

# JAAN ALTOSAAR

Department of Physics, Princeton University  
Office: 307 Jadwin Hall  
Princeton, New Jersey 08540

☎ +1 (609) 285-3059  
✉ [altosaar@princeton.edu](mailto:altosaar@princeton.edu)  
🌐 <https://jaan.io>

**BORN:** March 8, 1992 — Ottawa, Canada

**LANGUAGES:** English (native), Estonian (native), French (professional proficiency)

## AREAS OF SPECIALIZATION

Machine Learning • Theoretical Physics • Biophysics • Functional Analysis • Algebra

## EDUCATION

- 2013- **Ph.D., Physics**  
*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

- 11/2013- **Founder, Useful Science** (<http://usefulscience.org>)  
Led team of 65 through launch of a non-profit science website (400k+ hits, 10k+ subscribers). Partnered with the [Washington Post](#), [The Rounds](#), [The Talent Strategy Group](#), and [Fitbit](#).
- 5/2013-8/2013 **iOS & Android User Interface Designer, Ottawa Hospital Research Institute**  
Led user interface design and testing; completed the design of Canada's vaccinations mobile app released in 2014 ([demo](#): 10k+ users).

## RESEARCH EXPERIENCE

- 9/2014- **Advisor: David Blei**  
*Columbia University, Departments of Computer Science and Statistics*  
Graphical models & variational inference: extensions of latent Dirichlet allocation for math equations; Poisson factorization models for content-based music recommendation.
- 4/2014-8/2014 **Advisor: David Blei**  
*Columbia University, Departments of Computer Science and Statistics*  
Topic modeling  $\LaTeX$  equations on the [arXiv](#): applying machine learning techniques to equations the arXiv corpus. Supported by [Google Summer of Code](#).
- 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: virtual high throughput screening of potential *Magnaporthe grisea* aldolase II pesticides through simulation of molecular docking. 3D conformational modeling of various aldolases.

## RESEARCH ADVISING

- Fall 2014 **Ethan Benjamin** (M.Sc. '14 Columbia University)  
Building an open source music remixing tool in javascript.
- Fall 2014 **Anjishnu Kumar** (M.Sc. '14 Columbia University)  
Developing an open source posterior visualization tool based on word2vec and t-SNE features.
- Fall 2014 **Andrew James Mercer-Taylor** (B.Sc. '15 Columbia University)  
Computer vision for tracking fish and subsequent algorithmic music generation.
- Fall 2014 **Jingwei Zhang** (M.Sc. '14 Columbia University)  
Identifying which concepts migrate from humanities to the sciences in the JSTOR corpus.
- Fall 2014 **Tony Paek** (M.Sc. '15 Columbia University)  
Sentiment analysis of Ph.D. theses' acknowledgments sections.
- Fall 2014 **Drishan Kumar** (M.Sc. '14 Columbia University)  
Topic modeling of scientific abstracts to detect merging of fields.

## 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**

## ORAL PRESENTATIONS

- 2014 Experimental project oral presentation, *Princeton University*
- 2013 Montreal Startup Club presentation on the Immunize Canada app, *Rho Canada Ventures*
- 2013 Faculty of Science presentation on research opportunities, *McGill University*
- 2012 Department of Mathematics Honours Project Oral Component, *McGill University*
- 2012 Department of Physics Undergraduate Student Symposium, *McGill University*
- 2012 Canadian Undergraduate Physics Conference, *University of British Columbia*
- 2012 Department of Physics Honours Research Thesis Defense, *McGill University*

## PROGRAMMING SKILLS

Version control systems: Git

Systems administration: LE(A)MP stacks on Ubuntu & Debian

Systems languages: C

Scripting languages: Python, Shell Script

Web development: D3.js, HTML5, CSS, Flask, MySQL

Data analysis: Mathematica, Matlab

## PUBLICATIONS

- 2013 J. Sygusch and J. Altosaar. The Resonant Recognition Model: long-range protein interaction via transition dipole couplings. *McGill Honours Research Project*.
- 2013 T. Lin, J. Altosaar, P. Henelius, and M. J. P. Gingras. Numerical study of perturbations in dipolar spin ice. *The American Physical Society March Meeting 2013*.
- 2012 J. Altosaar. Detecting methylation of single molecules of DNA using a methyl binding domain GFP fusion protein. *McGill Honours Research Thesis*.

## CONFERENCES, WORKSHOPS & POSTERS

- 2015 [Workshop on Big Data and Statistical Machine Learning](#), University of Toronto
- 2015 [Center for Applied Rationality Workshop](#), Boston, MA
- 2014 [Metaknowledge Research Network summer meeting](#), Asilomar, CA
- 2014 [Y Combinator Startup School](#), New York, NY
- 2014 [ComSciCon](#): Communicating Science, Harvard University: ranked top 50 of 870 applicants
- 2013 Reinforcement Learning and Decision Making, Princeton University
- 2013 John von Neumann Symposium: Towards Quantitative Biology, Rockefeller University
- 2013 HackMIT; developed [Android app](#) to track sitting, Massachusetts Institute of Technology
- 2013 <sup>3</sup>WEP Poster Competition, King Abdullah University of Science and Technology
- 2012 <sup>2</sup>Canadian Undergraduate Physics Conference, University of British Columbia  
*First Prize for best poster*
- 2012 <sup>2</sup>Faculty of Science Undergraduate Research Conference, McGill University  
*Second Prize: induction to Sigma Xi Society*
- 2012 <sup>2</sup>Department of Physics Poster Conference, McGill University  
*Third Prize: nomination and award for Canadian Undergraduate Physics Conference*
- 2012 Highly Frustrated Magnetism, McMaster University
- 2012 Friday Condensed Matter Seminars, Perimeter Institute for Theoretical Physics
- 2012 Southwest Ontario Condensed Matter Symposium, Perimeter Institute
- 2012 <sup>1</sup>Groupe de Recherche Axé sur la Structure des Protéines Symposium, McGill University
- 2011 <sup>1</sup>Canadian Undergraduate Physics Conference, University of Saskatchewan
- 2011 <sup>1</sup>Department of Physics Poster Conference, McGill University  
*Hon. Mention: nomination and award for Canadian Undergraduate Physics Conference*
- 2011 <sup>1</sup>Department of Engineering Poster Conference, McGill University
- 2010 Gordon Research Conference: Enzymes & Metabolic Pathways, White Mountain, NH  
<sup>3</sup>Poster: Protein interaction through transition dipole couplings: Resonant Recognition  
<sup>2</sup>Poster: How stuffing leads to novel behaviour in spin ice  
<sup>1</sup>Poster: DNA methylation mapping in nanochannels

## SCIENCE OUTREACH

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

## PROFESSIONAL ASSOCIATIONS

*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

- 2014-2015 [Resident Graduate Student](#), Wilson College, Princeton University
- 2009- Meditation (Enpuku-ji Zen Center, Abbess: Zengetsu Myokyo)
- 1996- Classical and jazz piano, electronic music production
- 2012 University of Waterloo Choir (Director: Professor Gerard Yun)
- 2012 University of Waterloo Intramural Beach Volleyball (placed second out of 54 teams)
- 2011 Milton Park Recreation Association Beach Volleyball
- 2009 McGill Choral Society (Director: Mary-Jane Puiiu)

## SELECTED PRESS

- 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 [Computerworld.nl](#), "Het leven van een IT'er is dodelijk!"
- 2014 [McGill Reporter](#), "Simplifying science without dumbing it down"
- 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 [MSURJ](#), "Scientifically proven\* to improve your life – an interview with Useful Science"
- 2014 [Betakit](#), "McGill grad launches curated list of science articles"
- 2014 [uOttawa Gazette](#), "Useful Science... in 5 seconds or less"
- 2014 Art of Change [podcast](#), "The secret to making your ideas a reality"
- 2014 CBC Radio, Spark [episode](#) on Sciencescape
- 2013 [The Bull & Bear](#), "Undergraduate Innovation – A Campus-wide Opportunity"
- 2013 [McGill Office for Undergraduate Research in Science](#)