- 2020 Town J, Abbass A, Stride C, **Nunes A**, Bernier D, Berrigan P. Efficacy and Cost Effectiveness of Intensive Short-Term Dynamic Psychotherapy for Treatment Resistant Depression: 18 Months Follow-Up of The Halifax Depression Trial. *Journal of Affective Disorders*. 2020;273:194-202 [PDF]
- 2020 **Nunes A**, Alda M, Bardouille T, Trappenberg T. Representational Rényi Heterogeneity. *Entropy* 2020;22(417):1-30 [PDF]
- 2020 Scott J, Bellivier F, Manchia M, ..., **Nunes A**, ..., The ConLiGen Collaboration. Can network analysis shed light on predictors of lithium response in bipolar I disorder? *Acta Psychiatrica Scandinavica*. 2020;141(6):522-533. doi:10.1111/acps.13163
- 2020 Thompson P, Jahanshad N, Ching CRK, ..., **Nunes A**, ..., and Zelman V. ENIGMA and Global Neuroscience: A Decade of Large-Scale Studies of the Brain in Health and Disease across more than 40 Countries. *Translational Psychiatry* 2020;10:100. [PDF]

- 2020 **Nunes A**, Trappenberg T, and Alda M. Asymmetrical reliability of the Alda Score favours a dichotomous representation of lithium responsiveness. *PLOS ONE* 2020;5(1): e0225353 [PDF]
- 2020 **Nunes A**, Trappenberg T, and Alda M. We Need an Operational Framework for Heterogeneity in Psychiatric Research. *Journal of Psychiatry & Neuroscience* 2020 45(1): 3-6. [PDF]
- 2020 **Nunes A**, Arda R, Berghöfer A, Bocchetta A, Chillotti C, Deiana V, et al. Prediction of Lithium Response using Clinical Data. *Acta Psychiatrica Scandinavica* 2020: 141: 131–141 [PDF]
- 2019 **Nunes A**. Two common questions about machine learning methods in psychiatric applications. *Bipolar Disorders* 2019;21(7):665 [PDF]
- 2018 **Nunes A**, Schnack HG, Agartz I, Akudjedu T, Alda M, Alnaes D, et al. Using structural MRI to identify bipolar disorders – 13 site machine learning study in 3020 individuals from the ENIGMA Bipolar Disorder Working Group. *Molecular Psychiatry*. 2018;Aug 31: 1-14. [PDF]
- 2018 **Nunes A**, Rudiuk A, & Trappenberg TP. An Algorithm for Clustering Decision-Making Phenotypes from Behavioural Data. *Cognitive Computational Neuroscience* 2018 [PDF]
- 2017 Fard FS, **Nunes A**, and Trappenberg TP. An Actor Critic with an Internal Model. *Cognitive Computational Neuroscience* 2017 [PDF]
- 2016 **Nunes A**, MacArthur RGG, Kim D, Singh G, Buchholz H, Chatterley P, Klarenbach SW. A Systematic Review of the Cost-Effectiveness of Long-Term Mechanical Circulatory Support. *Value in Health* 2016;19(4):494-504
- 2014 **Nunes A**, Hajek T, and Alda M. Early and delayed treatment of bipolar disorder (Letter). *British Journal of Psychiatry* 2014;205(5):411
- 2013 Jonker ID, **Nunes A**, Elhenawy AM, Das D, and MacArthur RG. Double aortic arch presenting in an adult with dysphagia. *Journal of Cardiac Surgery* 2013;28(6):670-1
- 2012 **Nunes A**, Buchholz H, Sinnadurai S, and MacArthur RG. Long-term mechanical circulatory support of an adult patient with Down Syndrome. *Annals of Thoracic Surgery* 2012;93:1305-07
- 2010 Nielsen CA, Deegan EG, Hung ASL, and **Nunes A**. Potential effects of sleep deprivation on sensorimotor integration during quiet stance in young adults. *WURJ* 2010;1

Submitted

- 2020 **Nunes A**, Arda R, Berghöfer A, ..., and Alda M. Are clinical predictors of lithium response medication specific?.
- 2020 **Nunes A**, Alda M, and Trappenberg T. Measuring Heterogeneity in Normative Models as the Effective Number of Deviation Patterns. PsyArXiv [PDF]
- 2020 **Nunes A** and Alda M. Uncovering the Computational Pathophysiology of Bipolar Disorder through the Study of Lithium Responders.
- 2020 **Nunes A**, Stone W, Arda R, Berghöfer A, Bocchetta A, Chillotti C, et al. Exemplar Scoring Identifies Genetically Separable Phenotypes of Lithium Responsive Bipolar Disorder. *medRxiv*. 2020:1-34 [PDF]
- 2020 Stone W,* **Nunes A**,* Akiyama K, Akula N, Arda R, Aubry JM, et al. Prediction of Lithium Response in 2210 Subjects Using Genomic Data from 14 Centres of the International Consortium on Lithium Genetics (ConLiGen). (* Co-lead authors)

PRESENTATIONS

Peer-Reviewed Meetings

- 2018 Impaired Model-Based Control in Bulimia Nervosa
Nunes A, Helson T, Dixon L, Trappenberg T, & Keshen AR
Canadian Psychiatric Association Meeting, Toronto 2018
- 2018 An Algorithm for Clustering Decision-Making Phenotypes from Behavioural Data
Nunes A, Rudiuk A, & Trappenberg TP
Computational Cognitive Neuroscience 2018, Philadelphia, PA
- 2017 Of meals, models, and habits: A review of reinforcement learning studies in eating disorders
Nunes A, Trappenberg TP, and Keshen AR
Canadian Psychiatric Association Meeting, Ottawa 2017
- 2017 Fitr: An Accessible Toolbox for Computational Psychiatry
Nunes A & Trappenberg TP
Canadian Psychiatric Association Meeting, Ottawa 2017
- 2017 The Prognosis of Treated Neurosyphilitic Psychosis: A Review of the Literature
Nunes A, Manning A, & Zhou C
Canadian Psychiatric Association Meeting, Ottawa 2017
- 2016 Modeling psychosis: The computational nature of hallucination and delusion
Nunes A & Trappenberg TP
Atlantic Provinces Psychiatric Association Conference; St. John, NB, June 2016
- 2012 Systematic Review of the Cost-Effectiveness of Mechanical Circulatory Support
Nunes A, Wiebe N, Chatterley P, MacArthur RG, and Klarenbach SW
Canadian Cardiovascular Congress; Toronto, ON, 2012
- 2012 Cost of Long-Term Mechanical Circulatory Support at Large Canadian Transplantation Centre
Nunes A, MacArthur RG, and Klarenbach SW
Canadian Cardiovascular Congress; Toronto, ON, 2012
- 2012 Double Aortic Arch Presenting in an Adult with Dysphagia
Jonker ID, **Nunes A**, Elhenawy AM, Das D, and MacArthur RG
Canadian Cardiovascular Congress; Toronto, ON, 2012
- 2012 Use of Recombinant Factor VIIa for Refractory Haemorrhage in Patients Receiving Mechanical Circulatory Support
Nunes A, Hruczkowski J, Nahirniak S, and MacArthur RG
Canadian Cardiovascular Congress; Toronto, ON, 2012
- 2012 Edmonton Experience with Venovenous Extracorporeal Membrane Oxygenation in Critically Ill Adults with Severe Respiratory Failure
Nunes A, Hruczkowski J, MacArthur RG, and Singh G
Canadian Cardiovascular Congress; Toronto, ON, 2012
- 2012 First Canadian Report of Destination Therapy With the HeartWare HVAS in a Biventricular Configuration
Nunes A, Hruczkowski J, Das D, and MacArthur RG
Canadian Cardiovascular Congress; Toronto, ON, 2012
- 2011 Clinical Outcomes of Long-Term Mechanical Circulatory Support at a Large Canadian Transplantation Centre
Nunes A, Buchholz H, Sinnadurai S, Mullen JC, Singh G, Meyer SR, Wang S, Modry DL, and MacArthur RG
Canadian Cardiovascular Congress; Vancouver, BC, 2011
- 2011 Bridge to Decision Using Short Term Ventricular Assist Device For Critically Ill Moribund Patients

Mutsuga M, Nunes A, Sinnadurai S, Meyer S, MacArthur RG, Mullen J, Rebeyka I, Ross D, and Buchholz H
Canadian Cardiovascular Congress; Vancouver, BC, 2011

2011 A Protocol for the Assessment of Heart Mate II Patients' Fitness to Drive
Nunes A, Sinnadurai S, MacArthur RG, and Buchholz H
Canadian Cardiovascular Congress; Toronto, ON, 2011

TEACHING EXPERIENCE

I am involved in the teaching of medical students whilst they rotate through various psychiatry services, as well as during on-call shifts. I have also delivered lectures for the psychiatry core rotation seminar series. Intermittently, I have taught sessions in Dalhousie's clinical skills course, focusing on psychiatric interviewing.

I have given lectures on probabilistic modeling for the senior undergraduate/graduate course on machine learning at Dalhousie University.

I have closely assisted in the supervision of a Master's student in computer science (W. Stone, *Biologically Informed Feature Selection in Large-Scale Genomics*, 2020), and am currently assisting with the supervision of a Master's student in psychiatry, working on theory-driven modeling of decision-making in bulimia nervosa.

EDITORIAL ACTIVITIES

Editorial Board Positions

2019-Present **Junior Editorial Board**
Bipolar Disorders

Peer-Review Contributions

- British Journal of Psychiatry (2)
- Canadian Medical Association Journal (1)
- Current Pharmaceutical Design (1)
- Journal of Affective Disorders (1)
- PLoS ONE (1)
- Bipolar Disorders (1)
- Journal of Psychiatry & Neuroscience (1)
- Conference on Cognitive Computational Neuroscience (1)

INTERESTS

Clinical: Mood disorders, Neuropsychiatry
Research: Heterogeneity, Generative models, Computational psychiatry, Reinforcement learning, Machine learning in genomics and neuroimaging
Other: Fat tails (probability), Information theory, Differential geometry, Mathematical finance, Resilience and virtue (psychology)