Tongzhou Wang

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Education

Massachusetts Institute of Technology — *Cambridge, MA*

Machine Learning PhD Candidate at MIT CSAIL — *Feb. 2019 - PRESENT*

- Research Interests: **Structures in machine learning and artificial agents:** invariance, abstraction, distance, factorization, redundancy, *etc*.
  - Structures **of** learned representations
  - Structures **for** more efficient and general agents
  - Structures **needed in** learning via structured synthetic data
- Advisors: Phillip Isola and Antonio Torralba.

University of California, Berkeley — *Berkeley, CA*

B.A. in Computer Science and Statistics — *Aug. 2013 - May 2017*

- Research with Stuart Russell, Ren Ng, and Alexei Efros.

Industrial Experience

Facebook AI Research (FAIR) — *Remote*

Research Intern — *June 2021 - Dec. 2021*

- Minimal representation for model-based reinforcement learning. Paper appeared in ICML 2022.
- Host: Yuandong Tian

Facebook AI Research (FAIR) — *New York, NY*

Full-time Framework Engineer on the PyTorch Team — *Aug. 2017 - Jan. 2019*

- PyTorch core team when team size < 10.
- Scientific computing & deep learning operators, autograd optimization, CPU & GPU optimization, data loading, Python binding, etc.

Publications

Structures of representations · Structures for better agents · Structures in learning via synthetic data

Optimal Goal-Reaching Reinforcement Learning via Quasimetric Learning — *2023*

Tongzhou Wang, Antonio Torralba, Phillip Isola, Amy Zhang

- International Conference on Machine Learning 2023 [ICML 2023].
- Webpage arXiv

Generalizing Dataset Distillation via Deep Generative Prior — *2023*

George Cazenavette, Tongzhou Wang, Antonio Torralba, Alexei A. Efros, Jun-Yan Zhu

- IEEE/CVF Conference on Computer Vision and Pattern Recognition 2023 [CVPR 2023].

Improved Representation of Asymmetrical Distances with Interval Quasimetric Embeddings — *2022*

Tongzhou Wang, Phillip Isola

- Workshop on Symmetry and Geometry in Neural Representations at NeurIPS 2022 [NeurReps Workshop at NeurIPS 2022].
- Proceedings of Machine Learning Research (PMLR), Volume on Symmetry and Geometry in Neural Representations
- PyTorch Package for Quasimetric Learning Webpage OpenReview arXiv

Procedural Image Programs for Representation Learning — *2022*

Manel Baradad, Chun-Fu Chen, Jonas Wulff, Tongzhou Wang, Rogerio Feris, Antonio Torralba, Phillip Isola

- Conference on Neural Information Processing Systems 2022 [NeurIPS 2022].
- Code & Datasets Webpage OpenReview arXiv

Denoised MDPs: Learning World Models Better Than the World Itself — *2022*

Tongzhou Wang, Simon S. Du, Antonio Torralba, Phillip Isola, Amy Zhang, Yuandong Tian

- International Conference on Machine Learning 2022 [ICML 2022].
- Code Webpage arXiv

On the Learning and Learnability of Quasimetrics — *2022*

Tongzhou Wang, Phillip Isola

- International Conference on Learning Representations 2022 [ICLR 2022].
- Code Webpage OpenReview arXiv

Dataset Distillation by Matching Training Trajectories (🗄) *2022*

George Cazenavette, Tongzhou Wang, Antonio Torralba, Alexei A. Efros, Jun-Yan Zhu

- IEEE/CVF Conference on Computer Vision and Pattern Recognition 2022 [CVPR 2022].
- Code Webpage arXiv

Totems: Physical Objects for Verifying Visual Integrity *2022*

Jingwei Ma, Lucy Chai, Minyoung Huh, Tongzhou Wang, Ser-Nam Lim, Phillip Isola, Antonio Torralba

- European Conference on Computer Vision 2022 [ECCV 2022].
- Code Webpage arXiv

Learning to See by Looking at Noise (🗄) *2021*

Manel Baradad*, Jonas Wulff*, Tongzhou Wang, Phillip Isola, Antonio Torralba

- Advances in Neural Information Processing Systems 2021 [NeurIPS 2021].
- Code & Datasets Webpage arXiv

Understanding Contrastive Representation Learning through Alignment and Uniformity on the Hypersphere (⬡) *2020*

Tongzhou Wang, Phillip Isola

- International Conference on Machine Learning 2020 [ICML 2020].
- Code Webpage arXiv

Rewriting a Deep Generative Model (🗄) *2020*

David Bau, Steven Liu, Tongzhou Wang, Jun-Yan Zhu, Antonio Torralba

- European Conference on Computer Vision 2020 [ECCV 2020].
- Code Webpage arXiv

Diverse Image Generation via Self-Conditioned GANs (⬡) *2020*

Steven Liu, Tongzhou Wang, David Bau, Jun-Yan Zhu, Antonio Torralba

- Conference on Computer Vision and Pattern Recognition 2020 [CVPR 2020].
- Code Webpage arXiv

Dataset Distillation (🗄) *2018*

Tongzhou Wang, Jun-Yan Zhu, Antonio Torralba, Alexei A. Efros

- Code Webpage arXiv

Meta-Learning MCMC Proposals *2017*

Tongzhou Wang, Yi Wu, David A. Moore, Stuart Russell

- Advances in Neural Information Processing Systems 2018 [NeurIPS 2018].
- Oral presentation at ICML 2017 AutoML workshop.
- arXiv

Learning to Synthesize a 4D RGBD Light Field from a Single Image *2017*

Pratul Srinivasan, Tongzhou Wang, Ashwin Sreelal, Ravi Ramamoorthi, Ren Ng

- International Conference on Computer Vision 2017 [ICCV 2017].
- Code arXiv

Academic Services

Reviewer	ICML 2020 (Top Reviewer), NeurIPS 2020, ICML 2021, CVPR 2021, NeurIPS 2021, ICLR 2022, ICML 2022, NeurIPS 2022, ICML 2023, NeurIPS 2023, TMLR.
Workshop Organizer	Goal-Conditioned Reinforcement Learning (GCRL) Workshop at NeurIPS 2023.