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George Steel

Technologies and Languages

Languages: Go, Rust, C++, JavaScript, Typescript, Haskell, Python, SQL, TEX

Technologies: FIDO2/Webauthn, MFA, OAuth, Lit, WebAnimations, Blink, WPT testing, W3C specs, Postgres, CockroachDB, GTK, EPUB, Flask

Education

2010 – 2016 **University of Toronto**, *Hon. B. Sc. in Mathematics*

- Minors in Computer Science and Biology.
- Graduated with High Distinction (GPA 3.9).

Employment History

Apr 2021 – Jun 2023 **Software Developer**, LoginID Canada

- Created an OpenID Connect server supporting configurable multi-factor authentication methods, including passwordless FIDO2, SMS, TOTP, and others.
- Led multiple refactoring projects to reduce tech debt and improve performance in related services, eventually architecting a move to a single-binary to reduce microservice overhead.
- Created a custom high-performance database client library for our Go services based on sqlx and pgxpool. This allowed queries to be performed in all transactional modes supported by CockroachDB (including the fast batch mode unsupported by database/sql and existing ORMs) with the results automatically mapped into slices of structs.

Jun 2019 – Nov 2020 **Software Developer**, *Chrome Animations*, Google Canada

- Helped complete and launch the WebAnimations API in Blink (the rendering and Javascript engine powering Chrome and Electron used on over 3 billion devices), giving a unified Javascript interface to declarative animations from all sources.
- Contributed a section to the WebAnimations spec (including cross-browser Web Platform Tests) allowing the creation and manipulation of animations targeting pseudo-elements.
- Contributed numerous bugfixes and optimizations across the Blink animations stack. This included allowing percentage transform animations (sidebars and some popups) to run off-thread, allowing them to run more smoothly despite the actions of other scripts on the same page.
- Contributions at `https://chromium-review.googlesource.com/q/owner:gtsteel@chromium.org`

Nov 2017 – Feb 2019 **Full-stack Software Developer**, *Satsuma Labs*

- Created a prototype mobile application using a Haskell backend and a React-Native frontend.
- Developed a number of open-source libraries furthering the Haskell web service and react-native ecosystems, including a spatial indexing layer which we used with CockroachDB. (Available at `https://github.com/SatsumaLabs`)

May 2016 – May 2017 **Software Developer**, *Prof. Peter Jurgec*, Linguistics, University of Toronto

- Created browser-based educational software used in introductory phonology courses.
- Rewrote and further developed a research tool which uses a maximum-entropy machine learning model to analyze the relative frequency of sound patterns in speech based on sample text and generate random pronounceable gibberish based in the inferred constraints.

Sept 2013 – Mar 2014 **IT Assistant**, *ENAGB Youth Program*, Native Canadian Centre of Toronto

Created a responsive website for the ENAGB program (featuring a dynamic events calendar) along with a variety of promotional materials (posters, brochures, business cards, etc.) for the program.

Summer 2011, 2012 **Summer Research Assistant**, *Prof. Gilbert Walker*, Chemistry, University of Toronto
Performed spectroscopy and microscopy supporting research into creating nanoparticle based markers for medical diagnostic use, improving the sensitivity non-destructive procedures for determining particle shape.

Summer 2010 **Intern**, *Kerr Vayne Systems*
Created a web application to stream real-time data for schedule display in a broadcast automation system.

Releases and Publications

2021 – 2022 **Contributions to Ink/Stitch**, `https://github.com/inkstitch/inkstitch`
Added a new algorithm for running stitch along curves which gets much more uniform stitch spacing as well as a system for randomized satin stitch which stays stable under changes in path shape.

2019 **persistent-spatial**, `https://hackage.haskell.org/package/persistent-spatial`
A data structure for storing and indexing geographic coordinates which can be used with any SQL database to provide fast area queries using a standard b-tree index. Originally used with CockroachDB, which had no spatial index support at the time of release.

2017 **Maxent Phonotactic Learner**, `https://github.com/george-steel/maxent-learner`
A machine-learning tool for automatically inferring phonotactic grammars from a lexicon and using those grammars to generate random text, based on Hayes and Wilson's *A Maximum Entropy Model of Phonotactics and Phonotactic Learning*.

2017 **frpnow-gtk3**, `https://hackage.haskell.org/package/frpnow-gtk3`
High-level interface for GTK3 using FRPNow for asynchronous, reactive event handling.

2016 – 2017 **PhonoApps**, *with Prof. Peter Jurgec*, `http://phonology.us/`
Computational and learning tools for phonologists.