James Gleeson

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Education

- **University of Toronto** — Toronto, ON
  M.Sc., Computer Science — *Sep. 2013 - Jan. 2015*
  - Advisor: Eyal de Lara
  - My research so far has focused on operating system level solutions to mobile security problems that are efficient without sacrificing user experience, and transparent to avoid complecting existing application requirements.
  - **Memory Encryption on Mobile Devices.**
    I measured the performance and energy tradeoffs of protecting against cold boot attacks on Android through the encryption of sensitive processes. To support background applications running while encrypted, I swap encrypted DRAM pages into and out of a tightly managed decrypted secure memory. I extended encryption of user-level application pages to kernel stacks to prevent leaking AES state, tracking page accesses inside the kernel using in-kernel page faults.
- **University of Waterloo** — Waterloo, ON
  H.B.Sc. Computer Science: Specialization in Bioinformatics — *2007-2012*
  - Graduated with with Distinction, **89%** cumulative average

Publications

- Refereed Publications
  - **Protecting Data on Smartphones and Tablets from Memory Attacks**
    Patrick J. Colp, Jiawen Zhang, James Gleeson, Sahil Suneja, Eyal de Lara, Himanshu Raj, Stefan Saroiu, Alec Wolman.
    ASPLOS 2015 (To appear).

Course Projects

- **CSC2228: Mobile and Pervasive Computing**
  GPU Encrypt: AES Encryption on Mobile Devices — *Sept. 2013 - Dec. 2013*
  - Used the general purpose GPU programming language OpenCL to implement AES on a Nexus 4 Android phone, performing GPU-specific optimizations to maximize throughput.
  - Benchmarked OpenCL against a CPU-based OpenSSL implementation, achieving a 1.79% speedup using the GPU (smaller than desktop benchmarks due to the abudance of cores on desktop platforms)
- **CSC2604: Human-Centered and Interdisciplinary Computing**
  Calm: Talking to Background Applications — *Sept. 2013 - Dec. 2013*
  - Explored voice-activated interfaces for aiding interaction with background desktop applications without leaving the foreground application.
  - Extended Instant Messenger with voice commands to RESPOND to the last message sender, Music Player to play a TRACK selected using keyboard based autocomplete, and Window Manager with tile-based windowing commands (e.g. PUT TOP LEFT)
  - Addressed sensitivity and false positives by intiating a conversation with an application of interest while ignoring others, using keyboard for free-form dictation, and recording macros for common operations

Work Experience

- **Innovative Medicine, Mount Sinai Hopsital** — Toronto, ON
  Software Developer — *Oct. 2012 - Aug. 2013*
  - Elicited requirements by sitting down with molecular biologists to formalize what heuristics they apply to determine genotypes from raw SNP data.
  - Constructed an in-house pipeline for processing raw SNP data into phenotypes (e.g. reactivity to drugs) that inform doctors to create customized therapeutic treatments.
  - Pipeline was modeled as a dependency graph of stages backed by database tables allowing a declarative style of programming, real-time visualization of progress in a web front end, and reports informing doctors how therapeutic recommendations were generated from raw SNP data.
  - Delegated tasks to undergraduate coop students, getting them up to speed and contributing to the project.

DemonWare — Vancouver, BC
Software Developer — *Sept. 2011 - Dec. 2011*
- Worked cooperatively and concurrently in a five person team, contributing a Bamboo continuous integration test suite that involved compiling and packaging software into RPMs for rapid deployment, and executing unit tests.
- Quickly learned and utilized an in-house service-oriented Python framework to develop net services for games.

The Hospital for Sick Children — Toronto, ON
Research Trainee in Bioinformatics — *Sept. 2011 - Dec. 2011*, *May 2010 - Aug. 2010*, *Sept. 2009 - Dec. 2009*
- Surveyed and summarized scientific papers to determine top performing disease-gene prediction algorithms that make use of protein-protein interaction (PPI) networks, clarifying with authors when necessary.
- Implemented top algorithms using a combination of Perl and MATLAB, and evaluated their predictive performance using leave-one-out cross-validation on OMIM and HPRD datasets.
- Collaborated with members of the ProHits project at the University of Toronto to create Perl scripts for loading mass spectrometry (MS) data into a MySQL database, and for querying data in a format suitable for Significance Analysis of the Interactome (SAINT) software tools.

Teaching Experience

- **University of Toronto** — Toronto, ON
  Teaching Assistant — *Sep. 2013 - Jan. 2015*
  - CSC108: Introduction to Computer Programming - *Fall 2013, Winter 2013*
    CSC209: Software Tools and Systems Programming - *Fall 2014*

Awards and Interests

President's Entrance Scholarship (for 90-94.9% average) 2007
The Governer General's Academic Medal 2007

Technical Skills: C/C++, Java, ARM Assembly, Python, Ruby, Perl, Scheme, OCaml, Haskell, MATLAB, R, Erlang, JavaScript, LaTeX, Linux

Interests: Fishing, attending concerts, gaming, functional programming, open source software