

Christopher R. Mitchell

EDUCATION

2010-present: **The Courant Institute of Mathematical Sciences**, NYU, New York, NY.
Doctorate in Computer Science, projected graduation May 2015.
2005-2010: **The Cooper Union for the Advancement of Science and Art**, New York, NY.
Masters of Electrical Engineering, graduated May 2010, cumulative GPA: 4.0/4.0
Bachelors of Electrical Engineering, graduated May 2009, cumulative GPA: 3.44/4.0
2001-2005: **Regis High School**. Graduated June 2005.

RELEVANT COURSES

CS and Systems: Honors Analysis of Algorithms, Distributed Systems, Honors Operating Systems, Machine Learning.
Signal Processing: Signal Processing and Systems Analysis, Digital Signal Processing, Communication Theory, System Design for Signal Processing Applications, Control Systems, Advanced Control Systems.
Electronics Design: Circuits and Electronics I, Circuits and Electronics II, Solid State Materials, Engineering Electromagnetics, Digital Logic Design.
Programming and Theory: Computer Architecture, Advanced Computer Architecture, Computer Programmer and Drafting for Engineers, Programming Languages (C, C++), Computer Operating Systems, Compiler Design, Communications Networks, Computer Security, Signals and Security (Biometrics), Database Design, Natural Language Processing.

SKILLS

Programming/Scripting Languages:

Fluent: C++, C (tools/APIs including YaCC, Bison, and CUDA), Java, Lush, PHP, Python, Perl, z80 ASM, Javascript, MATLAB scripting, Batch/Shell Scripting, BASIC (several variants).

Familiar: x86 ASM, nesC, Verilog/VHDL, AutoLISP, C#.

Markup Languages:

 [X/D]HTML, XML, CSS, LaTeX.

Notable Computer Programs: Matlab, TeXnicCenter, AutoCAD/AutoDesk VIZ, Photoshop/GIMP; Visual Studio, Eclipse, and other IDEs; Linux CLI tools; vim, Notepad++, Microsoft Office, OpenOffice.

Computing Environments: Windows, Linux (several distributions), OS X.

RESEARCH

[See also <http://resume.cemetech.net/pubs.html>]

Courant Institute of Mathematical Sciences

NYU, New York, NY

Systems Researchers

2010-Present

Research into data-centric distributed processing architectures. Extension of the Piccolo distributed computing framework to incorporate active triggers for efficient sparse parallel processing. Implementation of several canonical Piccolo as well as deep examination of performance breakdown compared with current leading software. Oolong, a distributed framework for asynchronous applications, building on the database concept of triggers. Sample applications including PageRank, SSSP, a web crawler, and Bipartite Matching show the interface simplicity and speed advantages for some problems over canonical Piccolo.

C. Mitchell, R. Power, J. Li, "Oolong: Programming Asynchronous Distributed Applications with Triggers," in Proc. of SOSP 2011, Cascais, Portugal, October 23-26, 2011 (to appear).

S*ProCom²

Cooper Union, New York, NY

Graduate Fellow

2009-2010

Undergraduate Fellow

2007-2009

Cooper Union Center for Signal Processing research. Work on security issues for FPGAs including parallelizing stream ciphers targeted for low-resource, high-throughput platforms and fabricating Trojan attack vectors. Additional research on implementing highly-parallelized algorithms on commodity GPGPUs.

Master's thesis focusing on the application of Convolutional Neural Networks (CNNs) to facial detection and recognition in wearable computing systems. Synergistic use of high-speed algorithms with CPU-intensive, high-performance techniques for realtime image processing on moderate-resource hardware.

C. Mitchell, "Applications of Convolutional Neural Networks to Facial Detection and Recognition for Augmented Reality and Wearable Computing," Master's thesis, Cooper Union, New York, defended May 3, 2010, 148pp.

[and others]

Binghamton University

Binghamton, NY

NSF REU Research Fellow

Summer 2008

Designed and constructed a complete node design for physical small-scale wireless network testing, including communication and isolation, and preliminary work with NS2; research in virtual machine optimization.

C. Mitchell, V. Munishwar, S. Singh, X. Wang, K. Gopalan, and N. Abu-Ghazaleh, "Testbed Design and Localization in MiNT-2: A Miniaturized Robotic Platform for Wireless Protocol Development and Emulation," in Proc. of ComsNets09, Bangalore, India, January 5-10, 2009, 10pp.

[and others]

Stevens Institute of Technology

Hoboken, NJ

NSF REU Research Fellow

Summer 2007

Studied image processing methods used in facial recognition, modified to analyze photomicrography. Designed MATLAB application to identify cells in microscope images taken at a range of magnifications. Implemented code to dynamically determine cell density in images as a method of identifying cancerous or precancerous tissue regions.

HONORS

The Cooper Union for the Advancement of Science and Art, full-tuition scholarship (2005-2010)
Dean's List, Spring 2008, Fall 2008, Spring 2009
Engineer Intern (*Passed Fundamentals of Engineering Exam, 2009*)
Outstanding Summer Research Award, Stevens Institute of Technology REU (2007)
Frank Caldiero Humanities Award, First Place (2006)

SELECTED PROJECTS

[See also <http://resume.cemetech.net/projects.html> for full list]

- » **CALCnet/globalCALCnet:** Refinement and implementation of a robust, powerful, lightweight networking protocol for low-resource, two-wire devices such as graphing calculators. Creation of several hardware and software solutions to link CALCnet devices to and over the Internet.
- » **Cemetech:** Design, programming, and maintenance of an 2000-member calculator and computer programming community called Cemetech. Creation of a portfolio of over 300 programs and applications for graphing calculators as well as other software projects, hardware projects and modifications, and web applications, some as "Kerm Martian."
- » **Clove 2/3:** One-handed Bluetooth/wireless typing glove for wearable computing and mobility-challenged applications.
- » **Doors CS 7:** 48KB shell and GUI for TI graphing calculators in z80 assembly. Capable of networking, executes all device-specific file formats, contains extensive APIs for program use.
- » **Document DE 7:** Fully graphical text editor for Doors CS, written in z80 assembly.
- » **Gossamer:** Web browser for globalCALCnet written in z80 assembly.
- » **kcc:** C compiler producing x86 assembly, implementing a large subset of the C99 standard. Future plans to add z80 assembly backend.
- » **MobileTunes DE 3.1:** MOD music player for TI graphing calculators, capable of quadraphonic sound over the device's serial port via PWM. Written in z80 assembly.
- » **NYFi:** Engineering design project to evaluate the feasibility of a metropolitan WiFi mesh network. Exploration of wireless technologies, budget and feature refinement, and project management and organizational methods.
- » **Oolong:** A distributed framework for asynchronous applications featuring database-style triggers.
- » **SimmsAI:** Development of a distributed learning neural network, including thread management and handling across multiple machines, load balancing, and error recovery.
- » **smsdoor:** A lock capable of activation via web interface, instant messaging, SMS messaging, and key. Ability to control user-level access including day/time access limits.
- » **SourceCoder 2.5:** Complete web IDE for (de)tokenizing, editing, and sharing TI-BASIC and Casio BASIC programs.
- » **Ultimate Calculator 1-3:** A hardware modification project to provide integrated PS/2 support, screen backlighting, case modification, keyboard and form factor reconfiguration on graphing calculators.
- » **WiSO Safe, A Sustainable Wireless Sensor Network to Detect Coastal Rip Currents:** Senior engineering project to detect rip currents at shores and beaches using wireless mesh sensor nodes. Development of water current magnitude/direction sensor, low-power RF systems, sensor interfacing over I²C, and self-sustaining power management systems.

WORK EXPERIENCE

- Teaching Assistant, Courant Institute** *Spring 2011*
Recitation instruction, personal tutoring, lab co-design, and grading for Computer Organization, teaching low-level C and Linux programming fundamentals with labs implementing operating systems and security applications.
- Research & Development Programmer, Bloomberg** *Summer 2009*
Programming and software development on monitoring, debugging, and support tools for realtime financial data delivery software. Linux and Solaris development of backend and frontend components for high-load, low-latency systems.
- Head Systems Administrator Emeritus, Cooper Union microLab** *2006-2010*
Maintenance and oversight of Electrical Engineering computer network. Administration of Linux servers, Linux and Windows workstations, application licensing, maintenance, and network infrastructure management.
- Intern and Executive Assistant, HL Capital** *2005-2006*
- Volunteer Teaching Assistant and Tutor, Blessed Sacrament Elementary School** *2003-2005*

ACTIVITIES

- Association for Computing Machinery (ACM)** *Member 2005-present, Vice President 2007-2008, President 2008-2009*
Organization of lectures, workshops, and events; organization of annual cross-disciplinary Student Research Showcase to display student research projects, internships, and jobs to students, alumni, and faculty with other professional societies.
- Institute of Electrical and Electronics Engineers (IEEE)** *Member 2005-present, Treasurer 2008-2009*
Organization of lectures and workshops; administrative and clerical management of budget
Collaboration with other societies to organize interdisciplinary events
- American Chemical Society (ACS) and Society of Women Engineers (SWE)** *Member 2007-2010*
Participated in lectures and trips to learn about engineering and chemistry. Organized and participated in volunteer Kids in Engineering program to introduce principles of science and engineering to elementary school students.
Helped organize and publicize events.