jacobdenson

Mathematician

Interests

Harmonic Analysis, Ergodic Theory, and Complex Geometry.

Contact Information

Additional Contact Info Redacted For Web Version
denson@ualberta.ca

Websites

Github Profile: jdjake

Stack Overflow Profile: jacob-denson

https://jdjake.github.io/ (Work in Progress)

Languages

English, Elementary German and Chinese, Python, Perl, C++, C, C#, Matlab, HTML, Javascript, Latex (This resume is proof!)

Summary

I am a senior at the University of Alberta, intending to apply my strong knowledge of analysis and enthusiasm to become a solid aid to a future research group in mathematics. My previous work in software engineering at Microsoft has given me strong communication skills, which I hope to apply to the mathematics world. My current breadth of knowledge, and my eagerness to learn more should be a useful asset to your research group.

Talks

2016 **CUMC Undergraduate Conference** University of Victoria, Vancouver Island
'On Molecular Gases and the Natural Numbers', a quick, twenty-minute talk introducing the subject of Ergodic theory to undergraduate students, and emphasizing its relation to a variety of problems in mathematics, emphasizing number theory.

2015 **Microsoft Intern Talks** Microsoft Campus, Redmond
'Category Theory for Computer Programmers', My original talk on category theory, shortened to a 20 minutes talk, and edited to reduce mathematical prerequisites and to emphasize the practical uses for the average programmer. Ran a weekly meeting for interns to give talks to the group about various interesting topics.

2015 **Honours Computing Science Seminar** University of Alberta
'Category Theory and its relation to Computing Science', an hour-long talk introducing the subject to Honours computing scientists and emphasizing its relation to the Curry Howard isomorphism.

2014 **NLP Research Group** University of Alberta
'Cognates for Reconstruction of Native American Language groups', a twenty minute talk emphasizing my work over the summer and explaining the organization method and SVM classification method for identifying cognates.

2013 **RLAI Tea Time Talks** University of Alberta
'Room Abstraction in Sokoban', a 15 minute talk introducing the game of Sokoban, its combinatorial issues, and room abstraction as an aid to attacking the game.

Education

2013-2017 **Bachelors** in Computing Science — The University of Alberta

2011-2013 **International Baccalaureate** High School Diploma — Harry Ainlay High School

Experience

Selected Mathematics Courses (3.96 Math GPA, 3.8 General)[1]

FUNCTIONAL ANALYSIS

- Banach Spaces (MATH 418 - A)
- Operator Algebras (MATH 519 - A+)
- Abstract Harmonic Analysis (MATH 642)
- Locally Convex Spaces (MATH 518)*

COMPLEX ANALYSIS

- Complex Variables (MATH 411 - A-)
- Modular Forms (MATH 681)
- Multivariate Complex Analysis (MATH 506)*

ALGEBRA

- Galois Theory (MATH 424 - A)
- Representation Theory of Lie Algebras (MATH 682)*

TOPOLOGY

- Topology (MATH 447 - A+)
- Algebraic Topology (MATH 530 - A+)

DISCRETE MATHEMATICS

- Combinatorial Optimization (CMPUT 675)
- Fourier Analysis of Boolean Functions

PROBABILITY THEORY

- Stochastic Processes (STAT 580 - A+)
- Multi Armed Bandits (CMPUT 654)

LOGIC AND THEORETICAL COMPUTING SCIENCE

- Mathematical Logic (PHIL 420 - B+)
- Nonstandard Logical Systems (PHIL 422 - A)
- Formal Language Theory (CMPUT 474 - A)

Relevant Work & Experience

2015 **UNIVERSITY OF ALBERTA** Edmonton, Alberta

'Tangible Introduction To Computing Science' Teaching Assistant

Advised students in the honours stream of Computing Science who were taking CMPUT 275, a class which introduced students to basic algorithmics, such as asymptotic analysis, divide and conquer, dynamic programming, and such. Led office hours weekly and marked assignments.

2013-Now **Competitive Programming club**

Competitor

Strong Competitor in Competitive Programming. Won the Microsoft 2014 Coding for Cash competition, placed 4th in the Alberta Collegiate programming contest in 2014 and 2015. Coached by Zachary Friggstadt (zacharyf@ualberta.ca), ACM world finalist.

[1] An asterix indicates a course I plan to take in the winter semester

Summer Internships

2015 **MICROSOFT** Redmond, Washington
Universal Store Spell Correction
Developed algorithms for data linkage. Utilizing various data-cleansing methods together with the Azure and Bing data-analysis packages, cleansed Microsoft's business partner database, removing redundant info, reducing database entries by 20%. My manager for this project was Aman Kansal (Kansal@microsoft.com). I also worked off-hours with a group of interns to send robot adventurers around the world (http://www.projectatlas.ms/), and organized weekly talk sessions!

2014 **UNIVERSITY OF ALBERTA** Edmonton, Alberta
Natural Language Processing and Cognate Identification
Worked with the NLP group at the University of Alberta to develop cognate recognition algorithms. Successfully pushed to create a centralized database for storing cognate information, simplifying the learning process. This program was successfully used by linguists at the University of Alberta to understand the Totonac language group. Garrett Nicolai supervised the project (Nicolai@ualberta.ca).

2013 **UNIVERSITY OF ALBERTA** Edmonton, Alberta
Reinforcement Learning GAMES group
Implemented efficient abstraction algorithms to create a Sokoban solver for the RLAI group at the University of Alberta, under mentor Harm Van Seijen (Harm.Van.Seijen@gmail.com).

Awards

2014 **Jason Lang Scholarship** Alberta Scholarships
Awarded to students Alberta post-secondary students continuing full-time in undergraduate programs with outstanding academic achievements.

2013 **Academic Excellence Scholarship** University of Alberta
Awarded to students with superior academic achievement entering the first year of an undergraduate degree program at the University of Alberta.

2013 **Faculty of Science Academic Excellence Scholarship** University of Alberta
Awarded annually on the basis of superior academic achievement to students entering the first year of an undergraduate degree program in the Faculty of Science at the University of Alberta.

2013 **Alexander Rutherford Achievement Scholarship** Alberta Scholarships
To recognize and reward academic achievement at the senior high school level and to encourage students to pursue post-secondary studies.