Kazem Meidani

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EDUCATION

Carnegie Mellon University *Pittsburgh, PA*
· GPA: 3.93/4.0 *2019 - May 2024 (Expected)*
PhD in Mechanical Engineering
M.Sc. in Mechanical Engineering

Sharif University of Technology *Tehran, Iran*
· GPA: 4.0/4.0 *2014 - 2019*
B.Sc. in Mechanical Engineering
B.Sc. in Industrial Engineering

EXPERIENCE

Graduate Research Assistant *Aug 2019 - Present*
Carnegie Mellon University *Pittsburgh, PA*
· Research Assistant in Mechanical and Artificial Intelligence Lab (MAIL), Advisor: Amir Barati Farimani
Developing Machine Learning frameworks to identify, model, and control physical systems including transport phenomena, dynamical systems, and molecular simulations.

AI Scientist Intern *May 2022 - Aug 2022*
Electronic Arts *Redwood City, CA*
· Summer Internship in EA AI Lab, working on machine learning frameworks in sports games

Undergraduate Research Assistant *May 2018 - May 2019*
Sharif University of Technology *Tehran, Iran*
· Research Assistant in MicroNanoSystem Lab (MNSL), Advisor: Mojtaba Taghipoor

PUBLICATIONS

· **Kazem Meidani***, P. Shojaee*, C.K. Reddy, AB. Farimani. (2023). "SNIP: Bridging Mathematical Symbolic and Numeric Realms with Unified Pre-training.", *Submitted to **ICLR 2024***, *Equal Contribution

· **Kazem Meidani***, P. Shojaee*, AB. Farimani, C.K. Reddy. (2023). "Transformer-based Planning for Symbolic Regression.", *Thirty-seventh Conference on Neural Information Processing Systems (**NeurIPS 2023**)*, *Equal Contribution

· Z. Li, **Kazem Meidani**, AB. Farimani. (2023) "Transformer for Partial Differential Equations' Operator Learning", *Transactions on Machine Learning Research **(TMLR)***

· **Kazem Meidani**, AB. Farimani. (2021). "Data-driven identification of 2D Partial Differential Equations using extracted physical features", *Computer Methods in Applied Mechanics and Engineering (CMAME)*

· **Kazem Meidani**, AB. Farimani. (2023). "IP2: Identification of Parametric Dynamical Systems using Integer Programming", *Expert Systems with Applications*

· Z. Li, **Kazem Meidani**, P. Yadav, AB. Farimani. (2022). "Graph Neural Networks Accelerated Molecular Dynamics", *Journal of Chemical Physics (**JCP**)*

· F. Ogoke, **Kazem Meidani**, A., AB. Farimani. (2021). "Graph convolutional networks applied to unstructured flow field data", *Machine Learning: Science and Technology (MLST)*

· **Kazem Meidani**, I. Borovikov, AB. Farimani, H. Chaput. (2023). "Inverse Lighting with Differentiable Physically-Based Model", *The 17th Learning and Intelligent Optimization Conference (LION 17)*

· **Kazem Meidani**, Z. Cao, AB. Farimani. (2021). "Titanium Carbide MXene for Water Desalination: A Molecular Dynamics Study", *ACS Applied Nano Materials*

· **Kazem Meidani**, S. Mirjalili, AB. Farimani. (2022) "Online Metaheuristic Algorithm Selection", *Expert Systems with Applications*.

· **Kazem Meidani**, S. Mirjalili, AB. Farimani. (2022). "MAB-OS: Multi-Armed Bandits Metaheuristic Optimizer Selection", *Applied Soft Computing*

· **Kazem Meidani**, AP. Hemmasian, S. Mirjalili, AB. Farimani. (2022). "Adaptive Grey Wolf Optimizer", *Neural Computing and Applications*

· **Kazem Meidani**, AB. Farimani. (2020). Learning equations of transport phenomena and fluid dynamics from data, *APS DFD*.

· P. Akbari, F. Ogoke, NY Kao, **Kazem Meidani**, CY Yeh, W Lee, AB Farimani. (2022). "MeltpoolNet: Melt pool characteristic prediction in Metal Additive Manufacturing using machine learning", *Additive Manufacturing*

TECHNICAL SKILLS

Programming	Python (fluent), MATLAB, C/C++ (familiar)
ML & Deep Learning	PyTorch (fluent), Tensorflow (familiar), Keras, CVXPY, Scikit-learn, SciPy
Molecular Dynamics	LAMMPS, VMD, OpenMM
Simulation	ANSYS Fluent, COMSOL MultiPhysics
Design	SOLIDWORKS

PROJECTS

- **Deep Learning Symbolic Mathematics and Identification of Governing Physics**
  · Proposing a multi-modal Symbolic-Numeric Pre-training Model to bridge the symbolic and numeric representations of mathematical functions
  · Proposing a Transformer-based Planning method for Symbolic Regression
  · Proposing a machine learning framework to identify Partial Differential Equations governing transport phenomena
  · Proposing an Integer Programming based framework for robust identification of dynamical systems from videos
- **Deep Learning for Inference and Modeling Physics**
  · Proposing an attention-based framework for data-driven neural operator learning
  · Proposing a GNN model for unstructured flow field data, with a case study of predicting airfoil drag coefficients
  · Proposing a Graph model to surrogate Molecular Dynamics simulations
- **Optimization**
  · Proposing a differentiable Physically-Based Model for inverse lighting design optimization
  · Proposing a landscape-aware framework for online selection of best optimizer in a portfolio
  · Proposing a Reinforcement Learning framework using Multi-Armed Bandits for intelligent optimizer selection
- **Molecular Simulations**
  · Molecular Dynamics study of Titanium Carbide MXene membranes for efficient water desalination

PROFESSIONAL SERVICES

- Reviewer for Journals of Expert Systems with Applications, Applied Soft Computing, Applied Intelligence, IEEE Access, and PLOS ONE

RELATED COURSEWORK

- Introduction to Machine Learning
- Deep Reinforcement Learning and Control
- Convex Optimization
- Probability and mathematical Statistics
- AI and ML for Engineers
- Deep Learning for Engineers
- Operations Research
- Analysis of Regression

HONORS AND AWARDS

- Ranked 1st (GPA based) in Industrial Engineering class of (2019) Sharif University of Technology
- Ranked 3rd (GPA based) in Mechanical Engineering class of (2019)
- Ranked 7th in Iran's national exam for university entrance (2014)