**Prem Chintalapudi**

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## Education

* Massachusetts Institute of Technology (MIT) (4.9/5 GPA) .
  + BSComputer Science & Engineering + Bioengineering (February 2022)
  + MEng Electrical Engineering and Computer Science (May 2023)

### Courses

|  |  |  |
| --- | --- | --- |
| Software Design and Engineering | Computer Architecture | Introduction to Machine Learning |
| Performance Engineering | Introduction to Embedded Systems | Probability and Random Variables |
| Design and Analysis of Algorithms & Data Structures | Computer Systems Engineering | Computational Systems Biology |

## Work Experience

### JuliaLab March 2021 –Present

*Undergraduate Researcher*

* Worked on Julia compiler written in C++ and LLVM to improve allocation optimization around PHI nodes
* Added automatic bounds checking elimination to the Julia language
* Updated the code generator to avoid emitting unnecessary instructions, hoisting allocations and write barriers out of loops
* Taught the compiler to hoist allocations out of specific branch idioms.
* Currently adding support for escape analysis for array allocations and hoisting allocations out of loops

### NVIDIA Corporation June 2021 – August 2021

*Computer Architecture Intern* Computation Modeling

* Designed and built replay system for GPU architecture model in C++ to speed up debugging and testing
* Developed a low-cost extensible method of autogenerating serialization methods
  + Used functional-style template metaprogramming to provide clean serialization API
* Designed the software
  + to incrementally compress saved data to optimize memory and disk usage.
  + to save sufficient data to replicate segmentation faults and other signal-based program crashes
* Built web-based interface to visualize and aggregate intermediate replay data
* Developed several tools to aggregate statistics on the flow of packets into and out of GPU units

### Doc.ai January 2021 – February 2021

*Software Engineering Intern*

* Digital IRB Clinical Protocol Parsing
  + Developed program in Python to parse clinical trial protocol PDFs using [pdfminer.six](https://github.com/pdfminer/pdfminer.six) into a document tree
  + Used [spacy.io](https://spacy.io/)'s natural language functionality to classify the nodes of the document tree as different sections of the protocol
  + Built significant sections of frontend and backend web app harnessing GPT-3 text summarization capabilities to produce study summaries for clinical trials

### McAfee, LLC May 2020 – August 2020

*Software Engineering Cloud Security Intern* Cloud Security BU Engineering

* Connected Apps Security
  + Added controls to endpoints to prevent unauthorized access to resources using Spring Security
  + Implemented new REST endpoints for aggregating and normalizing data for chart display
  + Developed automation test suite for UI components using Cypress to test application loading, access control, and application base load time

### Sandia National Laboratories (CA) June 2019 – August 2019

*Undergraduate Summer Intern R&D*

* Investigated antibacterial properties of mesenchymal stromal cells using CRISPRa/CRISPRi
* Performed bacterial work (Cloning, Minipreps, Maxipreps), cell lines + bacterial co-culture assays

## Personal Projects

### Mini Virtual Machine *C++* (June 2020 – March 2021)

* Bytecode interpreter modeled similarly to the JVM, written in C++
* Garbage collection, virtual memory allocation/deallocation, template metaprogramming
* Associated bytecode compiler written in C++ (tokenizing, parsing, compiling)

### Course Planner *Vue/Typescript* (December 2019 – January 2020)

* Graphical and responsive planning of courses using web technologies; intuitive user interface
* Rendering pipeline optimization, CSS animation/transitions

## Skills

* C++, Python, Java, Typescript, Javascript, Bash, SQL, HTML, CSS, SVG, Cypress, Spring Boot, Vue, LLVM, Git, Subversion, Perforce