

# brandon amos

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## Research Interests

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Mobile computing; distributed systems; computer vision.

## Education

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### Carnegie Mellon University

*Ph.D. Student, Computer Science*

**Pittsburgh, Pennsylvania**

*August 2014–Present*

### Virginia Tech

*B.S., Computer Science, Honors Scholar, 3.99/4.00*

**Blacksburg, Virginia**

*August 2011–May 2014*

## Research Experience

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### Carnegie Mellon University.....

#### Research Assistant

*Carnegie Mellon University*

**Pittsburgh, Pennsylvania**

*August 2014–Present*

- **Advisor:** Dr. Mahadev Satyanarayanan
- **Research Area:** Mobile computing and distributed systems.

### Magnum Research Group.....

#### Undergraduate Research Assistant

*Magnum Research Group*

**Blacksburg, Virginia**

*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**.

### Virginia Tech, Computer Science.....

#### Undergraduate Research Assistant

*Virginia Tech, Computer Science*

**Blacksburg, Virginia**

*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**.

### Systems Software Research Group.....

#### Undergraduate Research Assistant

*Systems Software Research Group*

**Blacksburg, Virginia**

*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

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

## Publications

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### 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

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### Adobe Research.....

#### Data Scientist Intern

Adobe Research

San Jose, California

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>.

## Snowplow Analytics.....

### 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.

## Qualcomm.....

### 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.

## Phoenix Integration.....

### 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**.

## Sunapsys.....

### Network Administrator Intern

Vinton, Virginia

Sunapsys

January 2011–August 2011

- Internship in high school to replace Windows domain, mail, DHCP, and DNS servers with virtual **Linux** servers using **KVM** and **virsh**.

## Projects

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### GitHub Portfolio.....

- Hosts code samples, original source code, and patches for open source projects.
- 25 original repositories, 5 forked repositories.

### Personal Blog and Website.....

- 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

## Skills

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- **Preference.** Arch Linux/Mac, vim/emacs, git/Make/sbt
- **Languages.** Akka\*\*, Bash\*\*, C/C++\*\*, C#\*, Fortran\*\*, HTML/CSS\*, L<sup>A</sup>T<sub>E</sub>X\*\*, Java\*\*, JavaScript\*\*, Mathematica\*\*, Make\*\*\*, PHP\*, Python\*\*\*, R\*, Scala\*\*\*
- **Systems.** Android\*\*, Linux\*\*\*, Mac\*\*\*
- **Rankings.** 1/10\* – 3/10\*\* – 5/10\*\*\* – 7/10\*\*\*\*

## Honors & Awards

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- Phi Beta Kappa Honor Society, Inducted 2014
- 1st Place Capstone Award, Virginia Tech Computer Science, 2014
- David Heilman Research Award, Virginia Tech Computer Science, 2014
  - Given to the Computer Science student with the most outstanding research experience.
- Senior Scholar Award, Virginia Tech Computer Science, 2014
  - Given to the senior in Computer Science with the most outstanding academic record.
- ACC Meeting of the Minds Undergraduate Research Conference, 2014
- Honorable Mention, CRA Outstanding Undergraduate Researcher Award, 2014
  - 1 of 15 North American males awarded honorable mention for exemplary computer science research.
- Qualstar Award, Qualcomm, 2013
- Pi Mu Epsilon Honor Society, Inducted 2013
- Benjamin F. Bock Merit Scholarship, Virginia Tech Engineering, 2013–2014
- Sophomore Scholar Award, Virginia Tech Computer Science, 2013
- University Honors, Virginia Tech, 2012–2014
- Intelligence Community Center of Academic Excellence Scholar, Virginia Tech, 2012–2014
  - Merit-based scholarship providing a cyber-security research fellowship.
- Dean's List with Distinction, Virginia Tech, 2011–2014
- Engineering Merit Scholarship, Roanoke County Public Schools Education Foundation, 2011
  - Merit-based scholarship presented annually to one student in the graduating Engineering class.
- Papa John's Merit Scholarship, 2011
- Gay B. Shober Memorial Merit Scholarship, Roanoke County Federal Credit Union, 2011
- Pamplin Leader Scholarship, Virginia Tech, 2011
  - Merit-based scholarship presented to one student from each public high school in Virginia.
- I. Luck Gravett Memorial Merit Scholarship, Scottish Rite of Freemasonry, 2011
- Salem–Roanoke County Chamber of Commerce Merit Scholarship, 2011

## Activities

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- Honors Residential College, Virginia Tech, 2013–2014
- Hokies Pep Band, Virginia Tech, 2012–2013
- Computer Science Community Service, Virginia Tech, 2012
- Symphony Band, Virginia Tech, 2011–2012
- Linux and Unix Users Group, Virginia Tech, 2011–2012
- Galileo Living–Learning Community, Virginia Tech, 2011–2012