# Andrew B. Rosen

Curriculum Vitae

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## Research Interests

- Peer-to-Peer Networks
- Delay and Fault Tolerant Networks
- Distributed Hash Tables
- Interplanetary Internet
- Astroinformatics

## Education

- **Ph.D.** in Computer Science, Georgia State University. May 2016 (Expected)
- **M.S.** in Computer Science, Georgia State University. May 2014, 3.89 GPA
- **B.S.** in Computer Science, Georgia Institute of Technology. May 2010, 3.00 GPA
- **Minor** in Music, Georgia Institute of Technology. May 2010

## Awards

- Outstanding Graduate Teaching Award, 2015

## Publications

1. Andrew Rosen, Brendan Benshoof, Robert W. Harrison, Anu G. Bourgeois "MapReduce on a Chord Distributed Hash Table" Presentation ICA CON 2014, Poster at IPDPS 2014 PhD Forum
2. Brendan Benshoof, Andrew Rosen, Anu G. Bourgeois, Robert W. Harrison "VHASH: Spatial DHT based on Voronoi Tessellation" ICA CON 2014
3. Erin-Elizabeth A. Durham, Andrew Rosen, Robert W. Harrison "A Model Architecture for Big Data applications using Relational Databases" 2014 IEEE BigData - C4BD2014 - Workshop on Complexity for Big Data
4. Chinua Umoja, J.T. Torrance, Erin-Elizabeth A. Durham, Andrew Rosen, Dr. Robert Harrison "A Novel Approach to Determine Docking Locations Using Fuzzy Logic and Shape Determination" 2014 IEEE BigData - Poster and Short Paper
5. Erin-Elizabeth A. Durham, Andrew Rosen, Robert W. Harrison "Optimization of Relational Database Usage Involving Big Data" IEEE SSCI 2014 - CIDM 2014 - The IEEE Symposium Series on Computational Intelligence and Data Mining
6. Brendan Benshoof, Andrew Rosen, Anu G. Bourgeois, Robert W. Harrison "A Distributed Greedy Heuristic for Computing Voronoi Tessellations With Applications Towards Peer-to-Peer Network" IEEE IPDPS 2015 - Workshop on Dependable Parallel, Distributed and Network-Centric Systems
7. Andrew Rosen, Brendan Benshoof, Robert W. Harrison, Anu G. Bourgeois "UrDHT: A Unified Model for Distributed Hash Tables" Submitted to IPDPS 2016
8. Andrew Rosen, Brendan Benshoof, Robert W. Harrison, Anu G. Bourgeois "The Sybil Attack on Peer-to-Peer Networks From the Attackers Perspective" In preparation
9. Chaoyang Li, Andrew Rosen, and Anu G. Bourgeois "A Novel Approach to Efficiently Detect 3D Full-View Coverage for Camera Sensor Networks" In Preparation

## Research and Projects

### UrDHT, 2015 - Present

- We designed and built a framework which maps distributed hash tables to the primitives of Voronoi Tesselation and Delaunay Triangulation.
- UrDHT allows developers to quickly create new DHT topologies by completing a few simple functions.
- Prototype implementation in Python.
- Project repo here: `https://github.com/UrDHT`

### Sybil Attack Cost Analysis, 2015

- Analyzed the computational and monetary cost of performing a large scale Sybil attack.
- Code and Paper here: `https://github.com/abrosen/datasec/tree/master/project`

### Performing MapReduce on a Chord Distributed Hash Table, 2013 - 2014

- We examined using the self-organizing features of a DHT for distributed computing.
- We tested the system by deploying it on Amazon EC2 and computing Monte-Carlo methods and word frequency counts.
- Code and paper can be found here `https://github.com/BrendanBenshoof/Chronus`

### VHash, 2014

- We designed a new DHT that uses Voronoi regions to determine responsibilty for resources.
- We detail algorithms that extend into an arbitrary number of dimensions, a feature lacking in similar works.
- Code and paper can be found here `https://github.com/BrendanBenshoof/pyVHash`

### $D^3$DNS, 2013

- We created a secure and fault-tolerant prototype replacement for DNS.
- Our solution is reverse compatible with the current system.
- Code: `https://github.com/BrendanBenshoof/P2PDNS`
- Paper: `https://github.com/BrendanBenshoof/P2PDNS/blob/master/P3DNS.pdf`

### A Survey of Routing Protocols for Vehicular Ad-Hoc Networks, 2012 - Present

- Explores common obstacles experienced in challenged and delay-tolerant networks.
- Examines in-depth various routing protocols for VANETs.
- Current work involves covering protocols for other challenged networks.
- `http://www.cs.gsu.edu/~arosen6/survey/survey.pdf`

### Reducing Traffic and Delays in P2P Systems with Replicated Mutable Files, 2011 - Present

- Reduced overhead of maintenance of mutable files while diverting traffic away from file sources.
- Strategies can be implemented on other DHT based P2P systems.
- `http://www.cs.gsu.edu/~arosen6/papers/IRMLP.pdf`

### Asthma Educational Game, 2009

- Flash based educational game developed with two other students to teach about asthma developed for senior project in Computer Science.
- Game is being further developed by a PhD student at Georgia Tech.

## Teaching

**CSc 3320 System Level Programming (Spring 2015)**

- Instructor - class size of 51
- Covered programming in and writing scripts for the Unix operating system.
- Introduced Python as a scripting language to the students.
- Taught more advanced topics in C: pointers and pointer arithmetic, memory management, segmentation faults, and buffer overflows.

**CSc 2010 Principles of Computer Science (Spring 2014)**

- Instructor - class size of 91
- Covered introductory Java topics including syntax, methods, and objects.
- Introduced foundational topics in Computer Science, such as the design an analysis of algorithms, binary, circuits, and architecture.

**CSc 3320 System Level Programming (Fall 2013)**

- Teaching Assistant - class size of 50
- Helped answer during office hours and during class. Graded homework and exams.

**CSc 3210 Computer Organization and Programming (Summer 2013)**

- Teaching Assistant - class size of 30
- Helped answer during office hours. Graded homework. Helped maintain course server.

**CSc 2010 Intro to Computer Programming - Robots Section (Spring 2011 and Spring 2013)**

- Teaching Assistant - class size of 25
- Helped maintain robots. Helped developed critical thinking skills. Created tests and quizzes.

**CSc 3410 Data Structures - CTW (Fall 2011 and Fall 2012)**

- Instructor - class size of 25
- Covered advanced topics in Java. Covered various data structures such as linked lists, queues, stacks, trees, and graphs. Emphasized critical thinking skills and object-oriented design.

## Appointments

**2CI Astroinformatics Fellow,** Georgia State University, Aug 2012 - Present

- Refactored database for near-earth stellar objects and developed an automated tool to load data into the database.
- Currently working with Astronomy Deptartment on developing tools for analysis of suspected periodic signals.
- Examining using techniques for analyzing unevenly sampled periodic data in network traffic analysis.

**Graduate Research Assistant,** Georgia State University, Aug 2011 - Present

- Researched the use of self-organizing features of DHTs to in performing distributed computations.
- Researched various protocols used for delay tolerant networking and interplanetary networking.
- Examined application of algorithms from one body of challenged networks to another.

**Graduate Lab Assistant,** Georgia State University, May 2011 - 2013

- Deployed and maintained computer labs, faculty, and graduate student machines.
- Constructed and deployed new computers for faculty and graduate students.
- Migrated e-mail server.

**External Funding**

**TCPP Travel Grant** for 28th IEEE International Parallel & Distributed Processing Symposium

**Service**

**Vice Chair,** Georgia State University Chapter of the Association for Computing Machinery (ACM), May 2014 - Present

**Treasurer,** Georgia State University Chapter of the Association for Computing Machinery (ACM), May 2012 - May 2014

**New Graduate Student Orientation Panelist**, Georgia State University, 2014-2015

**Department Representative,** Georgia State University Arts and Sciences Technology Fee Committee, 2013 - 2015

- Voted on submitted proposals to allocate tech fee funds each year.
- Allocated $\approx \$1,000,000$ each year.

**Employment**

**Developer** Georgia Tech Sonification Lab, Atlanta, GA May-Dec 2010

- Set up and maintained new lab server.
- Extended the NASA Math Description Engine to incorporate the results of research on developing graph descriptions for the visual impaired.
- Developed a parser for formulas to interface with different software libraries.
- Software was presented to Washington lawmakers.
- `http://sonify.psych.gatech.edu/research/sonification_sandbox/index.html`.

**Undergraduate Researcher** Georgia Tech Sonification Lab, Atlanta, GA Fall 2007 -Dec 2009

- Helped develop the Sonification Sandbox, a cross-platform tool which creates auditory graphs, by finding and extending libraries to add Excel-like operations, graph formulas, and generate and play midi information.
- Developed a tool to generate Spearcons - auditory icons developed by the Sonification Lab.
- Helped develop a web based tool to measure the use of sound in software by analyzing the source code of program.

**Programming Skills**

**Languages:** Python, C, Java.

**Fields:** Distributed Hash Tables, Fault Tolerant Networks, Compilers, Simulations, Networking, TCP/IP, Data Mining, HCI

**Other**

I compose and remix music in my spare time.
My Erdös number is 5.
I have built multiple computers from parts for both personal and professional purposes.

**References available upon request.**