

# Kazem Meidani

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## SUMMARY

I am a senior PhD candidate at **Carnegie Mellon University (CMU)**, and a graduate research assistant in Mechanical and Artificial Intelligence Lab (MAIL). During my PhD, I also worked with **Electronic Arts** as an AI Scientist Research Intern in EA AI Lab. Most of my research revolves around:

- **Language Models for Math:** Pre-training generative LMs, Fine-tuning and Planning for Language Generation
- **Multi-modal Learning:** Contrastive Multi-modal Pre-training for mathematical understanding
- **Deep Learning for Science:** Transformers/GNNs for Physical systems

## EXPERIENCE

### Carnegie Mellon University

*Graduate Research Assistant*

*Research Assistant in Mechanical and Artificial Intelligence Lab (MAIL)*

*Pittsburgh, PA*

*Aug 2019 -*

Selected Research Projects:

- Developed a **Multi-modal Pre-training Model** via Symbolic-Numeric Integrated Pre-training (SNIP)
- Introduced a **Transformer-based planning** for symbolic expression generation using **language models**
- Developed an Alignment and Fine-tuning model for Equation Discovery using language models with RL
- Developed a **Transformer** model (OFormer) for data-driven Neural Operator learning
- Developed **Graph Neural Network (GNN)** models for Physical Systems
- Introduced Machine Learning framework for system identification
- Proposed **Reinforcement Learning (RL)** framework for online optimization algorithm selection

### Electronic Arts

*AI Scientist Intern*

*Internship in EA AI Lab, Research: ML and Deep Learning Frameworks in Sports Games*

*Redwood City, CA*

*May 2022 - Aug 2022*

- Developed a Differentiable Physically-Based Model for inverse lighting optimization (200x faster computation)
- Introduced Deep Inverse Lighting model for lighting design of stadiums in sports games

## EDUCATION

### Carnegie Mellon University

Ph.D. in Engineering (Artificial Intelligence)

M.Sc. in Engineering (Artificial Intelligence)

*Pittsburgh, PA*

*2019 - May 2024 (Expected)*

GPA: 3.93/4.0

### Sharif University of Technology

B.Sc. in Mechanical Engineering

B.Sc. in Industrial Engineering

*Tehran, Iran*

*2014 - 2019*

GPA: 4.0/4.0

## TECHNICAL SKILLS

### Programming

Python, C/C++, MATLAB

### ML & Deep Learning

PyTorch, Tensorflow, JAX, Hugging Face

### Optimization

GUROBI, CVXPY, SciPy

## SELECTED PUBLICATIONS

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- *SNIP: Bridging Mathematical Symbolic and Numeric Realms with Unified Pre-training* **ICLR 2024 Spotlight**  
**K. Meidani\***, P. Shojaei\*, C.K. Reddy, AB. Farimani. \*Equal-contribution *NeurIPS 2023 AI4Science*
- *Transformer-based Planning for Symbolic Regression* **NeurIPS 2023**  
**K. Meidani\***, P. Shojaei\*, AB. Farimani, C.K. Reddy. \*Equal-contribution
- *Transformer for Partial Differential Equations' Operator Learning*  
Z. Li, **K. Meidani**, AB. Farimani. (2023) **Transactions on Machine Learning Research (TMLR)**
- *Inverse Lighting with Differentiable Physically-Based Model* **LION 17**  
**K. Meidani**, I. Borovikov, AB. Farimani, H. Chaput. (2023)
- *Online Metaheuristic Algorithm Selection*  
**K. Meidani**, S. Mirjalili, AB. Farimani. (2022) **Expert Systems with Applications (ESwA)**
- *MAB-OS: Multi-Armed Bandits Metaheuristic Optimizer Selection*  
**K. Meidani**, S. Mirjalili, AB. Farimani. (2022) **Applied Soft Computing**

## RELATED GRADUATE COURSES

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- Machine Learning
- Deep Learning
- Convex Optimization
- Probability and Statistics
- Deep Reinforcement Learning and Control
- Numerical Methods