

# 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.
  - 🧩 Geometric structures of learned representations
  - 🏠 Geometric structures for more efficient and general agents
  - 📊 Understanding training data 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

🧩: Geometric structures of representations   🏠: Efficient and general agents   📊: 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, RICHARD 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 (📄)

GEORGE CAZENAVETTE, [TONGZHOU WANG](#), ANTONIO TORRALBA, ALEXEI A. EFROS, JUN-YAN ZHU

2022

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

## Totems: Physical Objects for Verifying Visual Integrity

JINGWEI MA, LUCY CHAI, MINYOUNG HUH, [TONGZHOU WANG](#), SER-NAM LIM, PHILLIP ISOLA, ANTONIO TORRALBA

2022

- European Conference on Computer Vision 2022 [[ECCV 2022](#)].
- [📄](#) [Code](#) [Webpage](#) [arXiv](#)

## Learning to See by Looking at Noise (📄)

MANEL BARADAD, JONAS WULFF, [TONGZHOU WANG](#), PHILLIP ISOLA, ANTONIO TORRALBA

2021

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

## Understanding Contrastive Representation Learning through Alignment and Uniformity on the Hypersphere (🧠)

[TONGZHOU WANG](#), PHILLIP ISOLA

2020

- International Conference on Machine Learning 2020 [[ICML 2020](#)].
- [📄](#) [Code](#) [Webpage](#) [arXiv](#)

## Rewriting a Deep Generative Model (📄)

DAVID BAU, STEVEN LIU, [TONGZHOU WANG](#), JUN-YAN ZHU, ANTONIO TORRALBA

2020

- European Conference on Computer Vision 2020 [[ECCV 2020](#)].
- [📄](#) [Code](#) [Webpage](#) [arXiv](#)

## Diverse Image Generation via Self-Conditioned GANs (🧠)

STEVEN LIU, [TONGZHOU WANG](#), DAVID BAU, JUN-YAN ZHU, ANTONIO TORRALBA

2020

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

## Dataset Distillation (📄)

[TONGZHOU WANG](#), JUN-YAN ZHU, ANTONIO TORRALBA, ALEXEI A. EFROS

2018

- [📄](#) [Code](#) [Webpage](#) [arXiv](#)

## Meta-Learning MCMC Proposals

[TONGZHOU WANG](#), YI WU, DAVID A. MOORE, STUART RUSSELL

2017

- 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

PRATUL SRINIVASAN, [TONGZHOU WANG](#), ASHWIN SREELAL, RAVI RAMAMOORTHY, REN NG

2017

- 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.