Brandon Amos

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Research Interests

Mobile computing, distributed systems, and computer vision.

Education

Carnegie Mellon University   **Pittsburgh, Pennsylvania**
Ph.D. Student, Computer Science   *August 2014–Present*

Virginia Tech   **Blacksburg, Virginia**
B.S., Computer Science, Honors Scholar, 3.99/4.00   *August 2011–May 2014*

Research Experience

Research Assistant   **Pittsburgh, Pennsylvania**
Carnegie Mellon University   *August 2014–Present*
- **Advisor:** Dr. Mahadev Satyanarayanan
- **Research Area**: Mobile computing and distributed systems.

Undergraduate Research Assistant   **Blacksburg, Virginia**
Magnum Research Group   *May 2012–May 2014*
- **Advisor:** Dr. Jules White
- **Research Area**: Mobile computing, cyber-physical systems, and security.
- Android malware detection research implemented with a distributed **Actor**-based **Scala** system.
- Manufacturing cyber-physical security research implemented with **VC#** and **Python**.

Undergraduate Research Assistant   **Blacksburg, Virginia**
Virginia Tech   *January 2013–May 2014*
- **Advisor:** Dr. Layne Watson
- **Research Area**: Scientific computing.
- Algorithm development for stochastic optimization using quasi-Newton methods for **parameter estimation** in **Fortran 95** and **OpenMP**.
- Bioinformatics research on yeast cell modeling using **Fortran 95**, **C++**, and **Matlab**.

Undergraduate Research Assistant   **Blacksburg, Virginia**
Systems Software Research Group   *November 2012–March 2014*
- **Advisor:** Dr. Binoy Ravindran
- **Research Area**: Compilers.
- Compiler research on a heterogeneous system on automatic **OpenMP** to **CUDA** translation using **C++** and the **ROSE** compiler framework.
- Polyhedral loop optimization research to restructure **OpenCL** kernels for locality using **LLVM** and **Polly**.

Teaching Experience

- Undergraduate TA. **CS 2114, Software Design and Data Structures**. Virginia Tech. *January 2013–May 2013*.

Publications

Conference Proceedings

[C1] W. Hu, **B. Amos**, Z. Chen, K. Ha, W. Richter, P. Pillai, B. Gilbert, J. Harkes, M. Satyanarayanan, "The case for offload shaping," submitted.

[C2] **B. Amos** and D. Tompkins, "Performance study of spindle, a web analytics query engine implemented in spark," in *Proceedings of the 2014 IEEE International Conference on Cloud Computing Technology and Science (CloudCom), Big Data Track*, 2014.

[C3] T. Andrew, **B. Amos**, D. Easterling, C. Oguz, W. Baumann, J. Tyson, L. Watson, "Global parameter estimation for a eukaryotic cell cycle model in systems biology," in *2014 Summer Simulation Multiconference, Society for Modeling and Simulation International*, 2014.

[C4] **B. Amos**, D. Easterling, L. Watson, B. Castle, M. Trosset, W. Thacker, "Fortran 95 implementation of qnstop for global and stochastic optimization," in *2014 Spring Simulation Multiconference, 22nd High Performance Computer Symposium, Society for Modeling and Simulation International*, 2014.

[C5] **B. Amos**, H. Turner, J. White, "Applying machine learning classifiers to dynamic android malware detection at scale," in *IWCMC'13 Security, Trust and Privacy Symposium*, 2013.

Journal Articles

[J1] **B. Amos**, D. Easterling, L. Watson, W. Thacker, B. Castle, M. Trosset, "QNSTOP-QuasiNewton Algorithm for Stochastic Optimization," submitted.

Magazine Articles

[M1] H. Turner, J. White, **B. Amos**, J. Camelio, C. Williams, R. Parker, "Bad parts: are our manufacturing systems at risk of silent cyber-attacks?" *IEEE Security and Privacy Magazine*, to appear.

Industry Experience

Data Scientist Intern   **San Jose, California**
Adobe Research   *May 2014–August 2014*

- **Research Area**: Distributed Systems
- Built and released *Spindle* as an open source web analytics processing engine using **Scala**, **Spark**, **Spray**, and **Parquet** on **HDFS**. Spindle is available on GitHub at `http://github.com/adobe-research/spindle`.

Software Winter Intern   **London, United Kingdom (Remote)**
Snowplow Analytics   *December 2013–January 2014*

- Open-source **Scala** development with a startup on the Snowplow analytics platform, available at `http://github.com/snowplow/snowplow`.
- Developed a new server using **Spray** and **Actors** to store **Apache Thrift** events on **Amazon Kinesis**.
- Completed project ahead of schedule, and also helped port Snowplow's Scala enrichment process to Kinesis.

Source Integrity Team Software Intern   **San Diego, California**
Qualcomm   *May 2013–August 2013*

- Developed an XML modification **web application** for fuzz vector generation. Implemented with client-side **HTML** and **js**, using **D3** for graphics and **Handlebars** for templating.
- Developed an XML-based grammar translator in **C++** with the **Xerces** XML parser in **Linux**. Reimplemented in **Python** using the **ElementTree** XML API for sophisticated analysis and tree transformations.

Software Engineer Intern   **Blacksburg, Virginia**
Phoenix Integration   *May 2012–August 2012*

- Developed industry software in **VC++**, **VC#**, **Java**, and **Tomcat**.
- Improved the testing (**JUnit** and **NUnit**) and installation (**Ant**, **InstallShield**, and **Make**) frameworks.
- Integrated a new licensing mode into CenterLink, a grid computing application, using **FLEXlm** and **Java**.

Network Administrator Intern <div style="float:right">**Vinton, Virginia**</div>

Sunapsys <div style="float:right">*January 2011–August 2011*</div>
- Internship in high school to replace Windows domain, mail, DHCP, and DNS servers with virtual **Linux** servers using **KVM** and **virsh**.

Projects

Personal Blog and Website

- Available at `http://bamos.io`.
- Hosted on GitHub Pages. Uses **Markdown** for posts and **Jekyll** for static HTML generation.
- **42 posts** across the following tags, listed by highest frequency.
- Python, Bash, Linux, LaTeX, Fortran, Android, Scala, News, JavaScript, Zsh, C++, OpenMP, Lua, Make, Mathematica, mpv

GitHub Portfolio

- Available at `http://github.com/bamos`.
- Hosts code samples, original source code, and patches for open source projects.
- 25 original repositories, 5 forked repositories.

Skills

- **Preference.** Arch Linux/Mac, vim/emacs, git/Make/sbt
- **Languages.** Akka**, Bash**, C/C++**, C#*, Fortran**, HTML/CSS*, LaTeX**, Java**, JavaScript**, *Mathematica***, Make***, PHP*, Python***, R*, Scala***
- **Systems.** Android**, Linux***, Mac***
- **Rankings.** 1/10* − 3/10** − 5/10*** − 7/10****

Honors & Awards

- Phi Beta Kappa Honor Society <div style="float:right">Inducted 2014</div>
- 1st Place Capstone Award, Virginia Tech Computer Science <div style="float:right">2014</div>
- David Heilman Research Award, Virginia Tech Computer Science <div style="float:right">2014</div>
  - Given to the Computer Science student with the most outstanding research experience.
- Senior Scholar Award, Virginia Tech Computer Science <div style="float:right">2014</div>
  - Given to the senior in Computer Science with the most outstanding academic record.
- Honorable Mention, CRA Outstanding Undergraduate Researcher Award <div style="float:right">2014</div>
- Benjamin F. Bock Merit Scholarship, Virginia Tech Engineering <div style="float:right">2013–2014</div>
- Intelligence Community Center of Academic Excellence Scholarship, Virginia Tech <div style="float:right">2012–2014</div>
- Engineering Merit Scholarship, Roanoke County Public Schools Education Foundation <div style="float:right">2011</div>
- Papa John's Merit Scholarship <div style="float:right">2011</div>
- Gay B. Shober Memorial Merit Scholarship, Roanoke County Federal Credit Union <div style="float:right">2011</div>
- Pamplin Leader Merit Scholarship, Virginia Tech <div style="float:right">2011</div>
- I. Luck Gravett Memorial Merit Scholarship, Scottish Rite of Freemasonry <div style="float:right">2011</div>
- Salem–Roanoke County Chamber of Commerce Merit Scholarship <div style="float:right">2011</div>