

SARTHAK KAPOOR

PERSONAL INFORMATION

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Languages: English and Hindi (Bilingual proficiency)
Date of birth: Nov. 1, 1997
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EDUCATION

RWTH Aachen University 2020.10 - Present
MSc Simulation Sciences CGPA: 2.2
Focus: Applied mathematics, machine learning, computational modeling (German scale)

Machine Learning Summer School (MLSS^N) 2022.06
Jagiellonian University, Poland
Participated with a full scholarship

National Institute of Technology, Warangal 2016.08 - 2020.08
BTech Metallurgical and Materials Engineering CGPA: 9.13 (10)
Gold Medallist

WORK EXPERIENCE

Wissenschaftliche Hilfskraft (Research Assistant) 2021.05 - Present
Chair for Material Mechanics, RWTH Aachen
As a research assistant under Prof. Bob Svendsen, I am developing learning-based approaches to infer solutions of differential equations involved in solid mechanics, thereby providing an alternative to expensive numerical solvers. Working extensively with Python, TensorFlow, PyTorch.

Application Development Analyst 2020.09 - 2020.12
Accenture Technology Center, Bengaluru
During my stint as an Application Development Analyst at Accenture, I learned a great deal about conceptualizing software solutions and trained in software-delivery methods.

PROJECTS

Detecting gravity waves in atmospheric temperature data 2022.06
Applied and Computational Mathematics, RWTH Aachen
As part of a week-long study excursion, we developed an algorithm to detect gravity wave events, which are essential for reliable weather predictions, in large datasets of atmospheric temperature. The project was supervised by Dr. Joern Ungermann from Forschungszentrum Jülich and the code was written in Python using NumPy, SciPy, JAX libraries.

Tracking local optima in dynamic systems 2021.10 - 2022.02
Software and Tools for Computational Engineering, RWTH Aachen
Supervised by Prof. Uwe Naumann from Informatik-12, this semester-long project focused on building local-optima-tracking software for dynamic time-dependent functions. The software was written in C++ using dco/c++ library for automatic differentiation.

Fast iterative solvers for linear systems

2021.04 - 2021.09

Aachen Institute for Advanced Study in Computational Engineering Science, RWTH Aachen

Programmed multigrid solvers, Krylov-based linear system solvers (GMRES and CG) and eigensolver algorithms (Lanczos and Power Iteration) for huge sparse matrices taken from MatrixMarket. These implementations used vanilla Python code without computational libraries.

Simulation of Mold Filling in LPIM (MITACS Scholar)

2019.05 - 2019.08

Ecole Technologie Supérieure, Montreal

As a summer research intern, I worked on optimizing LPIM injection stage for metallic feedstock using FEM simulations and experimentation. I also worked on an initial layout of a new viscosity model that accurately captured viscosity behavior for our application. Gained experience in Moldflow, AutoCAD, MATLAB, and feedstock preparation.

Phase Field Modeling of Ternary System

2018.11 - 2019.04

National Institute of Technology, Warangal

During this semester-long bachelor project, I built a simulation routine to study the growth kinetics of precipitates in a hypothetical ternary alloy system. It was based on a phase-field model with semi-implicit spectral formulation and written in C using FFT libraries.

SKILLS

Development —C/C++, Python (TensorFlow, PyTorch, NumPy, SciPy, JAX, Scikit-Learn, Pandas), MATLAB, Java, OpenMP, MPI, DCO, HTML, Javascript, MySQL, L^AT_EX, GitHub.

Pursuits —Machine Learning (Deep Learning, Neural Networks, Neural Operators, Computer Vision, Data Analytics), Phase-field modeling, Continuum modeling, Automatic Differentiation, Parallel Computing, Fast Iterative Solvers

COMMUNICATION

Poster presented at MLSS 2022 —“Correlative modeling of microstructure and stress in solid mechanics using Machine Learning”

Published article —Raphaël Côté, Mohamed Azzouni, Oussema Ghanmi, Sarthak Kapoor, and Vincent Demers. “Impact of rheological model on numerical simulation of low-pressure powder injection moulding”. In: *Powder Metallurgy* 64.1 (2021), pp. 8–16

VOLUNTEERING

Project Aakaar: Making geometry accessible to visually impaired

2019.01 - Present

Started as a bachelor’s project at the maker space of NIT Warangal, Project Aakaar has expanded into a global network of designers, thinkers, managers, and engineers, with the common goal of making technical education accessible in the special schools of developing countries like India.

AWARDS

Recipient of a full scholarship to attend Machine Learning Summer School 2022 in Krakow, Poland

Recipient of Late Pendyala Upendra Gold Medal 2020 for academic excellence in BTech degree

Recipient of MITACS 2019 scholarship to pursue research at ETS Montreal

Recipient of NIT Warangal Merit Scholarship 2016, 2017, 2018, 2019 (Full Tuition Award)

Recipient of the prestigious OPJEMS award for two consecutive years 2018, 2019