

Arvind S. Rao, PhD

Contact Information	{first name} at {last name}.im	Citizenship: <i>United States of America</i>
	Website: rao.im	Aufenthaltstitel/Visa: <i>Niederlassungserlaubnis</i>
	GitHub: github.com/arvsrao	Deutschkenntnisse: Goethe Niveau B1
Certifications	<i>Sensor Fusion Nanodegree</i> , Udacity (Verified Certificate)	
	August 2022	
	As part of the program I implemented in C++ obstacle detection from lidar point clouds, registration of lidar point clouds to camera images, object tracking with Kalman filters, and more. All of my final project submissions are on GitHub.	
Industrial Positions	<i>Lead Software Engineer</i> Schwalbach am Taunus, Germany	HERE Technologies February 2016 – Present
	Within the HERE Geocoding & Search product, I mainly contribute to the development of map data compilers—distributed applications that run in cluster environments. I also have had the opportunity to do some research and prototyping. For instance, I developed Apache Spark implementations of known image processing methods for very large sparse global (as in the earth) heat maps. I reported on this work at Spark Summit Europe 2017 .	
	<i>Technical Skills Practiced:</i> functional programming, concurrency with monix /futures, Scala, Java, Spark, Protocol Buffers ; Pandas, BASH, and Python	
	<i>Data Scientist</i> San Francisco, CA	Riviera Partners February 2013 – September 2015
	At Riviera I was charged with implementing a candidate to job matching system. To further evolve the matching system, I applied statistical machine learning techniques to understand its performance. I was also responsible for the development of candidate scoring and matching methodologies. I completely refactored the existing candidate scoring service, leading to a 20 fold speed up. Additionally, I worked directly on the main application, implementing the matching feature, maintaining and extending the search function (elasticsearch), as well as bug fixing.	
	<i>Technical Skills Practiced:</i> Javascript, Angular, Ruby, Python, NumPy/Pandas, SQL (PostgreSQL, Microsoft SQL, etc.), BASH & Python scripting; data cleaning, normalization, and modeling	
	<i>Software Engineering Contractor</i> San Francisco, CA	ark.com October 2012 – January 2013
	Ark.com was a YC alumnus, and I worked on a research project regarding social network entity resolution. We were specifically interested in applying techniques from computer vision to this problem. I wrote scripts for image histogram comparison (used pyOpenCV), and I curated a set of images for testing/exploration. Additionally, I wrote web crawlers to acquire data from social networks. While doing so, I learned about web architectures, and how to use proxies to crawl the social web fast.	

**Research and
Teaching
Experiences***Postdoctoral Researcher*
Philadelphia, PA**University of Pennsylvania**
[Section of Biomedical Image Analysis](#)
March 2010 – July 2012

I developed a suite of mathematical contrast measures for 3D diffusion MRI to better classify pathologies of neurodegenerative diseases. Statistical analysis was done with these measure to find significantly different brain regions within a population of patients and normal subjects. These measures are clinically relevant and outperform comparator measures. Additionally, I used machine learning techniques to aid assessment of group difference within a population represented by brain connectivity graphs.

- Implemented experiments and methods in C++ , Matlab, Maple, and Python.
- Developed image filters with C++ library ITK. Some experience with Boost (only spherical harmonic functions).
- Wrote BASH and Python scripts to batch process 3D diffusion images on a compute cluster.

Graduate Teaching Assistant
Iowa City, IA**University of Iowa**
August 2003 – December 2009 (most fall &
winter semesters)

- Course instructor for Algebra II, during fall semester of 2006.
- Led two discussion sections, and each met biweekly. Wrote and graded quizzes. Also graded homework assignments.
- Assisted students of Engineering Calculus II with Mathematica assignments.
- Provided one-on-one tutoring for students enrolled in University of Iowa mathematics courses ranging from Algebra I to Multivariate Calculus.
- Wrote solutions to homework assignments for Differential Geometry of Curves and Surfaces (Fall 2006, Spring 2008) and Real & Complex Analysis II (Spring 2008).

Education

The University of Iowa, Iowa City, IA

May 2010

Ph.D. in Mathematics

Dissertation: [“Weak solutions to a Monge-Ampère type equation on Kähler surfaces”](#)

Research Area: Geometric Analysis, Differential Geometry

Georgia Institute of Technology, Atlanta, GA
B.S. in Electrical Engineering

May 2002

Publications

1. Arvind Rao, [“Weak Solutions to a Monge-Ampère Type Equation on Kähler Surfaces.”](#) PhD Dissertation, University of Iowa, 2010.
2. Arvind Rao, Alex R. Smith, Robert Schultz, Timothy P.L. Roberts, and Ragini Verma, [“Peak Geodesic Concentration: A Measure of WM Complexity”](#), Proceedings of MMBIA 2012.

Software

I have a lot of experience developing software in Linux and macOS environments, and some familiarity developing software in Windows.

- [CLion](#), IntelliJ, Sublime, Git, RubyMine, L^AT_EX, and Microsoft Office Suite.
- GitLab, Gerrit, GitHub, Jenkins, Jira

- Selected Conferences and Presentations**
- [Spark Summit Europe 2017](#) November 2017
Dublin, Ireland
- Presentation of work done at HERE Technologies titled, “[Histogram Equalized Heat Maps from Log Data via Apache Spark](#)”.
- [IEEE Workshop on Mathematical Methods in Biomedical Image Analysis](#) January 2012
Breckenridge, CO
- Poster presentation of, “[Peak Geodesic Concentration: A Measure of WM Complexity](#)”.
- [Geometric Partial Differential Equations](#) February 2009 – May 2009
Institute for Advanced Study, Princeton, NJ
- While in residence, I wrote my dissertation, presented a paper in an advanced topics PDE course, and attended seminars.
- Differential Geometry Seminar September 2006 and 2007
University of Iowa, Iowa City, IA
- Two presentations on global estimates for a Monge-Ampère type equation, my dissertation research project.
 - Three presentations about the Calabi Conjecture based on lectures notes by Yum-Tong Sui.
 - Four presentations based on the John Lee and Thomas Parker exposition of the Yamabe Problem.
- Fellowships and Service**
- Member of the University of Pennsylvania Biomedical Postdoc Community Service Committee, May 2011 - April 2012.
 - NSF–VIGRE Traineeship, Spring Semester 2009.
 - University of Iowa Graduate College Summer Fellowship, Summer Semester 2008.
 - Volunteered at Iowa high school mathematics competition, hosted by the University of Iowa Mathematics Department, during the spring of 2006 and 2007.