

MAX TOROP

✉ torop.m@northeastern.edu 🌐 maxtorop.github.io ☎ +1 347-224-6458

EDUCATION

Northeastern University

PhD Candidate in Electrical Engineering, GPA: 4.00/4.00

- **Advisor:** Professor Jennifer Dy

Boston, MA

Sep 2020 — Current

Washington University in St. Louis

M.S. in Computer Science, GPA: 3.97/4.00

- **Advisor:** Professor Ulugbek Kamilov

St. Louis, MO

Sep 2018 — Dec 2019

The University of Rochester

B.S. in Data Science, GPA: 3.40/4.00

Rochester, NY

Sep 2014 — May 2018

ACADEMIC EXPERIENCE

Machine Learning Lab

Northeastern University

Boston, MA

Sep 2020 — Current

- **Interpretability:** Developed SmoothHess, a method for interpreting neural network predictions through quantifying input feature interactions. SmoothHess was used to interpret predictions from a network trained on spiromgrams to predict biomarkers related to lung disease. Published in **NeurIPS 2023**.
- **Out-of-Distribution Detection:** Collaborated with scientists at **Memorial Sloan Kettering Cancer Center** to evaluate and improve the capability of self-supervised out-of-distribution detection methods for dermoscopy data. Published in the NeurIPS 2021 Workshop: Medical Imaging Meets NeurIPS.

Computational Imaging Group

Washington University in St. Louis

St. Louis, MO

May 2019 — Dec 2019

- Collaborated with radiologists to develop a self-supervised deep learning model which reconstructs quantitative $R2^*$ images from MRI data. $R2^*$ is a metric which gives insight into the iron contents of the brain. Published in **Magnetic Resonance in Medicine (MRM)**.
- Mentored an undergraduate student in the lab for her senior thesis project.

WORK EXPERIENCE

Apple

ML Research Intern

Seattle, WA

May 2024 — Aug 2024

- Worked in the Data and Machine Learning Innovation Team, developing data valuation methods for large-language models.

iD Tech Camps

Instructor

New York, NY

July 2018 — Aug 2018

- Taught teenagers to create neural networks and familiarized them with basic machine learning practices.

PUBLICATIONS AND TALKS

Published

- Davin Hill, Aria Masoomi, **Max Torop**, Sandesh Ghimire, Jennifer Dy. “Boundary-Aware Uncertainty for Feature Attribution Explainers.” **AISTATS 2024**.
- **Max Torop***, Aria Masoomi*, Davin Hill, Kivanc Kose, Stratis Ioannidis, Jennifer Dy. “SmoothHess: ReLU Network Feature Interactions via Stein’s Lemma.” **NeurIPS 2023**.
- Davin Hill, **Max Torop**, Aria Masoomi, Peter J. Castaldi, Jennifer Dy, Michael H. Cho, Brian D. Hobbs. “Deep Learning Utilizing Discarded Spirometry Data to Improve Lung Function and Mortality Prediction in the UK Biobank.” **ATS 2022 (Oral)**.
- **Max Torop**, Sandesh Ghimire, Wenqian Liu, Dana H. Brooks, Octavia Camps, Milind Rajadhyaksha, Jennifer Dy, Kivanc Kose. “Unsupervised Approaches for Out-Of-Distribution Dermoscopic Lesion Detection.” **NeurIPS 2021: Medical Imaging Meets NeurIPS Workshop**.

- **Max Torop**, Satya V.V.N. Kothapalli, Yu Sun, Jiaming Liu, Sayan Kahali, Dmitriy A. Yablonskiy, Ulugbek S. Kamilov. “Deep learning using a biophysical model for robust and accelerated reconstruction of quantitative, artifact-free and denoised images.” **Magnetic Resonance in Medicine**, vol. 84, no. 6, pp. 2932–2942, 2020.

Preprints

- Davin Hill, **Max Torop**, Aria Masoomi, Peter J. Castaldi, Edwin K. Silverman, Sandeep Bodduluri, Surya P. Bhatt, Taedong Yun, Cory Y. McLean, Farhad Hormozdiari, Jennifer Dy, Michael H. Cho, Brian D. Hobbs. “Deep learning utilizing suboptimal spirometry data to improve lung function and mortality prediction in the UK Biobank.” medRxiv 2023. In Submission.

Talks

- “SmoothHess: ReLU Network Feature Interactions via Stein’s Lemma,” Prof. Finale Doshi-Velez’s group at Harvard, Boston, MA, 10/2024 (upcoming).
- “Unsupervised representation learning for detecting out of distribution samples in dermoscopy images of eight types of skin lesions,” SPIE BIOS, San Francisco, CA, 03/2022.

TEACHING AND LEADERSHIP

- Teaching assistant for the Advanced Machine Learning course at Northeastern University (Spring 2022).
- Organized the purchase and setup of a server for our group. Developed usage guidelines documentation.
- Co-organize a bi-weekly seminar for the SPIRAL group at Northeastern University. Selected speakers: Brian Kulis (BU), Amin Karbasi (Yale), Michael Hughes (Tufts) and David Rosen (NEU).

SKILLS AND SERVICE

- **Research:** Interpretable ML, Self-Supervised Learning, Out-of-Distribution Detection
- **Languages/Tools:** Python, PyTorch, pandas, NumPy, scikit-learn, L^AT_EX, SLURM.
- **Familiar:** MATLAB, Java.
- **Service:** Reviewer for AISTATS, AAAI and SIVP.

AWARDS

- | | |
|---|----------------------------|
| • Dean’s Fellowship (Northeastern) | <i>Sep 2020 — May 2024</i> |
| • Dean’s List, 5 Terms (Rochester) | <i>Sep 2014 — May 2018</i> |
| • Research and Innovation Grant (Rochester) | <i>Sep 2014</i> |