Rajeev Jain

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Experience

CASE Staff At-Large, The University of Chicago (UChicago) – Chicago IL, USA **Sep 2023 – present**

- Joint appointment for computational cancer research initiatives between Argonne National Laboratory (ANL) and UChicago.

Research Software Developer, Math and Computer Science Division, ANL – Lemont IL, USA **Aug 2009 – present**

- Over the years I have contributed to five major projects: See **Major Projects** section.

Research and Teaching Assistant, Struct. Engg., Arizona State University – Tempe, AZ, USA **Aug 2007 – Jul 2009**

- Improved the design of U.S. Army Research Office's blast-resistant structures using FEM-based shape optimization.

Project Engineer, Wipro Technologies – Bangalore/Hyderabad, India **May 2006 – Jun 2007**

- Rapidly acquired Java and SAP skills to develop robust production-ready code, becoming a key team player.

Technical Skills

HPC and Programming Expertise: Advanced proficiency in Python, Fortran, and C++ for simulation development; experienced with parallel file-systems/computing (MPI, OpenMP), job scheduling and performance optimization on HPC systems.

Software Development and Data Analysis: Strong skills in software development practices (Git, CI/CD), optimizing deep neural networks (PyTorch, Keras), and data analysis/visualization tools (NumPy, Matplotlib).

Education

The University of Chicago, MS in Computer Science **Jun 2020**

Arizona State University, MS in Structural Engineering (Minor in Computer Science) **Jul 2009**

IIT Dhanbad, India, BT in Mechanical Engineering **May 2006**

Major Projects

IMPROVE/CANDLE (Cancer Data Science - fully funded Exascale Compute Project - ECP) **Jan 2017 – present**

- Led the development of CANDLE/Supervisor, a scalable workflow suite for deep-learning models on DOE supercomputers, revolutionizing cancer research. Awarded the R&D 100 Award in 2023.
- Innovated a novel approach for cancer-related gene discovery through noise injection and counterfactual analysis.

Uxarray (Climate Computation/Modeling - funded by the Department of Energy - DOE) **Jun 2021 – present**

- Co-created, Uxarray, a leading Python library, enhancing climate data analysis with upto 60x speedup through advanced vectorization and parallelization techniques. Significantly boosted performance of real-world scientific workflows.

FLASH-X (Multiphysics Simulation, Astrophysics - fully funded ECP) **Jun 2016 – Sep 2023**

- Enhanced FLASH-X with HDF5 asynchronous I/O and (SZ3/ZFP) compression, boosting performance by over 20%. Recognized with the R&D 100 Award in 2022. Designed a testing and verification system for composable physics simulations.

Urban Coupled Simulations (seed funded ECP) **Jun 2016 – Sep 2018**

- Directed a multidisciplinary team to develop a simulation framework, advancing urban climate modeling.

SIGMA/MeshKit/RGG (Nuclear Reactor Simulations - DOE NEAMS funded, PI) **Aug 2009 – Sep 2018**

- Led development of RGG MeshKit (part of Nuclear Energy Advanced Modeling and Simulations (DOE NEAMS) project), a groundbreaking toolkit for reactor geometry mesh generation, leading to commercialization with Kitware Inc. NY.
- Achieved record-breaking parallel mesh generation, enabling multiphysics simulations previously deemed impossible.

Services And Awards

- Served as an editor and reviewer for a few conferences and journals. **May 2011 – present**
- Supervised several summer students, full-time staff and postdocs. **May 2011 – present**
- Interacted with high school students for the yearly "Hour of Code" event. **Jul 2014 – present**
- University Graduate Fellowship (ASU) - USD 4000. **Jul 2007 – Jun 2009**
- 1st Prize for Low Budget Car Design Contest, IIT Kharagpur and MINDA DELHI -INR 40k+. **Jan 2004**
- Engineering Entrance IIT JEE All India Rank 3487 out of over 150k applicants. **Jul 2002**