

Mikhail M. Meskhi

Curriculum Vitae

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Education

- 2019–2024 **Ph.D. in Computer Science**, University Of Houston.
○ **Ph.D. Thesis:** "*Data Distillation in Learning to Learn: Learning a Meta-Dataset & Task Characterization*," under supervision of **Dr. Ricardo Vilalta**
- 2015–2019 **B.Sc. in Computer Science**, North American University, GPA 3.91.

Research Projects

- **Ph.D. Overall Project**
Learning to learn a meta-dataset using Kernel Induced Points using Sparse Gaussian Processes. Currently consists of [1, 4].
- **Novel Constraint on Nuclear EOS**
A novel constraint on the high temperature nuclear equation of state and describes which EOS candidates are more or less favored by an bootstrapped Monte-Carlo simulation of information-theoretic metric [2].
- **Transfer Explainability via LRP**
Exploring and understanding feature contributions in transfer learning. Implemented LRP on transformer model trained on COVID detection in X-Rays to better understand model's behavior.
- **Bayesian Domain Adaptation**
Active-learning method to domain adaptation across domains using priors [3]. Applied novel method on classifying various craters from satellite images of Mars.

Experience

- 2023 **Data Science Intern**, *Merck Inc.*, Implemented state-of-the-art meta-learning framework for molecular property prediction.
- 2022 **Data Science Intern**, *National Research Group*, Worked on implementing custom NLP topic modeling and sentiment analysis methods.
- 2020 **Research Associate**, *Entergy*, Developed a non-linear binary programming solution that optimizes the failure rates in electrical grids under certain constraints.
- 2019 **Data Scientist**, *PDR Corp*, Designed and implemented an ETL pipeline to collect architecture project data. Deployed PySpark and Hadoop clusters that facilitated data ETL into Azure data lakes..

Programming Languages & Frameworks

- **Languages:** Python, C, R, SQL

- **Frameworks:** JAX, PyTorch, Optax, NumPy, Pandas, Scikit-Learn
- **Tools:** AWS (S3, Lambda, RedShift), DataRobot, AutoML, Airflow, Git

Skills

Deep Learning

Development, *Experienced in designing, implementing, debugging and tuning a large variety of end-to-end differentiable systems, including meta-learning and transfer learning systems. In-depth understanding and experience in auto-differentiation libraries such as Jax and PyTorch.*

Research, *Experienced deep learning researcher with a focus on meta-learning and data distillation. I have collaborated with various researchers from different fields such as statistics, astrophysics, and political science on over 5 projects. I like working on different machine learning projects with intersecting ideas to develop novel and creative solutions..*

Engineering

Software Engineering Skills, *High performance computing, federated/distributed programming, networks programming, REST API.*

Talks & Engagement

- 2021 **Poster,** *AAAI Meta-learning Workshop, Learning Abstract Task Representation.*
- 2021 **Oral Presentation,** *Research Showcase at the University of Houston.*
- 2019 **Oral Presentation,** *Machine Learning MeetUp at the University of Houston.*

Honors & Awards

- 2021 **University Of Houston,** Graduate Research Showcase Best Poster in Machine Learning, Work based on the AAAI publication [1].
- 2019–2024 **University Of Houston,** Graduate Tuition Fellowship.
- 2018 **Texas Southern University,** MLH hackHouston Gold Medal.

Teachings

- 2023 **Advanced Machine Learning,** *COSC 6397, Teaching Assistant.*
- 2022 **Machine Learning,** *COSC 6342, Teaching Assistant.*
- 2021 **Machine Learning,** *COSC 6342, Teaching Assistant.*
- 2020 **Operating Systems,** *COSC 3360, Teaching Assistant.*

Professional Activities

Reviewer, International Neural Network Society Journal.

Reviewer, AISTATS 2022 Conference.

Reviewer, AutoML 2022 Conference and Meta-Learning Workshop.

Junior Reviewer, NeurIPS 2022 Meta-Learning Workshop.

Publications

- [1] **M. Meskhi, Mikhail**, A. Rivolli, Rafael G. Mantovani, and R. Vilalta. Learning Abstract Task Representations. *AAAI Conference on Artificial Intelligence, Meta-Learning & Co-Hosted Challenge Workshop*, Jan. 2021.
- [2] **Mikhail M. Meskhi**, N. E. Wolfe, Z. Dai, C. Fröhlich, J. M. Miller, R. K. W. Wong, and R. Vilalta. A new constraint on the nuclear equation of state from statistical distributions of compact remnants of supernovae. *The Astrophysical Journal Letters*, 932(1):L3, jun 2022.
- [3] R. Vilalta, K. D. Gupta, D. Boumber, and **Mikhail M. Meskhi**. A general approach to domain adaptation with applications in astronomy. *Publications of the Astronomical Society of the Pacific*, 131(1004):108008, sep 2019.
- [4] R. Vilalta and **Mikhail M. Meskhi**. Transfer of knowledge across tasks. In *Metalearning: Applications To Data Mining, second edition*. Springer, 2021.

Languages

- **Native:** Georgian, English, Russian
- **Proficient:** Arabic