Juspreet S. Sandhu

Address: 19 Shepard St Apt 3, Cambridge, MA, 02138 Number: (301)529-9744 E-Mail: jssandh2@illinois.edu

Interests

Type Theory, Programming Language Theory, Interpreters, Graph Theory, Cryptography, Computational Complexity, Abstract Algebra

Education

University of Illinois at Urbana-Champaign — **Urbana-Champaign, IL**
Bachelor of Science: Engineering Physics — **Aug 2011 – May 2015**
Minors: Computer Science, Mathematics
(Dean's List - Spring 2012)

Technical Experience

Research, LLVM Compiler, UCSD Programming Systems Lab — **September 2017 – Present**

- Working to add Refinement Types to the LLVM Compiler with the aid of Fixpoint based Algorithms
- Introduced graceful handling for Immutable Variables by building Constraint Blocks using Fixpoint for CFGs

Software Engineer, Graph Infrastructure Team, Kensho Technologies Inc. — **August 2017 – Present**

- Writing Python and using RabbitMQ and Celery to scale Infrastructure for the Graph Database
- Making contributions to the GraphQL Compiler

Software Engineer, Search & Discovery Team, Tumblr Inc. — **December 2015 – August 2017**

- Decreased Search Latency and implemented a Query-Tree Structure for Parallelized Retrieval in PHP and Scala
- Designed & implemented the Relational Algebra for the Tumblr's Explore page, and optimized the Clustering Algorithm used by the service

Contributor, Formal Verification of Distributed Systems, Verdi (UWPLSE) — **April 2017**

- Worked with James Wilcox to extend the Verdi framework to provide base for an implementation of a Multi-State implementation of the Counter Server
- Worked to extend the Network Semantics and Handler Monads to be more robust and provable

Interpreter: Untyped-Lambda Calculus (LISP) — **September 2016**

- Wrote an interpreter in Racket (LISP) for a version of the Untyped-Lambda Calculus (called MUPL) as part of the Programming Languages Course on Coursera (UW)

Researcher (SPIN), NCSA (Natural Language Processing) — **February 2015 – May 2015**

- Worked as a Research Programmer in GroupScope, under I-CHASS & National Center for Supercomputing Applications to and wrote Python code using the iGraph library

Grader/TA, CS-410 (Text Information Retrieval Systems) — **January 2015 – May 2015**

- Helped Grade Midterm Exam and HW Assignments for 180 students
- Regularly held Office Hours to provide Algorithmic and Coding assistance to students

Independent Study: Computer Science (Natural Language Processing) — **August 2014 – January 2015**

- Analyzed Data Sets with Natural Language Processing toolkits in Python & Java (NLTK and StanfordCoreNLP) to resolve co-reference resolution and create modified Term Frequency distributions
- Conducted Analysis on large datasets to optimize for Search Performance & evaluate MAP on a Query-Set

Custom Search Engine (Group Project: CS-410 - Text Information Retrieval Systems) **June 2014 – July 2014**

- Formulated and coded a Retrieval Function in Python using relevance measures, sentiment analysis, stock prices and aggregated through Alchemy API, Quandl API and Bing Finance Query API
- Created a Custom Search Engine that generates a ranking of publications related to company finance performance as measured by Stock prices

Independent Study: Physics (Data Analysis in Astro-Physics) **February 2014 - May 2014**

- Designed and coded an Algorithm in Python to compute Bayesian Probabilities for Supernovae
- Applied the GALSNID method to create plots of Supernovae and to visualize host-galaxy morphology effects

Leadership Experience

Peer Mentor for Freshman Physics Students **August 2013 – May 2015**

- Guided and assisted freshman in Physics with queries regarding the Physics program at U of I

Awards

National Mathematical Olympiad **August 2008**

- Stood 52nd out of at least 10,000+ in the event, held in New Delhi, India

Classical Guitar, Delhi School of Music **December 2010**

- Performance Recital with Distinction (Grade 5) from Trinity College, London, UK

Relevant Coursework

Data Structures	Text Information Retrieval	Abstract Linear Algebra	Machine Learning
Discrete Math	Quantum Theory	Data Mining	Differential Geometry
Modern Physics Laboratory	Algorithms & Computational Theory	Grad Seminar: Information Retrieval	Applied Complex Analysis
Programming Languages (Coursera)	Cryptography (Coursera)	Graph Theory (Coursera)	Enumerative Combinatorics (Coursera)

Professional Skills

- **Programming Languages :** Python, SML, Coq, Racket(LISP), Scala, Rust, LaTeX, C++ HTML
- **Platforms:** Linux (Ubuntu), Mac OS X, Windows, ROOT
- **Spoken Languages:** English, Hindi, Punjabi, Sanskrit
- **Control Systems/Version:** Git, Subversion

Personal Website, GitHub

Personal Website: https://jssandh2.github.io/Juspreet-Sandhu/

Github: https://github.com/jssandh2

Quora: https://www.quora.com/profile/Juspreet-Sandhu