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Education

2017– PhD in Computer Science, Yale University. Advisor: Smita Krishnaswamy.
Thesis committee: Ronald Coifman, Guy Wolf, and Marynel Vasquez

2015–2017 MS in Computer Science, Tufts University. Advisor: Soha Hassoun.

2013–2017 BS in Computer Science, Tufts University. (*summa cum laude*).

Publications

* † Denote equal contribution.
Links to full publications available on my website: `https://alextong.net/publications`

[1] (Preprint) Kuchroo, M., Huang, J., Wong, P., Grenier, J.-C., Shung, D., **Tong, A.**, Lucas, C., Klein, J., Burkhardt, D., Gigante, S., Godavarthi, A., Israelow, B., Oh, J. E., Silva, J., Takahashi, T., Odio, C. D., Fournier, J., Cruz, D., Ko, A. I., Wilson, F. P., Hussin, J., Wolf, G. & Krishnaswamy, S. Multiscale PHATE Exploration of SARS-CoV-2 Data Reveals Multimodal Signatures of Disease. BioRxiv (2020).

[2] *(Preprint)* **Tong, A.***, Wenkel, F.*, MacDonald, K. Krishnaswamy S.† & Wolf, G.† Data-driven Learning of Geometric Scattering Modules for GNNs.

[3] *(Preprint to appear in Nature Biotechnology)* Burkhardt, D. B.*, Stanley, J. S.*, **Tong, A.**, Perdigoto, A. L., Gigante, S. A., Herold, K. C., Wolf, G., Giraldez, A. J.†, van Dijk, D.†, & Krishnaswamy, S.† Quantifying the Effect of Experimental Perturbations in Single-Cell RNA-Sequencing Data Using Graph Signal Processing. BiorXiv preprint.

[4] Castro, E., Benz, A., **Tong, A.**, Wolf, G.†, & Krishnaswamy, S.† Uncovering the Folding Landscape of RNA Secondary Structure with Deep Graph Embeddings. in 2020 IEEE International Conference on Big Data.

[5] **Tong, A.***, Wenkel, F.*, MacDonald K., Wolf, G.† & Krishnaswamy, S.† Scattering Priors for Graph Neural Networks. In Conference on the Mathematical Theory of Deep Learning (2020).

[6] **Tong, A.**, Wolf, G. & Krishnaswamy, S. Fixing Bias in Reconstruction-based Anomaly Detection with Lipschitz Discriminators. in IEEE MLSP (2020). **Best Student Paper Award**

[7] **Tong, A.**, Huang, J., Wolf, G.†, van Dijk, D.† & Krishnaswamy, S.† TrajectoryNet: A Dynamic Optimal Transport Network for Modeling Cellular Dynamics. in Proceedings of the 37th International Conference on Machine Learning (2020).

[8] **Tong, A.** & Krishnaswamy, S. Interpolating optimal transport barycenters of patient manifolds. 28th Conference on Intelligent Systems for Molecular Biology (2020).

[9] Dijk, D. van[*], Burkhardt, D. B.[*], Amodio, M., **Tong, A.**, Wolf, G.[†] & Krishnaswamy, S.[†] Finding Archetypal Spaces Using Neural Networks. in 2019 IEEE International Conference on Big Data (Big Data) 2634–2643 (IEEE, 2019). doi:10.1109/BigData47090.2019.9006484

[10] **Tong, A.**[*], van Dijk, D.[*], Stanley III, J. S., Amodio, M., Yim, K., Muhle, R., Noonan, J., Wolf, G.[†] & Krishnaswamy, S.[†] Interpretable Neuron Structuring with Graph Spectral Regularization. in Advances in Intelligent Data Analysis XVIII 509–521 (Springer International Publishing, 2020). doi:10.1007/978-3-030-44584-3_40

[11] Aspnes, J., Haeupler, B., **Tong, A.** & Woelfel, P. Allocate-On-Use Space Complexity of Shared-Memory Algorithms. (2018). doi:10.4230/LIPICS.DISC.2018.8 (Note: authors ordered alphabetically)

Workshops

[1] **Tong, A.**, Kuchroo, M., Huguet G., Coifman R., Wolf G., Krishnaswamy S., Fast Diffusion Optimal Transport for Manifold-of-Manifold Embeddings. (to appear) NeurIPS 2020 Workshop on Learning Meaningful Representations of Life.

[2] **Tong, A.**[*], Wenkel, F.[*], MacDonald, K. Krishnaswamy S.[†] & Wolf, G.[†] Data driven learning of deep scattering networks. (to appear) NeurIPS 2020 Machine Learning for Molecules Workshop

[3] Castro, E., Benz, A., **Tong, A.**, Wolf, G. & Krishnaswamy, S. Uncovering the Folding Landscape of RNA Secondary Structure with Deep Graph Embeddings. ICML 2020 Workshop on Graph Representation Learning and Beyond.

[4] **Tong, A.**, Huang, J., Wolf, G.[†], van Dijk, D.[†] & Krishnaswamy, S.[†] Modeling Cellular Dynamics with Continuous Normalizing Flows. NeurIPS 2019 Workshop on Learning Meaningful Representations of Life. Spotlight presentation.

[5] **Tong, A.**[*], van Dijk, D.[*], Stanley III, J. S., Amodio, M., Yim, K., Muhle, R., Noonan, J., Wolf, G.[†] & Krishnaswamy, S.[†] Graph Spectral Regularization For Neural Network Interpretability. Presented at the Workshop on Representation Learning on Graphs and Manifolds (ICLR 2019). Poster.

Teaching

Spring 2019	(TA) CPSC 465/565, Theory of Distributed Systems	Yale University
Fall 2018	(TA) CPSC 468/568, Computational Complexity	Yale University
Spring 2016	(TA) COMP 150, Cryptography	Tufts University
Fall 2015	(TA) COMP 160, Algorithms	Tufts University
Spring 2015	(TA) COMP 160, Algorithms	Tufts University
Fall 2014	(TA) COMP 40, Machine Architecture	Tufts University

Honors

Best Student Paper IEEE Machine Learning and Signal Processing 2020
Tau Beta Pi Honor Society 2016
3 time Academic All-American ICSA

Experience

Montreal Institute for Learning Algorithms (MILA), Montreal, CA (virtual)
Visiting Researcher, Fall 2020

- Collaboration with Guy Wolf on geometric scattering

Artificial Intelligence Laboratory, Xevo Inc., Bellevue, WA
AI Research Intern, Summer 2017

- Productized object detection algorithms for use in automotive computer vision systems
- Improved embedded high-performance, low-power machine learning framework

Ab Initio, Lexington, MA
Software Engineering Intern, Summer 2016

- Integrated statistics tracking into Hadoop Map-reduce multi-process environment
- Worked on meta-programming system to cross compile on multiple architectures

Amazon Robotics (formerly Kiva Systems), North Reading, MA
Software Engineering Intern, Summer 2015

- Developed a visual localization system to augment personnel tracking system
- Simultaneous Localization and Mapping (SLAM) system presented to CEO

Surround.io, Seattle, WA
Software Engineering Intern, Summer 2014

- Implemented Raspberry Pi based Hadoop Map-reduce cluster
- First intern in early stage startup with four senior software engineers