

IOANNIS SAKIOTIS

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EDUCATION

Old Dominion University

Doctorate of Philosophy: Computer Science

Expected May. 2024

Master of Science: Modeling and Simulation Engineering

Aug. 2016

Bachelor of Science: Modeling and Simulation Engineering

May 2014

HIGHLIGHTS

- Member of **Dark Energy Survey (DES)** as external collaborator
- Maintained and developed HPC software in **DOE supercomputers**
- Best Researcher in the Computer Science Department (2023)
- 2nd place for Best Poster Graduate Day (2021)
- Outstanding Graduate Teaching Assistant (Spring 2019)
- Order of AHEPA, chapter 122 Scholarship (2015, 2016, 2017, 2018)
- Talks at IXPUG 2022, NIST, and Jefferson National Laboratory

INTERNSHIPS

Fermi National Accelerator Laboratory

Summer 2022

- Conducted research on the utilization of GPU accelerated numerical integration software in a cosmology application
- Provided expertise in **CUDA** and VOLTA/AMPERE GPU architectures
- Analyzed and visualized profiling data with R
- Enabled large scale execution of an MPI cosmology analysis tool by realizing and resolving memory consumption issues

Fermi National Accelerator Laboratory

Summer 2019

- Installed CUDA software on the laboratory's GPU cluster
- Modernized a prototype numerical integrator implemented in CUDA
- Implemented numerous CUDA and C++ related features
- Wrote benchmarks to compare the serial CUBA library's integrators with CUDA prototypes

EXPERIENCE

Old Dominion University

2018 - 2024

Graduate Research Assistant

- Provided **High Performance Computing expertise** to physicists and scientists for utilizing various hardware, software, and improved algorithms to accelerate their workloads
- Developed and maintained HPC scientific computing codes and simulation software on GPU clusters including **DOE supercomputers**
- Developed scalable software in **C++, CUDA, Kokkos, and oneAPI** for Fermi National Laboratory Lab-Directed R&D project
- Resolved load-balancing and memory conservation issues that resulted in orders-of-magnitude speedup
- Designed and implemented the **fastest open-source parallel numerical integration software** with probabilistic and deterministic variants github.com/marcpaterno/gpuintegration
- Heavily utilized R for data analysis to facilitate correctness, performance, and algorithmic improvements on scientific computing software

- Developed particle-collider simulation in CUDA, capable of multi-node multi-GPU execution with MPI, and single-node multi-GPU execution with OpenMP
- Acquired extensive experience with profiling tools such as nvprof and Nsight Compute
- Created benchmark demos and analysis scripts to evaluate the performance of experimental algorithms, features, and optimizations

Old Dominion University

2018 - 2019

Graduate Teaching Assistant

- Designed and implemented original programming projects and assignments for undergraduate-level C++ courses
- Generated teaching material in the form of tutorial videos and coding samples
- Created solutions and graded assignments/exams for graduate-level algorithms course

M.S. Thesis

2014 - 2016

- Developed a simulation-based software framework for collaborative autonomous systems
- Constructed an expandable layered structure using C++
- Designed a data-communication protocol for expandable layered structures

Newport News Shipbuilding

Aug. 2013 - May 2014

- Designed and implemented a simulation-based production planning and scheduling tool
- Created an input-handling graphical user interface using VBA

SKILLS

C++, CUDA, Kokkos, Intel oneAPI, SYCL, MPI, OpenMP, CMake, Catch2, R, MATLAB, Python, SQL, VBA, LaTeX, Git, Linux, SLURM, object-oriented programming, parallel programming, multi-threaded programming, template metaprogramming, HPC, profiling

PUBLICATIONS

- **I. Sakiotis**, K. Arumugam, M. Paterno, D. Ranjan, B. Terzic, and M. Zubair, Porting numerical integration codes from CUDA to oneAPI: a case study, in **ISC 23: The International Conference for High Performance Computing**, Hamburg, Germany, May, 2023.
- **I. Sakiotis**, K. Arumugam, M. Paterno, D. Ranjan, B. Terzic, and M. Zubair, m-Cubes: An efficient and portable implementation of multi-dimensional integration for GPUs, in **ISC 22: The International Conference for High Performance Computing**, Hamburg, Germany, May, 2022.
- **I. Sakiotis**, K. Arumugam, M. Paterno, D. Ranjan, B. Terzic, and M. Zubair, PAGANI: a parallel adaptive GPU algorithm for numerical integration, in **SC 21: The International Conference for High Performance Computing, Networking, Storage and Analysis**, St. Louis, Missouri, USA, November 14 - 19, 2021, 2021, p. 83:1-83:13. doi: 10.1145/3458817.3476198.
- **I. Sakiotis**, K. Arumugam, D. Ranjan, B. Terzic, and M. Zubair, Efficient Parallel Multi-bunch Beam-Beam Simulation in Particle Colliders, in **26th IEEE International Conference on High Performance Computing, Data, and Analytics, HiPC 2019**, Hyderabad, India, December 17-20, 2019, 2019, pp. 123130. doi: 10.1109/HiPC.2019.00025.
- **I. Sakiotis**, A simulation-Based Layered Framework for the Development of Collaborative Autonomous Systems, 2016
- A. Allen, J. Caldwell, C. Heard, **I. Sakiotis**, and D. J. Tillinghast, Discrete Event Simulation for Supporting Production Planning and Scheduling Decision in Job Shop Facilities, 2018., ModSim Conference World 2014, Norfolk 2014
- A. Allen, J. Caldwell, C. Heard, **I. Sakiotis**, and D. J. Tillinghast, Discrete Event Simulation Implementation of a Production Planning and Scheduling Tool, Capstone Design Conference 2014, Hampton 2014