Ian Li

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# Skills

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| --- | --- |
| **Programming Languages** | C, C++, CUDA, C#, Python, Java, Javascript, Typescript, Bourne Sh/Bash, Scheme, ARM assembly, R |
| **Tooling** | LLVM, Linux, Nix/NixOS, MS Azure, Selenium, Regex (PCRE), Make, Git, SSH, GDB/LLDB |
| **Web Development** | React, React Native, .NET Core, SQL, Express, SASS, Bootstrap, MongoDB, Flask |
| **Certificates** | Microsoft Azure AZ-900, Microsoft Azure AI-900 |

# Experiences

## Web Developer, *nvision* - *Markham, Canada* 2019

* Independently developed employee dashboards for visualization of metrics using **React** and **MongoDB** (**MERN** stack)
* Developed customizable Wordpress themes, collaborating with UI designers to bring design mockups into fruition
* Maintained **Linux** servers and MySQL databases to host Wordpress sites using the **LAMP** stack

# Ongoing Thesis

## Improving KLARAPTOR: Automatic Finding of Optimal CUDA Kernel Launch ParametersCurrent

Automatically find near-optimal **CUDA** kernel parameters for fast GPU kernel execution. I am working on a(n):

* Method to detect constraints on kernel launch parameters using Scalar Evolution (SCEV) and Quantifier Elimination
* **LLVM** pass to find range of all valid launch parameters for a given kernel (to facilitate profiling using KLARAPTOR)

In order to speed up *data-oblivious* computations (*e.g.* matrix operations for machine learning/AI, computer graphics, *etc.*)

# Projects

## Experimental Language - [repo](https://github.com/ianayl/compiler)Current

Shells are *outdated*: Creating a langauge in **C++** with goals to be a good general-purpose language *and* a fast replacement to shells

* Devised an *automatic* table-based **lexer generator**, and wrote a **recursive descent** parser following LL grammar
* Writing a **tree-walk evaluator** for interpretation, and AST passes to generate CFGs and LLVM IR for compilation
* Working on a static type system with type inference, goals for JIT compilation in future using LLVM

## Mindless - [repo](https://github.com/ianayl/mindless)2021

Proof-of-concept **unconditionally secure** biometrics password manager based on hashing algorithms (SHA256)

* Developed a password manager using facial recognition landmarks (extracted using **OpenCV**) with a web frontend (**Flask**)
* Created a method to generate consistent passwords from facial landmark data: *passwords are* ***never*** *stored! Not even encrypted*
* Became a finalist project in a 36-hour hackathon (Hackwestern 8) out of 346 teams

## Rentura (Startup) 2021 – 2022

Lead the development and design of a *minimum viable product* for a B2C furniture rental platform

* Developed a backend in Javascript, implemented a **RESTful API** with **CRUD** endpoints secured with tokens (in **Express.js**)
* Maintained **MongoDB** instances on a **Linux** server, and designed database schemas for an *order management system*
* Developed a responsive, mobile-first *e-commerce* frontend in **React.js** using **Sass** and **Axios** (**MERN** stack)

## Shell Site Generator (shsg) - [repo](https://github.com/ianayl/shsg)Current *(On hiatus)*

Ultra lightweight and portable static site generator that will run on *anything* with a minimal UNIX-like enviroment

* Developing a static site generator using **POSIX shell** and **PCRE Regex**: *No dependencies other than a UNIX shell & coreutils!*
* Transpiles markdown to themed webpages with no installation, compilation, or alternative runtimes required
* Working on removing dependency on PCRE extensions (support for Busybox), and parsing tables and lists in pure regex

# Education

## University of Western Ontario - *London, Canada* 2021 – Current

### Candidate for Honours Specialization in Computer Science

Anticipated in Spring 2025, 3.9/4.0 GPA