

Benjamin Scher Purcell

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Summary

Skilled software engineer proficient in multiple languages and complex software designs seeking a position as a developer working on the cutting edge of technology, tools, and ideas.

Skill Highlights

- Expertise in a number of imperative, object-oriented, and functional programming languages: C, C++, Java, Ruby, Go, C#, SML, OCaml, Perl, ARM assembly, x86 assembly, and x86_64 assembly.
- Expertise with various libraries, frameworks, tools, and techniques: OpenGL3, SDL2, Ruby on Rails, Boost, React, Gradle, Maven, lock-free programming, scalable architectures, parallel architectures, NoSQL databases, and relational databases.
- Extensive experience with all levels of the software stack, from low-level programming to front-end web development.
- Advanced practical knowledge of data structure implementations.
- Skilled experience with the various issues and pitfalls of maintaining legacy code and reducing technical debt.
- Highly skilled in test driven development.
- Passionate about following good principles of library/API design and clean code structure.

Career History

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Sabbatical/Breakâ€Mexico City, Mexico

Personal Project Work: January 2017-present

- Completed an assembler/emulator for the *MIX* computer architecture. This is the computer architecture used in the seminal computer science textbook *The Art of Computer Programming*. It can compile and execute all examples and exercises from *TAOCP*.
- I am an active maintainer of and committer to the *Plan 9* operating system. My work during this period included improved performance, bug fixes, and added functionality to a new caching history preserving file system. This included a file system check as well as improved support for tagging and untagging history points. My previous work has included a new regular expression C library, improvements to the C compiler, and improvements to various areas of the OS.
- Created an *n*-body simulator game that models gravitational interactions on the order of thousands of bodies. Uses velocity verlet integration together with a Barnes-Hut quad-tree data structure to reduce calculations to

$O(n \log(n))$

complexity while performing calculations in parallel for maximum speed. Has a fully graphical front-end which allows for creation of new bodies/galaxies among other interactive features. Written in C++ using *SDL* and runs on Linux, macOS, Windows, and Plan 9.

- Worked on a C compiler that uses a *continuation passing style* intermediate representation for the backend/optimization stage. Front end is complete, currently working on translation to *CPS*.
- Completed advanced data structure implementations in a number of languages: C, C++, Go, SML, and OCaml including contributions to open source libraries.

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Backstop Solutions Groupâ€Chicago, IL

Software Engineer: April 2015â€January 2017

- Provided bug fixes and new development for combined CRM and financial accounting platform for the alternative investment community.
- Also worked on .NET suite of applications to help executives interface with the main platform via the *Microsoft Office* software suite.
- Developed location search functionality for the CRM platform: Javascript front-end, Java/Oracle back-end. Allowed fund managers to find clients along multiple search vectors.
- Developed *Microsoft Outlook* calendar integration with the CRM platform. Provided automatic syncing of Outlook meetings with the CRM. C#/WPF frontend, interfacing with a REST backend in Java.
- Was primary developer to support an internal *Ruby on Rails* application used for automated testing, continuous integration, and deployment and monitoring of testing and integration servers.

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IPsoft Inc.â€Chicago, IL

Devops Engineer: October 2014â€April 2015

- Wrote programs to automate systems deployments and uptime management for Fortune 500 level corporations.
- Primary development languages were Perl, Javascript, Bash, and a proprietary internal scripting language.
- Scale of automated management was on the order of thousands of servers.

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WiredTree Managed Hostingâ€Chicago, IL

Supervisor of Technical Support/Devops Engineer: September 2013â€October 2014

- Supervised teams of 3â€5 support administrators and set system administration policies.
- Created software for deployment, automation, and monitoring of servers for in-house use.

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The Academic Approachâ€Chicago, IL

Mathematics Writer: October 2012â€September 2013

- Wrote and edited mathematics curriculum for Chicago Public Schools and charter schools.
- Engineered formatting packages for published curriculum materials.

Education

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University of British Columbiaâ€British Columbia, CA

Master's Degree in Mathematics: September 2007-December 2009

- Worked on applications of algebraic geometry to string theory. Specifically Donaldson-Thomas invariants as a generalization of Gromov-Witten invariants.
- Coursework complete but I did not complete the thesis for the degree.

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Oberlin Collegeâ€Oberlin, OH

Bachelor's Degree in Mathematics magna cum laude: September 2002-December 2006

- Graduated with an honor's thesis on the category theory of groups.
- Also completed original research in number theory which was published in *The Fibonacci Quarterly* Volume 45, Number 3, August 2007.

Miscellaneous Achievements and Skills

- I have completed a highly optimized regular expression matching library which is currently in use in a community maintained fork of the *Plan 9* operating system. It provides the full *POSIX* regular expression syntax with guaranteed worst-case performance time that is linear in the length of the input.
- I have published original number theory research: under the title: Burns and Purcell, "Counting the number of winning binary strings in the 1-dimensional same game," *The Fibonacci Quarterly*, Volume 45 Number 3, August 2007
- I have written a C programming language compiler extension that adds support for concurrency operations such as type-checked thread creation and type-checked channel passing between threads.
- Fluent in Spanish.
- I maintain a portfolio of personal work at <https://github.com/spewspews>