**Prem Chintalapudi**

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**Summary**

Master of Engineering student at MIT working on performance improvements for the Julia compiler. Interested in designing and implementing efficient, performant, and resilient software systems that are also readable and maintainable. Enjoy working in a collaborative environment, where ideas are refined to a minimalistic yet powerful solution to the problem at hand. Often described as a dedicated individual, who will finish their assigned tasks on time. Draws upon a varied set of cross-disciplinary skills to solve problems.

**Education**

**Degrees:**

Master of Engineering (M. Eng.) in Computer Science and Engineering – May 2023

Bachelor of Science (B.S.) in Computer Science and Engineering and Bioengineering – May 2022

**Selected Coursework**:

Performance Engineering, Design and Analysis of Algorithms, Computer Architecture,

Distributed Systems Engineering, Computer Security, Machine Learning, Biological Engineering Design

**Specialties**: High throughput, low latency, multithreaded, and concurrent systems and frameworks

**Programming Languages and Tools**:

C++, Python, Java, Typescript, HTML/CSS, Bash, Go, MATLAB, Julia, LLVM IR, Git, SVN, Perforce

**Work Experiences**

**NVIDIA Corporation** | *GPU Architecture Intern* | C++, Python | *Product Development* | May 2022 – Sep 2022

* Built a point-to-point latency tracking framework in a GPU simulator
* Leveraged existing class infrastructure to add on tracking without significant user effort
* Implemented C++ best practices on core data structures in codebase to enhance performance

**JuliaLab** |*UG/M. Eng. Researcher* | C++, Julia | *Compiler Engineering* | Sep 2022 – May 2023

* Optimized JIT LLVM compiler to reduce compilation time and runtime for Julia programs
* Implemented automatic bounds check elimination, improved capabilities for vectorization
* Improved parallel compilation throughput using fine-grained locking and resource pooling
* Extended escape analysis optimizations for loops, reduced allocations in high performance programs
* <https://github.com/JuliaLang/julia/pulls?page=1&q=is%3Apr+author%3Apchintalapudi>

**Tornado** | *Data Science Intern* | Python, SQL | *Performance Optimization* | Jan 2022

* Optimized and extended data science model to use 2x less memory and enhance performance
* Moved computation from Python code to SQL query to reduce CPU and memory usage

**NVIDIA Corporation** | *Architecture Intern* | C++, Python | *Product Development* | Jun 2021 – Sep 2021

* Built a record-and-replay framework for traffic into and out of subunits in a GPU simulator
* Improved signal handler crash dump reporting to be async-signal safe

**doc.ai** | *Data Science Intern* | Python, Classification | *Data Processing* | Jan 2021 – Feb 2021

* Implemented PDF parser to extract document structure from clinical protocols and classify sections
* Collaborated with other interns to create web app using parser as an input to produce summaries

**McAfee, LLC** | *Cloud Security Intern* | Java, Javascript | *Security* | Jun 2020 – Aug 2020

* Secured backend endpoint control using Spring Security
* Implemented backend business logic for chart display to aggregate data into predefined schemas
* Developed automation suite using Cypress to test and analyze performance of application loading

**Broad Institute** | *UG Researcher* | Cell Culture, Microscopy | *Wetlab* | Sep 2019 – Jan 2020

* Investigated growth of human VK2 cells on PDMS microwells for bacterial vaginosis experiments
* Used DAPI and phalloidin staining to identify growth of cells and verify staining on PDMS

**Sandia National Laboratories** | *Molecular Biology Intern* | CRISPR | *Wetlab* | May 2019 – Aug 2019

* Performed research to characterize antibacterial properties of mesenchymal stromal cells
* Identified multiple transcription factors potentially responsible for antibacterial activity
* Learned bacterial transformation, CRISPR assays, flow cytometry, colony counting

**Koch Institute for Integrative Cancer Research** | *UG Researcher* | *Wetlab* | Feb 2019 – May 2019

* Participated in cancer research to identify proteins that complexed with actin regulator complex
* Learned proper aseptic technique, Western blotting, and co-immunoprecipitation assays

**Personal Projects**

**Virtual Machine** | C++ | *Compiler Engineering* | Jun 2020 – Mar 2021

* Project to build a virtual machine with the C++ standard library and Windows APIs
* Gained knowledge about OS APIs, virtual machine internals that lead to M. Eng thesis

[**Personal Website**](https://pchintalapudi.github.io) | Typescript, HTML/CSS | *Web Development* | Aug 2019 – present

* Built website to display personal work history and current projects, autogenerated from config files
* Optimized for good UX and loading performance with Lighthouse audits

[**Course Planner**](https://pchintalapudi.github.io/courses/) | Typescript, HTML/CSS | *Web Development* | Dec 2019 – Jan 2020

* Rebuilt course planning application for MIT courses to improve UX and load content asynchronously
* Handles large course schedules with better performance and increased feature set

[**Molecule Drawer**](https://pchintalapudi.github.io/mdraw/) | Typescript, HTML/CSS | *Web Development* | Jun 2018 – Jul 2019

* Draws molecules in web browser using SVG, similar to ChemDraw
* Intuitive drag-and-drop features, automatic inferral of hydrogens in organic structures

**Rendering Engine** | C++, Java | *Core Programming* | Aug 2019 – Jan 2020

* Project to build a rendering engine capable of displaying webpages in HTML/CSS
* Multiple versions, learned core browser APIs and efficient DOM manipulation methods

**Achievements**

**Juliacon 2022:** [Lightning talk](https://www.youtube.com/watch?v=A0VwcXcAz4o) describing my work on multithreading the Julia compiler

**Sandia Post Presentation:** [Poster presentation](https://www.osti.gov/servlets/purl/1641290) describing my Sandia work researching mesenchymal stem cells