Richard Emile Sarkis

Rochester, NY | @damnedfacts | rich@sark.is | www.sark.is

Summary

A practiced, experienced, and creative software programmer, and IT professional with 22 years experience. Accomplished in the design, and development of scientific software, and also the implementation of multi-component systems with complex network system management requirements, used in major academic research. Qualified in a number of programming languages, and paradigms, with focus on simple, but robust, and efficient problem solving. Strong willingness to learn new technologies, and techniques in a desire for continued self-betterment, and institutional advancement.

Education

Master of Science, Computer Science	Rochester Institute of Technology	Dec 2013
Bachelor of Science, Computer Science	University of Rochester	May 2005
Bachelor of Science, Physics and Astronomy	University of Rochester	May 2000

Skills

Languages	C, Python, Objective-C, BASH, JavaScript, Perl, PHP, C++, AWK, sed, Haskell, Lisp, Swift
Operating Systems	Apple macOS and iOS, Linux, FreeBSD, Microsoft Windows
Frameworks	Apple Cocoa, QT, GTK, Flask, Django, ZMQ
Tools	GCC, iptables, pf, Git, Mercurial, LaTex, make, Apple Xcode
Standards	POSIX, TCP, UDP, IP, ARP, SMTP, LDAP, HTTP, DNS, JSON, WebSocket, CSS, HTML/XML, Ethernet
Techniques	Code Analysis, Exploit Research, Intrusion Analysis, Development Tooling

Professional Experience

Lead Software Engineer and Architect — 1 year (Oct 2019-Present) — The LZ Dark Matter Experiment — Rochester, NY
LUX-Zeplin (LZ) is a next generation dark matter experiment, selected as one of three 'G2' (for Generation 2) dark matter experiments. Composed of many areas of engineering, this particular responsibility involved the data acqustion systems of experiment, known as the "online" system.

- Planned, designed, and implemented the Run Control system, and its various subsystems used for experiment control, and data acquisition.
- Develop full-stack application interface for Run Control using modern frameworks and tools for experiment interaction and control.
- Using collaborative software practices with an international team, and implementing code using C, C++, Python, shell on Linux-based architectures. Heavy use of the ICE RPC framework.

Software Engineer — 2 years (Oct 2017-Oct 2019) — SkuTek Instrumentation — Rochester, NY
Designed, and engineered a new data acquisition network communication software layer using Linux, C and Python, running on an instrument designed on a custom Beaglebone implementation intended for Physics research.

- Simplified, and improved the robustness and flexibility of data communication over previous versions of the device software.
- Heavily used FPGA, SPI, and GPIO technologies to communication with a digitizer through the Linux kernel programming interfaces.
- Architected a new communication protocol using the ZeroMQ library.
- Code was written in C, Python, and Bash shell, and managed under Git.

Adjunct Professor — 6 years (Jan 2015-Present) — University of Rochester — Rochester, NY
Fulfilled adjunct professorial duties to the Computer Science department by teaching undergraduate students on the topic of introductory programming and computer science using the Python programming language (CSC 161) and data structures and algorithms (CSC 162).

- Instructed over 150 students multiple times a year through weekly lectures, exams, quizzes and personal instruction.
- Managed teaching assistants on grading and student interaction, as well as direction of their other job responsibilities.
- Provided management to student workshop leaders in their pedagogical duties when running weekly workshop sessions. Oversaw workshop leaders on grading and their other workshop duties.

Lead Programmer/Analyst — 11 years (May 2009-Present) — University of Rochester — Rochester, NY
Supported the department of Physics & Astronomy consisting of 250 people, including 75 faculty and researchers and 100+ graduate students. Installed, configured and maintained a server infrastructure that provided network services supporting the

department. Configured, diagnosed and repaired Mac, Windows, and Linux systems. Trained faculty, staff, and students one-on-one and in groups on topics such as Linux, programming, software design, or general application usage.

- Developed system management tools using Python, C, and PHP.
- Managed student employees in day-to-day operations.
- Migrated 24 bare metal Linux servers to a high availability virtualization architecture using Linux KVM, Heartbeat, and Docker.
- Architected an innovative Linux netbooting system (*unionroot*) for instantly deploying PC Workstations with Ubuntu Linux.
  – Seamless live updates to a heterogeneous mix of netbooted PCs of varying configurations.
  – Coherent, consistent end user experience on every workstation through a standardized environment.
  – An extensible environment allowing for regular, methodical enhancement of core features.
  – Reduced security management time using simplified security auditing capabilities of union file systems.
  – Focused project simplicity of design and use.
- Spearheaded the implementation of an enhanced multilayer security framework, and policy that provided authorized and secure access to departmental computer resources.
  – Regularly audited system security and analyzed compromised hosts.
  – Trained users on safe internet practices and how to secure workstations and servers.
  – Implemented ITAR compliant data storage and access.

Senior Programmer/Analyst — 10 years (May 2000-Jul 2009) — University of Rochester — Rochester, NY
Supported an Astronomy research group consisting of faculty researchers and graduate students with specialized software development abilities in near infrared detector research. Additionally, performed in a sysadmin role by providing desktop, server, and data management for the research group.

- Administered specialized research systems based on FORTH, C, and Python.
  – Developed specialized project software and integrated it with Linux.
  – Documented and managed source code for research projects.
- Coded an astronomical image viewer and data analysis tool, MacDV, for the Apple OS X platform.
- Interconnected a heterogeneous network of workstations and servers using LDAP, NFS, DHCP under Red Hat and Gentoo Linux to maintain a consistent user experience and minimize administrative issues.

Lead Programmer — 2 years (Dec 2005-Jul 2007) — Fermilab — Chicago, IL
Engineered and implemented a scalable, highly parallel, high-throughput particle physics event data logger that significantly improved data acquisition from the CDF detector during its Run II phase.

- Achieved 125% of target throughput enabling 100 MB/s write speeds in the event logging pipeline.
- Guided a remote development team in defining the testing methodology and upgrade path for software implementation
- Surpassed original project performance goals and set a software architectural example for similar project at CERN.

Co-Founder — 4 years (Dec 2003-Mar 2007) — If Then — Rochester, NY
Conceptualized and prototyped an early implementation of a Wi-Fi captive portal hotspot called "Abydos". Lead a team in the creation of a wireless captive-portal device based on this prototype using C, Python and FreeBSD.

- Decided to use a low-cost, low-power single-board computer, running an embedded FreeBSD installation.
- Unique feature-set included timed access, and enforced captivity of unauthorized users.
- Developed a ground-up implementation of a Python-based *ipfw* firewall module for manipulating firewall rules programmatically.
- Managed web, mail and shell hosting services on FreeBSD servers.
- Oversaw developers and consultants involved with the product design and deployment.

Richard Emile Sarkis

@damnedfacts | rich@sark.is | www.sark.is

Projects

Project Name	Description	Languages Used	Date
virtualbosx	Apple macOS installer DMG on VirtualBox	BASH Shell	2016
coursetools	Web-scraping CLI tools for course management	Python	2015
ssh-fob	Secured ssh-agent on untrusted computers	Shell	2013
flask-boilerplate	Responsive-HTML based skeleton Flask app	Python, HTML, CSS	2013
Vernacular	Prototype system for native/web app develop	Objective-C, Python	2013
RSWebSocket	Websocket protocol client framework	Objective-C, Python	2013
RSWebSocketApplication	Websocket app messaging protocol framework	Objective-C, Python	2013
MacDV	Astronomical data visualization software	Objective-C, Python	2008
Consumer/Server Logger	Data logger for CDF project at Fermilab	C, C++, TCL, Shell	2006
Abydos	Captive portal for Wi-Fi management	C, Python	2003

Publications

Title	Publication	Date
Proposed Nomenclature for Surface Features on Pluto	SAO/NASA Astrophysics Data System	2015
Contributing columnist	Computer Link Magazine	2007
Upgrade of the CDF Run II Data Logger	IEEE NPSS Real Time Conference	2007
InterWeave: Trans. Data Sharing for Parallel and Dist. Sys.	LLE Review August 2004	2004
MHD Evolution of Aspherical Winds and Environments	SAO/NASA Astrophysics Data System	2000

Talks

Institution and Topic	Date
Rochester Institute of Technology	
Vernacular: Bridging Native and Web Applications, Masters Defense	Dec 2013
University of Rochester	
CSC 161: The Art of Programming, Course Instructor	Jan 2015 - Present
CSC 162: The Art of Data Structures, Course Instructor	Jul 2017 - Present
Presentation on Collaboration, Documentation and Versioning	Jun 2017
RocPy: Rochester's Python Programmers User Group	
Monthly RocPy opening presentations	Jul 2012 - Present
Raspberry Pi and Python to Automate Your Stuff	Sep 2019
Python Gotchas, Redux	Mar 2019
An Introduction to Pandas	Jun 2017
Binary & WebSockets	Feb 2017
Web Scraping	Jul 2016
Wat's Up __doc__? (Python "Gotchas")	Nov 2015
New features in Python 3.5	Sep 2015
Python Bridges: Working With Other Language Runtimes	Oct 2014
tmux: A terminal multiplexer	Jun 2014
Live from PyCon	Apr 2014
Python Metaprogrammings	Jan 2014
Python ctypes	Jun 2013
Python Concurrency	Jul 2013
Python Descriptors	Sep 2013
Autobahn: A WebSocket client/server for Python	Sep 2012
Django: The Next Generation Web Application Framework	Aug 2012
Fermilab	
Upgrade of CDF Data Logger , IEEE NPSS Real Time Conference	Apr 2007

Groups

Organization	Description	Position	Date
RocPy	Rochester, NY Python Programmers User Group	Co-organizer, presenter	2012 - Present
The Geek Podcast	Podcast on science, technology, geek culture	Co-Host	2010 - 2011
Apple CIDER	Apple Macintosh User Group	Treasurer, secretary	2006 - 2008