Matthew James Davis

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EDUCATION:

Georgia Institute of Technology

Ph.D of Computer Science – 1st Year

Advisor: Dr. Vivek Sarkar

Texas A&M University – College Station

B.S. Of Computer Science w/ Engineering Honors – 2022 Grad

Minors: Statistics, Mathematics

SKILLS:

Languages

- Proficiency – Java
- Competency – C/C++, Fortran, R, Python, Javascript, HTML, CSS

Tools/Frameworks

MPI, OpenMP, Google's Thread Sanitizer, LLVM

Experience:

May 2022 – August 2022: Helios Solutions – Software Engineering Intern

I worked for the Helios Solutions contracting firm on software used by Intuitive Machines on their lunar landers: IM-1, IM-2, & IM-3. I also developed on a project to create graphic user interface tools for TTTech.

Supervisor: Mr. Joel Busa

May 2021 - August 2021: Argonne National Lab – Research Aide

I assisted the MPICH library team by creating automated concurrency bug detection for the library and creating a system which automatically generates values for unit testing of MPI functions.

Supervisor: Dr. Yanfei Guo

Research:

Concurrent Program Security Tools

2019: Designed a program which generates Google Thread Sanitizer optimization blacklists for a tool which predicts potential concurrent software vulnerabilities in multithreaded internet browser software based on the Google Chromium base (Google Chrome, Microsoft Edge, Opera).

2020: Created a tool which finds Data Race concurrency bugs for programs written in C/C++ & Fortran using the OpenMP concurrency library. The program combines both static and dynamic analysis to achieve results better than existing tools.

2020-2021: Adapted the OpenMP data race detection tool OpenRace to be able to accept CUDA kernels for CUDA 8 and before. Set up the foundation for modeling CUDA programs when that previously was not in OpenRace. This work has been merged into the tool.

Research Advisor: Dr. Jeff Huang of Texas A&M University

Device Data Mapping Consistency Bug Detection and Repair

2022-current: Creating a hybrid analysis tool which performs bug detection, repair, and optimization on OpenMP device data mapping clauses.

Research Advisor: Dr. Vivek Sarkar of Georgia Institute of Technology

Honors & Awards:

Eagle Scout

Publications:

Davis, Matthew James; Theriot, Dylan (2022). Dynamatic: An OpenMP Race Detection Tool Combining Static and Dynamic Analysis. Undergraduate Research Scholars Program. Available electronically from https://hdl.handle.net/1969.1/194411.