

# JAAN ALTOSAAR

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**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 60 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](#).
- 10/2013- **Science Media Consultant, Thwacke**  
Consulting for game developers on how to create realistic game elements based on science. Literature reviews, communicating science to developers and screenwriters.
- 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 national vaccinations tracking mobile app and backend released in 2014 ([demo](#)).

## RESEARCH EXPERIENCE

- 4/2014- **Advisor: David Blei**  
*Columbia University, Departments of Computer Science and Statistics*  
*Google Summer of Code award*  
Topic modeling  $\text{\LaTeX}$  equations on the [arXiv](#): applying machine learning techniques to the arXiv corpus to analyze patterns in science and improve recommendation systems.
- 9/2013-4/2014 **Advisor: Iain Couzin**  
*Princeton University, Departments of Physics, Ecology and Evolutionary Biology*  
*Julie Payette NSERC Research Scholarship*  
Applied stochastic neighbor embedding techniques to analyze rainforest health via audio recordings, and realtime computer vision techniques to study collective behavior. 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, Honours Research Project*  
Theoretical biophysics: developed a physical foundation for the Resonant Recognition Model as a viable theory of biomolecular recognition via transition dipole coupling. This project received full funding for the KAUST 2013 Undergraduate Poster Competition.
- 5/2012-8/2012 **Advisor: Michel Gingras**  
*University of Waterloo, Department of Physics and Astronomy*  
*NSERC Undergraduate Student Research Award*  
Condensed matter theory: studies of the generalized dipolar spin ice model of dysprosium titanate via [cumulant expansion methods](#) implemented within Monte Carlo simulations, and crystal field calculations with Stevens operator methods. This project won awards at departmental, faculty-wide, and national conferences.

- 5/2011-4/2012 **Advisors: Moshe Szyf & Walter Reisner**  
**McGill University**, Department of Physics  
**McGill University**, Department of Pharmacology & Therapeutics  
 NSERC Undergraduate Student Research Award, McGill Honours Research Thesis  
 Biophysics: single molecule DNA methylation mapping in nanochannels. Experienced with Mat-  
 lab, protein purification and binding assays, and TIRF microscopy.
- 5/2010-8/2010 **Advisor: Jürgen Sygusch**  
**Université de Montréal**, Department of Biochemistry  
 NSERC Undergraduate Student Research Award  
 Bioinformatics: virtual high throughput screening of potential *Magnaporthe grisea* aldolase II pesti-  
 cides through simulation of molecular docking. 3D conformational modeling of various aldolases.

### 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 final 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
- 2014 [Metaknowledge Research Network summer meeting](#), Asilomar, California
- 2014 [Y Combinator Startup School](#), New York City
- 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, New Hampshire  
<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 Pui)

## 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](#)