

# Amir Behbahanian, Ph.D.

Senior Software Engineer | Machine Learning Model Developer | Expertise in Semantic Segmentation and Time-Series

## SUMMARY

Experienced Software/Machine Learning Engineer with 6+ years in industry and 6+ years in academia, including 1+ year of people management. Specializes in software development, statistical analysis, and machine learning with expertise in material science, physics, and sectors like Oil & Gas, Mining, and Semiconductors. Proficient in C++ and Python, with experience in PyTorch, TensorFlow, and deploying microservices on AWS.

## EXPERIENCE

### Sr. SOFTWARE ENGINEER

Apr. 2024 - Present

DYNO NOBEL

- **Led Development:** Spearheaded the creation of a Mining Blast Simulator, successfully delivering the product within 5 months, leveraging C++ and deploying on AWS. In the process of creating a Computer Vision replica for the simulator.
- **Key Contributor:** Oversaw end-to-end development, from conception to deployment, ensuring alignment with customer requirements and high performance.

### SOFTWARE ENGINEER

Oct 2022 – Apr. 2024

T.D. WILLIAMSON

- **Machine Learning Integration:** Developed and deployed an LSTM model in PyTorch for sensor failure detection, ensuring reliable operations across industrial systems.
- **Computer Vision Expertise:** Engineered a high-performance model for pipeline component detection, achieving 90% recall and 77% precision, deployed on-premises for enhanced data processing.
- **Technical Versatility:** Handled debugging and coding across Python and C++ in a fast-paced, agile environment.

### POSTDOCTORAL RESEARCHER

Dec 2021 - Aug 2022

TEXAS A&M UNIVERSITY

- **Research Leadership:** Directed a \$1.7M project, leading a team of 3 Ph.D. students to develop AI-driven models for material property prediction with a 94% R<sup>2</sup>-score, optimizing design procedures.
- **Advanced Modeling:** Applied cutting-edge machine learning techniques to create surrogate models, driving innovation in computational material science.

### MODELING SCIENTIST - INTERN

Jun 2021 - Dec 2021

TOKYO ELECTRON US

- **Simulation and Analysis:** Developed finite element models for chemical reaction simulations, integrating machine learning for enhanced signal processing.
- **Data Visualization:** Utilized Python (Pandas, NumPy, Matplotlib) for post-processing and visualization, effectively communicating results to the engineering division.

### GRADUATE RESEARCH ASSISTANT

Aug 2016 - Jun 2021

UTAH STATE UNIVERSITY

- **High-Performance Computing:** Optimized computational workflows using Python's multiprocessing on HPC platforms, significantly enhancing simulation efficiency.
- **Uncertainty Analysis:** Conducted Monte Carlo simulations and Taylor Series analysis to provide robust statistical insights for material science research.

### DATA ANALYST

Mar 2012 - Dec 2015

IRAN HOST

- **Time-Series Analysis:** Utilized Fourier Transform for seasonality removal and critical data extraction, driving strategic decisions for marketing campaigns. Deployed models using both MATLAB and C++ for enhanced performance and scalability.
- **Quantitative Analytics:** Provided statistical analysis using MATLAB and C++ to support targeted promotional strategies, ensuring robust data-driven insights for optimal marketing outcomes.

## EDUCATION

**Ph.D. in Mechanical Engineering** 2021  
*Utah State University*

**BS in Mechanical Engineering** 2012  
*Sharif University of Technology*

## SKILLS

Python, C++, HTML, Scikit Learn, PyTorch, TensorFlow, PyTorch Lightning, AZURE, AWS, CUDA, Git, SVN, Jenkins, PySpark, XGBoost, LightGBM, CatBoost, Feature Importance (SHAP), Frequency Analysis, Bayesian Optimization, BoTorch, Optuna

## LICENSES & CERTIFICATIONS

**Data Science** 2022  
*The Data Incubator*

**Stochastic processes** 2020  
*Coursera*

## HONORS & AWARDS

**Outstanding Doctoral Student Researcher** 2019  
*Utah State University*

## Publications

- **Behbahanian, A.,** R. Lundstrom, A Belanger, P Dalfonso, R Coleman. (2023). *PIPENet: A Semantic Segmentation Approach to Pipeline Component Detection from Magnetic Flux Leakage Readings*. International Conference on Machine Learning and Applications (ICMLA).
- **Zadeh, S. H., Behbahanian, A. (Co-First Author),** et al. (2023). *An interpretable boosting-based predictive model for transformation temperatures of shape memory alloys*. Computational Materials Science, 226, 112225.
- [Additional Publications Available Upon Request]

## Ways I Stand Out

- **Multi-Node System Expertise:** Proficient in data-parallel and model-parallel programming, with experience in CUDA, ensuring optimized performance in large-scale simulations.
- **Advanced Simulation Tools:** Extensive experience with nonlinear simulation tools and major simulation codes, both open-source and commercial.
- **Published AI Research:** Contributed to advancing the field of AI in scientific computing, with a strong record of publications in top-tier journals.