# Amir Behbahanian

amir.behbahanian@gmail.com

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

## EXPERIENCE

**DATA SCIENTIST/SOFTWARE ENGINEER** *Oct 2022 - Present*

T.D. Williamson

* Currently working on two candidate models, one based on LSMT, and another based on VAEs to detect signal anomalies.
* Spearheaded a pipeline component detection project and used the FPN and UNnet architectures. The final model had remarkable recall and precision of 90% and 77%, respectively.
* Coordinated the deployment of the model with our Software Team and implemented the model into the company's software using C++.
* Prepared an academic paper based on the project for ICMA 2023 and will present the work in the conference.

**POSTDOCTORAL RESEARCHER** *Dec 2021 - Aug 2022*

TEXAS A&M UNIVERSITY

* Defined the project steps with the project Principal Investigators to accomplish the proposed objectives of a 1.7-million-dollar project and lead a team of three Ph.D. students to accomplish the steps.
* Developed an advanced machine learning model, CatBoost, to predict material properties with 94% R2-score, enabling the creation of surrogate models for optimizing material design procedures.
* Published the work in the journal of computational material science and presented the scope of the project in the 2022 NSF Material Genome Initiative (NSF-MGI) Principal Investigators Meeting.

**MODELING SCIENTIST - INTERN** *Jun 2021 - Dec 2021*

TOKYO ELECTRON US

* Employed hard-coded Finite Element Analysis for quantitative modeling of chemical reactions, complemented by machine learning clustering techniques for enhanced data signal processing and remove noise from the signal.
* Conducted comprehensive post-processing and visualization of simulation data using Python libraries, such as Pandas, NumPy, Matplotlib, and Seaborn.
* Presented the final work to the Engineering Division and received an extremely positive response.

**GRADUATE RESEARCH ASSISTANT** *Aug 2016 - Jun 2021*

UTAH STATE UNIVERSITY

* Conducted rigorous uncertainty calculations using Taylor Series and Monte Carlo Method, yielding valuable insights for decision-making.
* Analyzed an extensive 2 Tb dataset, created by simulations, through the utilization of quantitative analytical modeling and statistical analysis using Python libraries, including Pandas, NumPy, and SciPy.
* Leveraged the Python Multiprocessing library to optimize computational performance on a High-Performance Computing platform.
* Presented the result of my work in two different conferences and published 6 scholarly articles.

**DATA ANALYST** *Mar 2012 - Dec 2015*

IRAN HOST

* Performed Statistical Analysis using MATLAB on user data to plan campaigns, sale events, and user specific promotions.
* To perform the analysis used Fourier Transform to remove seasonality and extract important information from time series data.

## EDUCATION

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

**BS in Mechanical Engineering** *Jun 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

***Computer Science Related***

- **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)*. **(Accepted)**
- Zadeh, S. H., **Behbahanian, A**. (Co-First Author), Broucek, J., Fan, M., Vazquez, G., Noroozi, M., ... & Arroyave, R. (2023). An interpretable boosting-based predictive model for transformation temperatures of shape memory alloys. *Computational Materials Science*, *226*, 112225.

***Other Publications***

- Cutler, R. A., Hui, C., Knudson, L., **Behbahanian, A**., Beatty, S., Risbud, S., ... & Prebys, E. (2023). Effect of ionizing radiation on thermal and mechanical properties of filled-epoxy adhesives. International Journal of Adhesion and Adhesives, 127, 103496.
- **Behbahanian, A**., Roberts, N., & Larkin, J. (2022). Characterization of temperature-induced randomness in the dynamics of vibration. In *APS March Meeting Abstracts* (Vol. 2022, pp. A12-007).
- **Behbahanian, A**., & Roberts, N. A. (2021). Phonon wave-packet simulations using the quantized definition of energy and a temperature-dependent phonon dispersion relation and phonon density of states. *Physical Review E*, *103*(4), 043311.
- **Behbahanian, A.** (2021). *Characteristic of the Dynamics of Disorder in Crystalline and Amorphous Materials* (Doctoral dissertation, Utah State University).
- Zhang, D., **Behbahanian, A.**, & Roberts, N. A. (2020). Thermal Conductivity Measurement of Supported Thin Film Materials Using the 3-omega method. *arXiv preprint arXiv:2007.00087*.
- **Behbahanian, A.**, & Roberts, N. A. (2019). Large Area Substrate-Based Nanofabrication of Controllable and Customizable Gold Nanoparticles Via Capped Dewetting. *JoVE (Journal of Visualized Experiments)*, (144), e58827.
- White, B. C., **Behbahanian, A.**, Stoker, T. M., Fowlkes, J. D., Hartnett, C., Rack, P. D., & Roberts, N. A. (2018). The effect of different thickness alumina capping layers on the final morphology of dewet thin Ni films. *Applied Physics A*, *124*, 1-7.
- Pepper, B., **Behbahanian, A.**, & Roberts, N. (2021). Open Source Software Problems in Heat Transfer to Explore Assumptions and Models.
- **Behbahanian, A.**, Davis, E. L., & Roberts, N. A. (2018, June). Open educational resources in the undergraduate engineering curriculum: A materials science case study. In *2018 ASEE Annual Conference & Exposition*.