

JAAN ALTOSAAR

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BORN: March 8, 1992 — Ottawa, Canada

LANGUAGES: English (native), Estonian (native), French (fluent), Spanish (working)

AREAS OF SPECIALIZATION

Machine Learning • Theoretical Physics • Biophysics • Deep Learning • Time series models

EDUCATION

- 2013- **Ph.D., Physics.** Advisors: [David Blei](#) and [Shivaji Sondhi](#).
Princeton University, Princeton, New Jersey, United States of America
- 2009-2013 **B.Sc. First Class Honours in Mathematics and Physics**
McGill University, Montreal, Quebec, Canada
Top 10% cumulative GPA, Dean's Honour List, Dean's Multidisciplinary Undergraduate Research List
- 2007-2009 **Ontario Secondary School Diploma**
Hillcrest High School, Ottawa, Ontario, Canada. Honours, Co-President of 1200-student body
- 2006-2007 **Higher School Certificate Years 9 & 10**
Randwick Boys High School, Sydney, New South Wales, Australia

HONORS, AWARDS, & FELLOWSHIPS

- 2014 [Google Summer of Code](#): Topic modeling LaTeX on the [arXiv](#) (Princeton, \$6,000)
- 2014-2017 [NSERC Doctoral Postgraduate Scholarship](#): ranked 3rd of 204 (Princeton, \$63,000)
- 2013 [Julie Payette NSERC Research Scholarship](#): awarded to the top 24 applicants in the Canada-wide Postgraduate Scholarships M competition (Ottawa, \$25,000)
- 2013-2016 [Commonwealth Scholarship](#), DPhil studies at University of Oxford (*Declined*, £31,875/year)
- 2013 [The Faculty of Science Moyse Travelling Scholarship](#), McGill University (Montreal, \$8,800)
- 2013 [Delta Upsilon Graduate Scholarship](#), McGill University (Montreal, \$5,000)
- 2013 Travel award, [KAUST WEP Conference](#) (Jeddah, \$2000)
- 2012 First Prize for best poster, [Canadian Undergraduate Physics Conference](#) (Vancouver)
- 2012 Elected to [Sigma Xi Society](#) (Montreal)
- 2012 Second Prize, [McGill Faculty-wide Undergraduate Research Conference](#) (Montreal, \$150)
- 2012 Third Prize, McGill Department of Physics Poster Conference (Montreal)
- 2012 [NSERC Undergraduate Student Research Award](#) (Waterloo, \$8,400)
- 2011 McGill Award for Canadian Undergraduate Physics Conference (Saskatoon, \$1,000)
- 2011 NSERC Undergraduate Student Research Award (Montreal, \$7,600)
- 2010 [Estonian Foundation of Canada Scholarship](#) (Toronto, \$2,000)
- 2010 NSERC Undergraduate Student Research Award (Montreal, \$5,500)
- 2009 Annette S. Hill McGill Scholarship and Bursary (Montreal, \$5,000)
- 2008 Harry Elton Memorial Award (Shanghai, China, \$2,000)

WORK EXPERIENCE

- 5/2016-9/2016 **Research Intern, Google Brain** (Mountain View, CA). Host: [Eugene Brevdo](#)
Research internship; variational inference in TensorFlow.
- 5/2015-9/2015 **Research Intern, Google DeepMind** (London, UK). Host: [Andriy Mnih](#)
Research internship, Deep Learning group.
- 11/2013- **Founder, Useful Science** (<http://usefulscience.org>)
Led team of 65 through launch of a non-profit science website (700k+ hits, 15k+ subscribers). Partnered with [Fitbit](#), "won \$50,000" on [Dragons' Den](#).
- 5/2013-8/2013 **UI and UX Designer, Ottawa Hospital Research Institute**
Led UI design and testing; completed the design of Canada's vaccinations mobile app used to submit vaccination profiles to the government. My designs are still in use: [demo](#) (140k+ users).

RESEARCH EXPERIENCE

- 4/2014- **Advisors: [David Blei](#) & [Shivaji Sondhi](#)**
Columbia University, Departments of Computer Science and Statistics
Princeton University, Department of Physics
Combining Bayesian inference with deep learning to model LaTeX equations and other time series; recommendation systems.
- 9/2013-4/2014 **Advisor: [Iain Couzin](#)**
Princeton University, Departments of Physics, Ecology and Evolutionary Biology
Applied machine learning techniques to study rainforest health via audio recordings. Completed 3-week field study in Costa Rica to collect rainforest audio.
- 9/2012-7/2013 **Advisors: [Jürgen Sygusch](#) & [Anmar Khadra](#)**
Université de Montréal, Department of Biochemistry
McGill University, Department of Mathematics and Statistics
Theoretical biophysics: analysis and testing of the Resonant Recognition Model as a potential theory of biomolecular recognition.
- 5/2012-8/2012 **Advisor: [Michel Gingras](#)**
University of Waterloo, Department of Physics and Astronomy
Condensed matter theory: studies of the generalized dipolar spin ice model of dysprosium titanate via [cumulant expansion methods](#) implemented within Monte Carlo simulations.
- 5/2011-4/2012 **Advisors: [Walter Reisner](#) & [Moshe Szyf](#)**
McGill University, Department of Physics; Department of Pharmacology & Therapeutics
Biophysics: single-molecule DNA methylation mapping in nanochannels. Experienced with Matlab, protein purification and binding assays, and TIRF microscopy.
- 5/2010-8/2010 **Advisor: [Jürgen Sygusch](#)**
Université de Montréal, Department of Biochemistry
Bioinformatics: computational high throughput screening of potential *Magnaporthe* pesticides.

RESEARCH ADVISING

- Spring 2016 **Eamonn Bell** (Ph.D. '18, Columbia University)
Fall 2014 **Ethan Benjamin** (M.Sc. '14, Columbia University)
Fall 2014 **Jingwei Zhang** (M.Sc. '14, Columbia)
Fall 2014 **Andrew James Mercer-Taylor** (B.Sc. '15, Columbia University)
Fall 2014 **Anjishnu Kumar** (M.Sc. '14, Columbia University)
Fall 2014 **Tony Paek** (M.Sc. '15, Columbia University)
Fall 2014 **Drishan Arora** (M.Sc. '14, Columbia University)

TEACHING EXPERIENCE

- Spring 2014 **Instructor, Princeton Splash.** Four lectures to local high school students.
Winter 2013 **Teaching Assistant, McGill University.** Applied Linear Algebra (Prof. Adam Oberman)
Winter 2012 **Teaching Assistant, McGill University.** Honours Complex Variables (Prof. Robert Seiringer)
Fall 2011 **Teacher, Montreal Estonian Society Kindergarten**
Fall 2011 **Mentor, McGill University Buddy Program**

INVITED TALKS

- 2016 Imperial College London, Talk on Operator Variational Inference
2016 Machine Intelligence Research Institute [Colloquium Series on Robust and Beneficial AI](#)
2015 Dragons' Den [demo day](#), *Canadian Broadcasting Corporation*
2014 Experimental project oral presentation, *Princeton University*
2013 Montreal Startup Club presentation on the Immunize Canada app, *Rho Canada Ventures*
2012 Department of Physics Undergraduate Student Symposium, *McGill University*
2012 Canadian Undergraduate Physics Conference, *University of British Columbia*

PUBLICATIONS

- 2016 J. Altosaar, R. Ranganath, and D. Blei. f-Proximity Variational Inference. *Approximate Inference Workshop, NIPS 2016*.
2016 R. Ranganath, D. Tran, J. Altosaar, and D. Blei. Operator Variational Inference. *NIPS 2016*.
2016 D. Liang, J. Altosaar, L. Charlin, and D. Blei. Factorization meets the item embedding. *Submitted to Recsys 2016*.
2016 E. Bell, and J. Altosaar. Word embedding models applied to classical music recover the circle of fifths in embedding space. *Submitted to ISMIR 2016*.
2015 J. Zhang, A. Gerow, J. Altosaar, R. J. So, and J. A. Evans. Discovering Topic Correlation Across Arbitrary Collections. *Empirical Methods on Natural Language Processing*.
2015 P. Henelius, T. Lin, M. Enjalran, Z. Hao, J. Altosaar, P. Henelius, F. Flicker, T. Yavors'kii, and M. J. P. Gingras. Refrustration and Competing Orders in a Spin Ice Material. *Phys. Rev. B*.
• Featured on Phys. Rev. B. [front page](#).
2015 A. J. Mercer-Taylor, and J. Altosaar. Sonification of fish movement using pitch mesh pairs. *NIME 2015*.
2015 E. Benjamin, and J. Altosaar. MusicMapper: Interactive 2D representations of music samples for in-browser remixing and exploration. *NIME 2015*.
• Featured and interviewed on [The Wire magazine](#).
2012 J. Altosaar. Detecting methylation of single molecules of DNA using a methyl binding domain GFP fusion protein. *McGill Honours Research Thesis*.

SELECTED POSTERS

- 2016 NIPS, Operator Variational Inference & Proximity Variational Inference
- 2014 [ComSciCon](#): Communicating Science, *Harvard University: ranked top 50 of 870 applicants*
- 2012 ²Canadian Undergraduate Physics Conference, *University of British Columbia*
First Prize for best poster
- 2012 ²Faculty of Science Undergraduate Research Conference, *McGill University*
Second Prize: induction to Sigma Xi Society
- 2012 ²Department of Physics Poster Conference, *McGill University*
Third Prize: nomination and award for Canadian Undergraduate Physics Conference
- 2011 ¹Department of Physics Poster Conference, *McGill University – Honourable Mention*
²*Poster: How stuffing leads to novel behaviour in spin ice*
¹*Poster: DNA methylation mapping in nanochannels*

SCIENCE OUTREACH

- 2014 Hopewell Elementary School science fair judge
- 2014 Princeton Physics Open House Committee

PROFESSIONAL ASSOCIATIONS

Reviewer for: PLOS ONE

Member: Association for Computing Machinery, Institute of Physics, Sigma Xi Scientific Society (nominated), American Association for the Advancement of Science (nominated), Institute of Mathematical Statistics

ACTIVITIES & INTERESTS

- 1996- Classical and jazz piano, electronic music production
- 2014-2015 [Resident Graduate Student](#), Wilson College, Princeton University
- 2012 University of Waterloo Choir (Director: Professor Gerard Yun)
- 2011 Milton Park Recreation Association Beach Volleyball

SELECTED PRESS

- 2016 Editorial, [The Conversation](#), "Accurate science or accessible science in the media – why not both?"
- 2016 Interview, [The Wire magazine](#)
- 2016 MusicMappr featured on [Prosthetic Knowledge blog](#)
- 2015 Featured on [Dragons' Den](#)
- 2015 [In Training](#), "Medical Student Startup Improves Science Communication"
- 2014 [Reddit](#) front page
- 2014 [Boing Boing](#), "Useful Science, accessible by all"
- 2014 [Lifehacker](#), "Excel shortcuts, article summaries, and web notes"
- 2014 [Fitbit](#) corporate blog, "7 science-backed numbers to improve your life"
- 2014 [New Zealand Herald](#), "10 top sites to visit this weekend"
- 2014 [AweSci](#), "A chat with Jaan Altosaar from Useful Science"
- 2014 [IT World](#), "Useful Science headlines that apply to your weird little computer life"
- 2014 [McGill Tribune](#), "Useful Science bridges communication gap in research"
- 2014 [McGill News](#), Alumni Magazine, "Better living through science"
- 2014 [Betakit](#), "McGill grad launches curated list of science articles"
- 2014 CBC Radio, Spark [episode](#) on Sciencescape