

Teddy Koker

CONTACT	teddy.koker@gmail.com https://teddykoker.com https://github.com/teddykoker	
EDUCATION	Worcester Polytechnic Institute , Worcester, MA Bachelor of Science in Computer Science	Sep. 2016 – Dec. 2019
PROFESSIONAL EXPERIENCE	Massachusetts Institute of Technology, Lincoln Laboratory <i>Associate Staff, AI Technology Group</i> Created equivariant neural networks for electron density prediction. Developed methods for contrastive representation learning of crystalline materials with graph neural networks. Researched domain adaptation and interpretability methods for timeseries models in collaboration with Harvard Medical School.	Apr. 2021 – Present
	Lightning AI <i>Machine Learning Research Engineer</i> Created torchmetrics package, complete with efficient and scalable implementations of popular evaluation metrics. Led project on model interpretability, introducing a new way of generating pixel level saliency maps. Assisted with research focusing on self-supervised learning of image representations through Variational Autoencoders.	Aug. 2020 – Feb. 2021
	Harvard Medical School <i>Machine Learning Research Associate</i> Conducted research within the Image and Data Analysis Core. Created deep learning model to detect manipulation of microscopy images. Proposed a novel approach to biomedical image retrieval.	Dec. 2019 – Aug. 2020
SELECT PUBLICATIONS	<i>Higher Order Equivariant Graph Neural Networks for Charge Density Prediction.</i> Teddy Koker , Keegan Quigley, Lin Li. In Review, 2023.	
	<i>Encoding Time-Series Explanations through Self-Supervised Model Behavior Consistency.</i> Owen Queen, Thomas Hartvigsen, Teddy Koker , Huan He, Theodoros Tsiligkaridis, Marinka Zitnik. NeurIPS, 2023 (spotlight)	
	<i>Domain Adaptation for Time Series Under Feature and Label Shifts.</i> Huan He, Owen Queen, Teddy Koker , Consuelo Cuevas, Theodoros Tsiligkaridis, Marinka Zitnik. International Conference on Machine Learning (ICML), 2023	
	<i>Graph Contrastive Learning for Materials.</i> Teddy Koker , Keegan Quigley, Will Spaeth, Nathan Frey, Lin Li. NeurIPS AI for Accelerated Materials Design Workshop, 2022.	
	<i>AAVAE: Augmentation-Augmented Variational Autoencoders.</i> William Falcon, Ananya Harsh Jha, Teddy Koker , Kyunghyun Cho. arXiv preprint.	
	<i>U-Noise: Learnable Noise Masks for Interpretable Image Segmentation.</i> T. Koker , F. Mireshghallah, T. Titcombe, G. Kaissis. International Conference on Image Processing (ICIP), 2021.	
	<i>On Identification and Retrieval of Near-Duplicate Biological Images: A New Dataset and Protocol.</i> T. Koker* , S.S. Chintapalli*, S. Wang, B.A. Talbot, D. Wainstock, M. Cicconet, M.C. Walsh. International Conference on Pattern Recognition (ICPR), 2020.	

TALKS	Poster presenter, Graph Exploitation Symposium at MIT	Aug. 2023
	Speaker, DTRA Chemical and Biological Defense Science & Technology Conference	Dec. 2022
	Speaker, Recent Advances in AI for National Security at MIT Lincoln Laboratory	Nov. 2021
PERSONAL WRITING	<i>Learning to Learn with JAX</i>	Apr. 2022
	<i>Performers: The Kernel Trick, Fourier Features, and Attention</i>	Dec. 2020
	<i>Deep Learning for Guitar Effect Emulation</i>	May. 2020
	<i>NLP from Scratch: Annotated Attention</i>	Feb. 2020
SELECT CODE		
	Torchsort , https://github.com/teddykoker/torchsort , 700+ stars	
	PyTorch library implementing the <i>Fast Differentiable Sorting and Ranking</i> algorithm, optimized with custom C++ and CUDA extensions.	
	Torchmetrics , https://github.com/lightning-ai/metrics , 1.6k+ stars	
	Machine learning metrics for distributed and scalable PyTorch applications.	
	Image GPT , https://github.com/teddykoker/image-gpt , 200+ stars	
	PyTorch implementation of <i>Generative Pretraining from Pixels</i> , including additional experiments on MNIST and CIFAR datasets. Early example demonstrating the usability of <i>Transformers</i> on images in a compute-limited setting.	