

# J. Asher Langton

langton@gmail.com

## Profile

---

Versatile software developer and security researcher. Current work: malware analysis, automated threat detection, static and dynamic analysis, software virtualization and emulation, machine learning models. Previous work: high-performance computing physics simulations, compilers, bioinformatics. Contributor to gfortran/gcc.

Extensive development experience (C, C++, Python, assembly, Java, etc.) on everything from 8-bit microcontrollers to petaflop-class supercomputers, using Linux, Windows, many commercial Unix variants (AIX, Solaris, etc.), OS X, VxWorks, etc.

## Experience

---

### Senior Software Engineer, *Juniper Networks*, 2013-present

Research and development on anti-malware and security intelligence products, including:

- malware reverse-engineering
- static and dynamic analysis
- models for predicting software maliciousness
- development on the software/virtualization infrastructure

Co-author of 10+ (as of March 2015) pending patents related to this work.

### Member of Technical Staff - Computer Scientist, *Lawrence Livermore National Laboratory*, 2009-2013

Member of the the KULL project, developing a fusion simulation code that runs on some of the world's fastest supercomputers, including InfiniBand-networked Linux clusters and IBM BlueGene platforms. Accomplishments include:

- Reduced Kull's peak memory footprint by more than 30 percent.
- Extensive work on the C++/Python interface (SWIG)
- Port to new architectures and reproduce/isolate "showstopper" bugs in the underlying operating systems file systems, and compilers for the respective vendors.
- Reduced Python module loading bottleneck by a factor of 60. See [http://github.com/langton/MPI\\_Import](http://github.com/langton/MPI_Import)

### Research Assistant, *UW-Madison Population Health Sciences*, 2008-2009

- Developed a Random Forest classifier (in C) that analyzed genome-wide data from the Framingham Heart Study.
- Used this software to find a correlation between specific genes and early-onset coronary heart disease and published the results in *BMC Proceedings*.

### Instructor/Teaching Assistant, *UW-Madison Math & Computer Science Departments*, 2002-2009

- Independently taught multiple sections of introductory programming, college algebra, and trigonometry.
- Teaching assistant for courses in compiler construction and calculus.
- Grader for graduate algebra courses.

### Technical Scholar, *Lawrence Livermore National Lab*, 2005-2007

- Designed and implemented Cray pointer extension for the gfortran compiler: <http://gcc.gnu.org/onlinedocs/gfortran/Cray-pointers.html>
- Contributed patches for legacy data types, IEEE-754 floating-point, and OpenMP.
- Obtained "write-after-approval" maintainer status for gcc.

### National Science Foundation Graduate Teaching Fellow, 2003-2004

- Worked with the K-Through-Infinity program to increase the scientific literacy of K-12 teachers and students.

- Raised interest in science, math and engineering among students in K-12, with an emphasis on groups underrepresented in science.
- Developed curriculum at the district level, and collaborated with researchers in the School of Education.

#### **Engineering Intern**, *ViaSat*, 2001-2002

- Software developer on Joint Communication Simulator (JCS), an RF simulator running in real time on custom hardware running VxWorks and MercuryOS with a Solaris front-end.
- Resolved bugs in the audio recording subsystem, and identified a significant security flaw that allowed computer microphones to be activated remotely and surreptitiously.

### **Education**

---

**M.A. Mathematics**, University of Wisconsin–Madison, 2007

Focus: Finite group theory.

Completed coursework and qualifying exams towards PhD.

**M.S. Computer Sciences**, University of Wisconsin–Madison, 2004

Focus areas: Compiler design and theoretical computer science.

**B.A. Mathematics**, *Summa Cum Laude*, University of San Diego, 2002

Minor: Computer Science.

Awards: Outstanding Scholastic Achievements in Mathematics

### **Publications, Presentations, and Research**

---

“Scalable Module Imports for Python.” *Nuclear Explosives Code Developers Conference*, October 2012.

“New Features in C++0x.” ASQ/GS-CAD Tech Talk Series, LLNL, January 18, 2011.

Maenner, M., L. Denlinger, **A. Langton**, K. Meyers, C. Engleman, and H. Skinner. "Detecting Gene by Smoking Interactions in a Genome-wide Association Study of Early Onset Coronary Heart Disease Using Random Forests." *Genetic Analysis Workshop 16*, BMC Proc. 2009; 3(Suppl 7): S88.

“Flavell’s Theorem on Subnormality.” Group Theory Seminar, University of Wisconsin, Fall 2008.

“The Automorphism Tower Theorem.” Group Theory Seminar, University of Wisconsin, Spring 2007.

“Improvements to gfortran.” HEDP Summer Student Presentations, LLNL, Summer 2006.

“Cray Pointers in GNU Fortran.” HEDP Summer Student Presentations, LLNL, Summer 2005.

NASA Reduced Gravity Student Flight Opportunities Program. Selected in a competitive application process to study the behavior of Faraday waves in a microgravity environment. April 2002.

Sheehan, D.P., J. Glick, T. Duncan, **J.A. Langton**, M.J. Gagliardi, and R. Tobe. "Phase Space Portraits of an Unresolved Gravitational Maxwell Demon." *Foundations of Physics* 32 (3): 441-462, 2002.

**Langton, J.A.** "Simulation and Analysis of Parrondo's Paradox." *Mathematical Association of America, Southern California Spring Meeting*, March 2001.

**Langton, J.A.** et al. “Diagnostic Development of a Mach Probe and Laser-Induced Fluorescence Instrument for Diffusion Measurements in a Low Temperature Plasma.” *American Association of Physics Teachers Winter Meeting*, January 2001.