

# 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 | 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**  
**Postdoctoral Research Fellow**

**Feb 2018–Aug 2021**

- 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**  
**Research Associate**

**Sep 2017–Jan 2018**

- 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](#)