Hossein Azizi, PhD

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Technical Skills

DATA & MACHINE LEARNING: Pandas | NumPy | SciPy | Scikit-Learn | Tableau | Matplotlib | Bokeh | Altair | ParaView | Beautifulsoup | Networkx | NLTK | spaCy | PySpark | TensorFlow | Keras

PROGRAMMING LANGUAGES: Python OOP | C/C++ | MATLAB | CUDA | SQL | Flask |HTML | Linux/Unix shell scripting

STATISTICS: Linear & Non-linear Regression | Bayesian Statistics | Time-series Analysis | DeepLearning | Random Forest | SVM | Neural Networks (CNN | RNN | LSTM) | Unsupervised Learning (Clustering | PCA)

HIGH-PERFORMANCE PARALLEL COMPUTING: Very Big Data Analysis OpenMp | MPI | Multi-Threads

ALGORITHM DESIGN: Image Analysis | Spectral Analysis | Dynamic Adaptive Mesh | Algorithm Optimization | PDEs

INDUSTRY KNOWLEDGE: Digital Strategy for Materials Design | Functionality Optimization | Computational Physics Statistical Analysis | Monte Carlo Simulation | 3D Metal Printing | Process Optimization & Automation | Material Science

Work Experience

UNIVERSITY OF NEW BRUNSWICK, Marine Additive Manufacturing Centre **Feb 2018–Aug 2021**
Postdoctoral Research Fellow

- Designed & implemented a high-performance computing algorithm for large-scale simulations of a solidification during 3D Metal Printing process of mechanical parts, resulting in 35x speedup across 1024 cores by applying MPI techniques. Supervised and trained a team to apply simulation to improve decision making process and parts' quality.
- Initiated process automation that required to collect, interpret, and visualize more than 10TB of data during 3D printing simulation. Accelerated processing time 7-fold (from 14 to 2 days).
- Predict spatio-temporal patterns in different physical systems based on the processing parameters using Neural Network analysis assisting in design of new Functionally Graded Materials for specific functions & applications. Executed 40+ simulations using 2000+cores; collected and analyzed ~ 10TB of data.

DEPARTMENT OF MECHANICAL ENGINEERING, MCGILL UNIVERSITY **Sep 2017–Jan 2018**
Research Associate

- Created simulation of heat-mass transfer process to assist in design new porous materials, with potential use in energy-efficient products. Project funded by Canadian Space Agency and EU Space Agency (ESA).
- Wrote a massively parallel 2D Monte Carlo code in C to generate variety of randomly structured materials. Improved accuracy of material's characterization by 20% resulting in better evaluation & selection of the most promising materials.

Education

Data Scientist Certification, The Data Incubator Fellowship Program | Aug 2021

PhD in Computational Physics | McGill University, Montreal, Canada | Sep 2017

As a System Administrator of a student admin system, used html code to create assignments & Tableau to generate reports

Data Science Workshops & Courses

McGill High Performance Computer Centre, Montreal, Canada:

Advanced & parallel Python (2016); Introduction to CUDA/GPU (2016); Data Intensive Computing (2016); Advanced MPI to create parallel software (2014); Scientific Visualization, ParaView (2014)

Publications & Projects

- Authored 4 papers, presented in 3 prestigious conferences, invited speaker in 2 symposiums. Google Scholar
- Worked with a team to customize and optimize pre-existing parallel 2D & 3D open-source simulation code, resulting in 100-fold acceleration and reduction of computational cost and memory usage. The software currently being used by research labs in Canada, US, Finland, and China.
- Modelling solidification of 3D Metal printing/Patten formation in porous materials. Github
- *E-com Fitness* web application: designed to forecast fitness product sales using data extracted from social media and time-series analysis. Capstone project