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Shashank Jaiswal
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Education

Purdue University, West Lafayette
PhD in Aeronautics and Astronautics ..... May'18 - May'21
MS in Physics and Astronomy ..... Aug'19 - May'21
MS in Aeronautics and Astronautics ..... Aug'16 - May'18

Indian Institute of Technology (IIT), Hyderabad
B.Tech in Mechanical Engineering (Honors) ..... Aug'12 - May'16

Work Experience

Altair Engineering, Troy, MI ..... 17 May'21 - Present
Sr. Software Developer - High Performance Computing with *Brian Janes (Senior Director)*
- Created a 10× faster event-driven system for resource allocation, monitoring, and scheduling on distributed systems.
- Developed and shipped modern web user-interfaces which replaced the legacy systems.
- Implemented numerous new functionalities based on customer feedback and demands.

Mentor Graphics (Siemens), Wilsonville, OR ..... 6 May'19 - 6 Sep'19
R&D Calibre Design-to-silicon Intern with *Dr. Fedor Pikus (Chief engineering scientist)*

Research in development of quantum algorithms for Electronic Design Automation (see patents [1, 2]). Our work focused on identifying, adapting, developing, and applying quantum algorithms to solve NP-hard problems arising in circuit design and verification.

Purdue University, West Lafayette, IN ..... 1 Jan'17 - 15 March'21
Research Assistant with *Dr. Jingwei Hu, and Dr. Alina Alexeenko (Associate Dean)*

Research in development of numerical methods for solving high dimensional partial differential equations on massively parallel architectures (see monographs [3–5] and National Science Foundation Grant #1854829 based on my thesis).

- Developed an $O(N \log N)$ algorithm (fastest known) for solving multi-species Boltzmann equation.
- The algorithm achieved a parallel efficiency of 99% on 34 GPUs.

Research interests

High performance computing, Reinforcement Learning, Quantum computing, Numerical analysis.

Patents

[1] Limited basis quantum particle definitions in applications of quantum computing to electronic design automation processes, (2020), US Patent 10,846,448.
[2] Adaptive penalty term determinations in applications of quantum computing to electronic design automation processes. (2020), US Patent App. 16/688,028

Research monographs

[3] *Isogeometric schemes in rarefied gas dynamics context,* Comput. Methods Appl. Mech. Eng. **383**, 113926 (2021).
[4] *Non-linear Boltzmann equation on hybrid-unstructured non-conforming multi-domains,* J. Comput. Phys. **450** (2022).
[5] *An entropy stable scheme for the non-linear Boltzmann equation,* J. Comput. Phys. **463** (2022)

General Skillset

Programming: C++, Python, Javascript, Tcl, Solidity
Tools/Frameworks: Tensorflow, PyTorch, Unity, Qiskit, OpenFOAM, ZeroMQ, React

- Experience with programming in Python, C++ (8+ years).
- Experience with parallel and distributed computing: MPI, CUDA, OpenMP, JAX.
- Experience with cloud computing: containers and micro-services design.
- Experience with development of quantum algorithms and quantum software stacks.
- Experience with PDE based machine-learning models and reinforcement learning.
- Experience with development of numerical schemes for solving partial differential equations.
- Experience with writing performance portable codes, profiling (LLVM sanitizers, valgrind, udb, gdb).
- Proficient working in a Linux/UNIX environment; git/subversion/p4, build/test systems, testing/release processes.