Arun Dunna

Research Assistant
M.S. Student

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Research Interests

Networks, network measurement, network security, censorship and censorship circumvention, digital privacy, and financial market modeling.

Education

University of Massachusetts Amherst — Amherst, MA
M.S. Computer Science — *May 2018 – May 2020*

- Advisor: Phillipa Gill
- Notable Courses: Affective Computing (CS 527), Neural Networks (CS 682), System Defense & Pentesting (CS 590A)

University of Massachusetts Amherst — Amherst, MA
B.S. Computer Science, Minor: Mathematics — *Sep. 2016 – May 2018*

- Advisor: Phillipa Gill
- Notable Courses: Machine Learning (CS 589), Detecting Interference in Networks (CS 690B), Artificial Intelligence (CS 383), Financial Mathematics (M 537)

Research

Calipr Lab — Amherst, MA
Advisor: Phillipa Gill — *Jan. 2017 – Current*

- **Multi-CDN**
  A study into performance of CDNs over time, varied by country, source AS, destination AS, and client. Compared local vs. remote caching, and performed studies on developing regions and IPV4 vs. IPV6. Pinpointed strategies in Microsoft's and Apple's deployment of CDNs for delivering software updates to clients, and identified impacts of client CDN migration and changes in CDN routing.

- **Analyzing China's Blocking of Unpublished Tor Bridges**
  A revisit to a series of papers published in 2012 and 2015, taking an updated look at how the Great Firewall of China (GFW) blocks unpublished tor relays, specifically bridge relays. Performed in-depth fingerprinting of GFW active scanners, determined how the GFW performs deep packet inspection (DPI) to detect the presence of Tor traffic, and proposed and tested circumvention methods for Chinese Tor users.

Experience

University of Massachusetts Amherst Amherst, MA
Departmental Assistant *May 2018 – Dec. 2018*

- Departmental assistant in Computer Science department to perform research in Calipr Lab, focused in network theory and coding theory. Working on multiple networks projects, such as "Multi-CDN" and "Analyzing China's Blocking of Unpublished Tor Bridges".

University of Massachusetts Amherst Amherst, MA
Research Experience for Undergraduates *May 2017 – Sep. 2017*

- Awarded stipend from grant to work in Calipr Lab at UMass on network measurement projects, most notably Multi-CDN. Worked on projects throughout the summer, and did key parts of analysis for the final paper.

Aura Political Group Atlanta, GA
Information Technology Specialist *Aug. 2015 – Aug. 2016*

- Developed software and websites for clients. Deployed and managed encrypted communication servers for secure communications between firm and clients.

nMomentum Corporation Atlanta, GA
DevOps *Jan. 2010 – Current*

- Deploy & manage critical network infrastructure (web/storage servers, encrypted file systems, secure remote file synchronization). Develop websites and software for company and its clients.

Skills

- **Languages:** Bash, Bro, C, C++, C#, CSS, HTML, Java, JavaScript, LaTeX, Lua, PHP, Python, R, Ruby, SQL, XML
- **Platforms:** Android, Unix, Windows
- **Specializations:** Cryptography, cybersecurity, Internet measurement, machine learning, networking, software/web development, Unix systems

Publications

1. Rachee Singh, **Arun Dunna**, and Phillipa Gill. Characterizing the Deployment and Performance of Multi-CDNs. *ACM Internet Measurement Conference (IMC)*. Boston, MA. Oct. 2018. **(Acceptance rate 23%)**
2. **Arun Dunna**, Ciarán O'Brien, and Phillipa Gill. Analyzing China's Blocking of Unpublished Tor Bridges. *USENIX Workshop on Free and Open Communications on the Internet (FOCI)*. Baltimore, MD. Aug. 2018. **(Acceptance rate 39%)**

Presentations

- *Analyzing China's Blocking of Unpublished Tor Bridges*
  - FOCI 2018 Presentation – Baltimore, MD (Aug. 2018)
  - CS 690B Course Presentation – Amherst, MA (May 2018)

Teaching

- *COMPSCI 197U - Introduction to Unix*
  - Spring 2019 (Jan. 28 – Mar. 7)

Projects

- **Text-Audio Synchronization Engine**, https://github.com/adunna/tase *Sep. 2018 – Current*

  Scalable and modular synchronization framework designed to associate positions in text with positions in corresponding audio. Primary example is timestamp position in audiobook with word position in ebook. Implemented using DeepSpeech.

- **sCTF**, https://sctf.io *Dec. 2014 – Jan. 2018*

  Founded online capture-the-flag competition focused on K-12 students. Largest had over 4000 competitors (K-12 and university students, industry professionals), and 56000 problem submissions.

- **STASiS**, https://adunna.me/stasis-project/ *Oct. 2016*

  Situational Analysis System: A tool for automatically monitoring for specific situations, such as a fire or a drunk driver, through visual input (picture or video), machine learning, and statistical analysis, all packaged with a nice front-end. Developed in 36 hours at HackUMass 2016, winner of MITRE Award.

Committee Involvement

- **Shadow PC Member** *May 2018 - Jul. 2018*
  ACM Internet Measurement Conference (IMC) 2018

Awards

- **NSF Research Experience for Undergraduates** *May 2017 - Sep. 2017*
  National Science Foundation
- **Chancellor's Award Scholarship** *Sep. 2016 - May 2018*
  University of Massachusetts Amherst
- **MITRE Award (STASiS)** *Oct. 2016*
  HackUMass