

CONTACT  
INFORMATION

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## Summary

**Quantitative talent:**

- Ranked 2nd in Canada on the Euclid 12th grade mathematics competition.
- Ranked 5th in Canada on the Putnam mathematics competition during second year of college.
- Completed B.Sc. (Honours) in Pure Mathematics in 20 months.
- Earned PhD in mathematics from UC Berkeley in May, 2013.
- Awarded 3-year research faculty position at the NSF Mathematical Biosciences Institute in September, 2013 (deferred)
- Worked as a financial trader at Jane Street Group in NYC.

**Technical skill:**

- Extensive coding experience in OCaml, VBA, Bash, and Macaulay2, and some experience with R and Python, for business, trading, and mathematical computing applications.
- Published thesis on applications of algebraic geometry to Hidden Markov models, a time series analysis tool.
- Experience analyzing EEG data using Bayesian network models.
- Developed a tensor manipulation package for Macaulay2.

**Management and team project experience:**

- Co-founded the Center for Applied Rationality (CFAR, <http://rationality.org/>), a non-profit which teaches workshops on improving decision-making by using recent advances in cognitive science, earning over \$500K in admissions revenue to date, now with 9 full-time employees.
- Co-developed Werewolves social computer game for International House, Berkeley.
- Co-developed Credence Calibration game for CFAR.

**Well-regarded as a speaker and consultant:**

- Invited to present at diverse venues, including the 2015 Oxford University Future of Humanity graduate lecture series, 2014 Thiel Foundation Summit in San Francisco, Harvard Effective Altruism 2014 speaker series, Thiel 20 Under 20 Summit in New York City, TEDxYouth@Tallinn in Tallinn, Estonia, the 2013 Effective Altruism Summit, the Carnegie Mellon statistics seminar, the Duke University algebraic geometry seminar, the NCSU symbolic computation seminar, McGill University causal inference seminar, the 2013 Thiel Foundation Appathon, Griffiths cognitive science laboratory, and the Founders Fund 2012 annual business meeting in Maui, Hawaii.
- Consulted on decision processes and training for numerous companies, including Founders Fund venture capital, MetaMed research, the US Army's University of Foreign Military and Cultural Studies, Facebook, Twitter.
- Advisor for startups NumerAI (homomorphically encrypted algorithmic stock prediction competition), AlphaSheets (multi-language spreadsheet IDE), Guesstimate (probabilistic programming spreadsheet interface), and ArbiTal (social media platform for navigating and scoring argument structures).

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## Details

EDUCATION	PhD in mathematics, UC Berkeley (May, 2013) Visiting scholar in mathematics, Uni Roma Tre (January - July 2010) M.Sc. in Mathematics, University of Toronto (August 2008) B.Sc. (Hons) in Pure Mathematics, Memorial University (May 2006) High school diploma, Clarenville High School (June 2004)
RESEARCH INTERESTS	Game theory for artificial agents; algebraic statistics and other applications of algebraic geometry to machine learning and statistical modeling; human cognition and de-biasing; causal inference; hidden Markov models; graphical models; singular learning theory; tensor network models; parameter identifiability; financial market research.
PUBLICATIONS	<i>Tensor representations of discrete data</i> , with Shaowei Lin, Luca Weihs, and Piotr Zwiernik. In preparation.  <i>Polynomial constraints on representing entangled qubits as matrix product states</i> , with Jason Morton (2012). SIGMA 10 (2014), 095.  <i>Binary hidden Markov models and varieties</i> (2012). arXiv:1206.0500. Journal of algebraic Statistics, Vol 4, No 1 (2013): AS2012 Special Volume, part 2  <i>A note on the proportionality between some consistency indices in the AHP</i> , with M. Brunelli, and M. Fedrizzi (2010). arXiv:1203.6431v1. Applied Mathematics and Computation 219 (14) (2013), 7901-7906.  <i>Resolving the Banach-Tarski paradox: inseparability of rigid bodies</i> (2006). B.Sc. Honors thesis.  <i>Pushing the limit (generalized limits and limit extrema)</i> (2006), AEJM 1 no. 1, pp. 47-55.
SOFTWARE	<i>Tensors.m2</i> , with Claudiu Raicu (2012), a Macaulay2 package for studying varieties of tensors and tensor networks.  <i>Credence Game</i> , with Alexei Andreev and Zachary Alethia (2012), a game for Windows, Mac, Android and iPhones for calibrating reported subjective credence levels to actual success rates.
PROGRAMMING LANGUAGES	OCaml (proficient) VBA (proficient) Bash (proficient) Macaulay2 (proficient) Python (some experience) R statistical language (some experience)
INVITED TALKS	Oxford University Future of Humanity Graduate Lecture Series, November 2015 Thiel Foundation Summit in San Francisco June 2014 Harvard Effective Altruism speaker series April 2014 TEDxYouth@Tallinn in Tallinn, Estonia November 2013 Thiel 20 Under 20 Summit in New York City November 2013 Effective Altruism Summit July 2013 Thiel Foundation Appathon February 2013 Carnegie Mellon statistics seminar February 2013 Duke University algebraic geometry seminar January 2013 NCSU symbolic computation seminar January 2013

McGill University causal inference seminar	December 2012
UC Berkeley algebraic geometry seminar	November 2012
Griffiths cognitive science laboratory	October 2012
RTG Workshop on Tensors and their Geometry at UC Berkeley	September 2012
York University statistics seminar	September 2012
Queen's University algebraic geometry seminar	September 2012
Autonomous electrical engineering and computer science seminar at UC Berkeley	August 2012
Summer Program on Applied Rationality and Cognition in Berkeley	August 2012
CFAR Westminster Retreat in Alamo, California	July 2012
Center for Applied Rationality workshop in Berkeley, California	June 2012
Algebraic Statistics in the Alleghenies at Pennsylvania State University	June 2012
Center for Applied Rationality workshop in Pescadero, California	May 2012
Founders Fund annual business meeting in Maui	May 2012
Stanford student algebraic geometry seminar	February 2012
COGS Causal Inference Symposium at UC Berkeley	February 2012
UC Berkeley algebraic geometry seminar	January 2012
Mathematicians Against Police Violence at UC Berkeley	November 2011
UC Berkeley algebraic geometry seminar	November, 2011
UC Berkeley algebraic statistics seminar	September 2011

HONORS AND  
AWARDS

Outstanding Graduate Student Instructor Award	March 2012
DARPA Graduate Student Research grant – \$24,000	January 2012
NSERC PGS-Doctoral Scholarship – \$42,000	September 2008
NSERC CGS-Doctoral Scholarship – \$105,000 (declined after 1 year)	September 2007
NSERC CGS-Masters Scholarship – \$17,500	September 2006
NSERC Undergraduate Summer Research Assistantship – \$6,000	May 2006
Governor General's Medal for Memorial University, awarded to the overall top undergraduate student across all faculties and departments.	May 2006
Memorial University Medal for Excellence in Mathematics	May 2006
Putnam mathematics competition – Honorable Mention (~ 5th in Canada)	December 2005
Centenary of Responsible Government Scholarship – \$1,000	November 2005
Memorial University undergraduate mathematics competition – 1st Prize	October 2005
Memorial University Faculty of Science Dean's departmental prize, awarded annually to the top non-graduating mathematics student.	October 2005
APICS (Atlantic Provinces) mathematics team competition – 1st Prize	October 2005
Memorial University undergraduate mathematics competition – 1st Prize	January 2005
APICS (Atlantic Provinces) mathematics team competition – 1st Prize	October 2004
Memorial University Alumni Scholarship – \$25,000	2004/09
Euclid 12th grade mathematics competition – 2nd in Canada	2004/05

PROFESSIONAL  
QUALIFICATIONS

FINRA Series 7 certified General Securities Representative	
FINRA Series 55 certified Equity Trader/Limited Representative	
Start-up experience (cofounded CFAR, <a href="http://rationality.org/">http://rationality.org/</a> )	
Management experience (as Chief Marketing Officer of CFAR)	
Freelance consulting experience (solicited by Founders Fund venture capital and MetaMed research)	
Trilingual fluency in English, French, and Italian.	
Bertini experience (numerical algebraic geometry package)	

PROFESSIONAL  
SERVICE

Thiel Under 20 Fellowship mentor (Aug 2013 - present)

Lead curriculum developer for UC Berkeley's new *Sense, Sensibility, and Science* course, under physics Nobel laureate Saul Perlmutter, philosophy professor John Campbell, and law professor Robert MacCoun (fall 2012 - spring 2013)

Signatory for THINK at UC Berkeley, facilitating discussion and implementation of high-impact altruism (fall 2012 - present)

Cofounder and Curriculum Developer for the Center for Applied Rationality (spring 2012 - present)

Co-organizer for the UC Berkeley student algebraic geometry seminar, first with Charley Crissman, and later with Andrew Dudzik (spring 2011 - spring 2012)

Co-organizer for the COGS Causal Inference Symposium with psychology PhD student Michael Pacer (February, 2012)

Co-organizer for the UC Berkeley algebraic statistics seminar with Shaowei Lin (fall 2011)

Co-organizer for the Math, Productivity, Happiness and Decision-making seminar at UC Berkeley with Stanford mathematics PhD student Nisan Stiennon (fall 2011)

Co-organizer for the Many-Algebro-Geometrically Important Concepts seminar at UC Berkeley (spring 2009)

EMPLOYMENT  
HISTORY

*Research Fellow* 2015/09 – present  
Employer: Machine Intelligence Research Institute  
Work: researching the game theory of artificial agents  
40 hours per week

*Algorithmic Trader* 2014/04 – 2015-08  
Employer: Jane Street Capital  
Work: researching, developing and supervising stock trading algorithms  
50 hours per week

*Postdoctoral Research Fellow* 2013/09 (deferred)  
Employer: Mathematical Biosciences Institute (NSF)  
Work: researching applications of algebraic geometry to neuroscience and machine learning  
40 hours per week

*Cofounder and Curriculum Developer* 2013/05 – 2014/04  
Employer: Center for Applied Rationality  
Work: Developing curriculum for statistical improvements in decision-making and cognitive debiasing.  
60 hours per week

*Graduate Student Instructor* 2010/08 – 2011/12 and 2012/08 – 2013/05  
Employer: UC Berkeley  
Work: classroom instruction, office hours, and grading.  
20 hours per week (except summer)

*Graduate Student Researcher* 2012/01 - 2012/07  
Employer: DARPA / UC Berkeley  
Research on applications of algebraic geometry to machine learning models under Professor Bernd Sturmfels  
20 hours per week

*Graduate Student Instructor* 2008/08 – 2009/12  
Employer: UC Berkeley  
Work: classroom instruction, office hours, and grading.  
10 hours per week (except summer)

*Lecturer (vector calculus)* 2009/06 – 2009/08  
Employer: UC Berkeley  
Work: classroom instruction, office hours, and grading.  
15-20 hours per week

*Teaching Assistantships* 2006/10 – 2008/05  
Employer: University of Toronto  
Work: tutorial classes, tutoring, and grading.  
5-10 hours per week

*Research Assistantship (NSERC-USRA)* 2006/05 – 2006/08  
Employer: NSERC / University of Toronto full time  
Work: researching division algorithms for analytic and quasi-analytic function classes  
under Professor Edward Bierstone.

*Mathematics Tutor* 2005/05 – 2006/05  
Employer: Memorial's Undergraduate Career Experience Program (MUCEP) variable hours  
Work: Tutoring mathematics regularly to residents of Paton College  
under Student Affairs and Services.

*Problem Solver/Designer* 2003/06 - 2003/08  
Employer: Student Work and Service Program (SWASP) full time  
Work: Creating, solving and typesetting problems for a contest training database  
under Professor M. Parmenter.