# Arun
Baskaran

02 November 1992

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https://arunbaskaran.github.io/


## Education

Ph.D in Material Science & Engg, Rensselaer Polytechnic Institute, Troy NY | GPA : 3.58 | Aug 2014-Feb 2020

MS in Computer Science & Engg, Rensselaer Polytechnic Institute, Troy, NY| GPA : 3.40 | Jan 2018-May 2019

B.Tech in Metallurgical & Materials Engg, IIT-Madras, India | GPA : 8.1/10 | Aug 2010-May 2014

## Skills

OOP Languages - C++, Python
Data Analysis - SQL, Scala, Spark
ML Frameworks - TensorFlow, Keras
Parallel Computing Platforms - MPI
Applied Math - Variational Calculus, PDE
Data Visualization - Paraview, Mathematica
Operating Environments - Unix, Windows

## Professional Summary


Ph.D candidate in Material Science and Masters graduate in Computer Science, with a proven publication record and strong knowledge of statistical techniques and applied mathematics. Skilled in developing software for scientific computing and experienced in designing machine learning models.


## Career Objective

Seeking an opportunity to grow as a research scientist, with focus towards application of AI to real-world challenges and augmenting industrial workflows with ML-techniques.

## Publications

- Quantitative Analysis of Microstructure using a Two Stage Image Driven Machine Learning Approach - Arun Baskaran, Genevieve Kane et al., *Computational Material Science, Awaiting review of resubmission ; Draft of a manuscript shall be provided under request*
- Kinetic Regimes of Grain Growth under Dynamic Solute Redistribution - Arun Baskaran, Catherine J Bishop et al.,*Submitted to Modeling and Simulation in Material Science and Engineering; Preprint shall be provided upon request*
- Effect of initial variance of microstructures on grain growth under mean curvature - Arun Baskaran, David Crist, and Daniel J Lewis. *Modelling and Simulation in Materials Science and Engineering, 2017 Volume 25, Number 6*

## Conference Presentations

- Materials Science & Technology, OH, 2019
  Phase field modeling of the influence of thermo-mechanical conditions on phase transformation in titanium alloys , Arun Baskaran and Daniel J Lewis
- 5th World Congress on Integrated Computational Materials Engineering, IL, 2019
  Multiscale Modeling of Microstructural Evolution Induced by Thermomechanical Processing in Ti-6Al-4V Alloys , Arun Baskaran, Sagar Bhatt, Daniel Lewis, Antoinette Maniatty
- Numiform:International Conference on Numerical Methods in Industrial Forming Processes, NH, 2019
  Numerical Modeling Of Ti-6Al-4V Microstructural Evolution For Thermomechanical Process Control, Sagar Bhatt, Arun Baskaran, Daniel Lewis, Antoinette Maniatty
- Fall Symposium, Center for Materials, Devices, and Integration Systems , NY, 2018
  Image processing aided supervised learning to classify titanium alloy microstructures and segment dominant morphologies , Arun Baskaran
- Fall Symposium, Center for Materials, Devices, and Integration Systems , NY, 2018
  Phase field method coupled with microelasticity theory to model microstructure evolution in Ti-6Al-4V alloys , Arun Baskaran & Daniel J Lewis
- The Eleventh International Symposium on Contact Angle, Wettability and Adhesion: Stevens Institute, Hoboken, NJ, June 13-15, 2018.
  A Framework to Study Heterogeneous Factors that Influence Grain Growth, D. Lewis and A. Baskaran
- Conference on Electronic and Advanced Materials, Jan, 2018, Orlando.
  A Framework to Study Heterogeneous Factors that Influence Grain Growth, D. Lewis and A. Baskaran
- Materials Research Society(MRS) Fall conference, November 2016, Boston
  Role of Grain Size Distribution and Solute Adsorption in determining the Kinetics of Grain Growth – Arun Baskaran, Daniel J Lewis.

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## Awards and Positions of Responsibility

- Reviewer, Full Paper Submissions and Extended Abstracts, Machine Learning for Health Workshop, NeurIPS 2019
- Reviewer, Full Paper Submissions, Machine Learning for Physical Sciences, NeurIPS 2019
- President, RPI Cricket Club. August 2017 - August 2018
- Awarded Best Poster in the ASM Materials Fall Symposium 2018, for the project, "Effect of initial variance of microstructures on grain growth under mean curvature"

## Projects

- Ph.D Thesis: Developed a multi phase-field model to simulate solid-state phase transformation and microstructure evolution in titanium alloys, towards understanding its morphological origins. The thesis is funded by National Science Foundation, Grant No : Grant No : CMMI-1729336.
- Smart Segmentation of microstructural features using Deep Learning: Implemented a pipeline for efficient quantitative characterization of a Titanium alloy dataset containing multiple morphological features by leveraging the power of Convolutional Neural Networks and Image Segmentation Algorithms.
- Augmenting Feature Space towards Improved Material Design for Grain Stability: Through a systematic design of simulations, demonstrated the utility of a new parameter ($X_{ratio}$) as a feature vector component towards robust alloy design for grain growth stability.
- Studying Grain Growth in Gradiented Structures Analysed the effect of spatial gradient in a microstructure's grain size on its growth kinetics, with the help of a front tracking model implemented on Surface Evolver.
- Selected Coursework Projects:
  - Ported NearptD, a nearest neighbor search algorithm with a grid-based data structure, from CUDA to the MPI paradigm on IBM's BG/Q.
  - Implemented a shallow CNN on the MNIST and CIFAR-10 datasets, achieving accuracy scores of 97% and 72% respectively.
  - Trained a RNN on the Youtube pose dataset, and achieved greater than 90% accuracy scores on all the joints.

## Courses Undertaken

- Computational Material Science: Advanced Thermodynamics and Kinetics, Material Informatics and Data Science
- Applied Mathematics: Methods of Applied Mathematics, Non-linear Programming
- Computer Science and Engineering: Parallel Computing, Intro to AI, Learning from Data, Deep Learning, Analysis of Algorithms, Operating Systems, Big Data Analysis with Scala and Spark

## Work Experience

- Teaching Assistant, Rensselaer Polytechnic Institute, Troy, NY
  August 2014-May 2016
  Involved in the design and demonstration of experiments for various core courses in the undergraduate material science curriculum.
- Undergraduate Summer Trainee, Tata Steel Limited, India
  May 2013 - July 2013
  Computational alloy design of two-phase high strength steels using MatCalc. Subsequently, performed characterization experiments on the alloys.