Arun Debray

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Objective

To begin mathematical research at PhD programs in mathematics.

Education

9/2011 – present	**Stanford University**. Current GPA: 3.781. BS degree in Mathematics with a minor in Computer Science, expected 6/2015.
8/2007 – 5/2011	**Catalina Foothills High School**, Tucson, AZ. Graduated in 5/2011. GPA: 4.26 (weighted).

Research Experience

- 7/2013 – 8/2013: Quick Error Detection in LLVM. I worked in a team, under direction of two CS graduate students, to implement and improve Quick Error Detection, a technique to insert error-checking routines for hardware errors into software with the LLVM compiler infrastructure. This project was for Stanford's Computer Science Undergraduate Research Internship (CURIS) research program, an REU.
- 6/2012 – 8/2012: Stanford Research Institute in Mathematics (SURIM), an REU. As part of this program, I did research on class numbers of binary quadratic forms, investigating their maxima and the structure of the class groups. The program included weekly presentations and writing a concluding paper.

Projects

- 9/2014 – present: Senior thesis. Under the direction of Professor Akshay Venkatesh, I am working on a senior thesis on modular representation theory, providing a solid and clear exposition of topics from Serre's *Linear Representations of Finite Groups* with more intuition and examples.
- 6/2014 – 9/2014: Internship at AT&T Foundry. In this internship, I applied techniques from abstract algebra and statistics to problems within network theory, including understanding conditions on a network for a linear code to exist and implementing probabilistic power conservation techniques within sensor networks.
- 10/2013 – 12/2013: Astronomical Implications of Machine Learning. Working with a fellow student, we used supervised learning to develop a classifier for stellar lightcurves to detect whether they indicated the presence of exosolar planets. We achieved 82% classification accuracy. This project was for Stanford's CS 229 class.
- 4/2013 – 6/2013: A Cool Compiler. Working with a fellow student, we wrote a compiler for the Cool programming language to MIPS assembly. The compiler included a lexer, parser, semantic analyzer, and code generator. This project was for Stanford's CS 143 class.

Other Mathematics and CS Experience

- Since 1/2013, I have been employed for 2 hours/week by the Stanford University Mathematical Organization to tutor students in Math 51, 52, and 53 (linear algebra, multivariable calculus, and differential equations).
- Math courses, primarily in abstract algebra (Math 120, 121, 122, 210A, 210B, and 210C), but also combinatorics (Math 108), real analysis (Math 171 and 205A), complex analysis (Math 116), Riemannian geometry (Math 137 and 144), and honors multivariable mathematics (Math 50H series).
- Computer science courses, including courses in machine learning (CS 229), compilers (CS 143), systems programming (CS 107, 110, and 240H), and CS theory (CS 154, 161, and 255).
- Experience with Python, Haskell, C++, C, Java, and Bash shell scripting.

- Experience with LaTeX.

Awards and Honors

- 6/2013: Boothe Prize for Excellence in First-Year Writing, Stanford University.
- 11/2011: Eagle Scout, Troop 007, Tucson, Arizona.

Volunteer Experience

- 6/2012: Coached a high school team for the American Regions Mathematics League (ARML) tournament; the team placed 7^{th} nationally.
- 2011 – present: Proctored at and wrote problems for the Stanford Mathematics Tournament (SMT) and Berkeley Mathematics Tournament (BMT).