

# Zheng (Thomas) Tang

SENIOR DEEP LEARNING ENGINEER AT NVIDIA · EXPERT IN COMPUTER VISION AND MACHINE LEARNING

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## Summary

Current Senior Deep Learning Engineer at NVIDIA · Previous Applied Scientist at Amazon ('19-'21) · Ph.D. in Electrical & Computer Engineering at UW · 6 filed U.S. patents and 25 publications · Tech Lead of Metropolis Multi-Camera Tracking AI Workflow featured in NVIDIA GTC'24 Keynote by Jensen Huang · Associate Editor of T-CSVT · Organizing Committee Lead of AI City Challenges at CVPR · Winning team's leader at the 2nd AI City Challenge in CVPR'18 · Finalist in 2 Best Student Paper Awards at ICPR'16 · No immigration sponsorship needed

## Education

### University of Washington (UW)

PH.D. IN ELECTRICAL & COMPUTER ENGINEERING

Seattle, WA, USA

Sep. 2014 - Jun. 2019

- Advised by Prof. Jenq-Neng Hwang (IEEE Fellow), dissertation titled "Robust Video Object Tracking via Camera Self-Calibration"

### University of Washington (UW)

M.S. IN ELECTRICAL ENGINEERING

Seattle, WA, USA

Sep. 2014 - Mar. 2016

- GPA: 3.83/4.0

### Queen Mary University of London (QMUL)

B.S. IN TELECOMMUNICATIONS ENGINEERING WITH MANAGEMENT (JOINT PROGRAMME)

London, UK

Sep. 2010 - Jun. 2014

- First Class Honours

### Beijing University of Posts and Telecommunications (BUPT)

B.S. IN TELECOMMUNICATIONS ENGINEERING WITH MANAGEMENT (JOINT PROGRAMME)

Beijing, China

Sep. 2010 - Jun. 2014

## Work Experience

### NVIDIA

SENIOR DEEP LEARNING ENGINEER, METROPOLIS

Redmond, WA, USA

May 2021 - PRESENT

- Led development of a Multi-Camera Tracking AI Workflow featured in the **NVIDIA GTC'24 Keynote** and ranked **2/19** in the 8th AI City Challenge
- Created a 3.2M-image dataset for human-centric tasks and trained a **ReID Transformer**, improving tracking accuracy by **6-20%** on our KPIs
- Organizing the **AI City Challenges** at CVPR with the largest indoor synthetic dataset created by **Omniverse**, featured in an **NVIDIA blog**

### Amazon

APPLIED SCIENTIST, AMAZON ONE

Seattle, WA, USA

Jul. 2019 - May 2021

- Worked on the research team that developed and launched **Amazon One**, an identity service using people's palm for payment, entry and more
- Invented an architecture that utilized various modalities of sensor data for automated user identification and was filed for a **U.S. patent**
- Invented a mechanism to update identification data in automated user-identification systems that was also filed for a **U.S. patent**

### NVIDIA

INTELLIGENT VIDEO ANALYTICS INTERN

Santa Clara, CA, USA

Jun. 2018 - Mar. 2019

- Created **CityFlow**, a city-scale benchmark for multi-target multi-camera (MTMC) vehicle tracking and ReID, accepted to **CVPR'19 (Oral)**
- Proposed **PAMTRI**, a pose-aware multi-task network for vehicle ReID using highly randomized synthetic data, accepted to **ICCV'19**

### University of Washington

RESEARCH ASSISTANT

Seattle, WA, USA

Jun. 2015 - Jun. 2018

- Built clustering-based vehicle tracking and camera self-calibration that won in **Track 1** of the **2nd AI City Challenge Workshop** in **CVPR'18**
- Developed multi-camera tracking from visual and semantic features that won in **Track 3** of the **2nd AI City Challenge Workshop** in **CVPR'18**
- Proposed evolutionary camera self-calibration from tracking, a finalist of **2 Best Student Paper Awards** at **ICPR'16** (funded by Prism Skylabs)

## Professional Services

### IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT)

ASSOCIATE EDITOR

Remote

Jan. 2021 - PRESENT

### AI City Challenge Workshops at IEEE Conf. Comput. Vis. Pattern Recognit. (CVPR)

ORGANIZING COMMITTEE LEAD

Remote

Jun. 2020 - PRESENT

# Selected Publications

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## JOURNAL ARTICLES

The staged knowledge distillation in video classification: Harmonizing student progress by a complementary weakly supervised framework

Chao Wang, Zheng Tang  
*T-CVST* 34.8 (2024) pp. 6646–6660. 2024

WSSGCN: Wide sub-stage graph convolutional networks

Chao Wang, Zheng Tang, Hailu Xu  
*Neurocomputing* 602 (2024) p. 128273. 2024

## CONFERENCE PAPERS

The 8th AI City Challenge

Shuo Wang, David C. Anastasiu, Zheng Tang, Ming-Ching Chang, Yue Yao, Liang Zheng, Mohammed Shaiqur Rahman, Meenakshi S. Arya, Anuj Sharma, Pranamesh Chakraborty, Sanjita Prajapati, Quan Kong, Norimasa Kobori, Munkhjargal Gochoo, Munkh-Erdene Otgonbold, Ganzorig Batnasan, Fady Alnajjar, Ping-Yang Chen, Jun-Wei Hsieh, Xunlei Wu, Sameer Satish Pusegaonkar, Yizhou Wang, Sujit Biswas, Rama Chellappa  
*Proc. CVPR Workshops*, pp. 7261–7272, 2024, Seattle, WA, USA

Radiance field learners as UAV first-person viewers

Liqi Yan, Qifan Wang, Junhan Zhao, Qiang Guan, Zheng Tang, Jianhui Zhang, Dongfang Liu  
*Proc. ECCV*, 2024, Milan, Italy

PAMTRI: Pose-aware multi-task learning for vehicle re-identification using highly randomized synthetic data

Zheng Tang, Milind Naphade, Stan Birchfield, Jonathan Tremblay, William Hodge, Ratnesh Kumar, Shuo Wang, Xiaodong Yang  
*Proc. ICCV*, pp. 211–220, 2019, Seoul, Korea

CityFlow: A city-scale benchmark for multi-target multi-camera vehicle tracking and re-identification

Zheng Tang, Milind Naphade, Ming-Yu Liu, Xiaodong Yang, Stan Birchfield, Shuo Wang, Ratnesh Kumar, David C. Anastasiu, Jenq-Neng Hwang  
*Proc. CVPR*, pp. 8797–8806, 2019, Long Beach, CA, USA

Camera self-calibration from tracking of moving persons

Zheng Tang, Yen-Shuo Lin, Kuan-Hui Lee, Jenq-Neng Hwang, Jen-Hui Chuang, Zhijun Fang  
*Proc. ICPR*, pp. 260–265, 2016, Cancún, México

# Selected Patents

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Multi-sensor subject tracking for monitored environments for real-time and near-real-time systems and applications

Zheng Tang, Sujit Biswas, Ganapathy Seshadri Cadungude Aiyer, Shuo Wang, Akshay Agrawal, Sameer Satish Pusegaonkar  
U.S. Patent Application No. 18/605,121 (Pending), 2024

Multi-subject multi-camera tracking for high-density environments

Zheng Tang, Sujit Biswas, Ganapathy Seshadri Cadungude Aiyer, Shuo Wang, Akshay Agrawal, Sameer Satish Pusegaonkar  
U.S. Patent Application No. 18/618,974 (Pending), 2024

Three-dimensional multi-camera perception systems and applications

Zheng Tang, Yizhou Wang, Orcun Cetintas, Sameer Satish Pusegaonkar, Ganapathy Seshadri Cadungude Aiyer, Shuo Wang, Akshay Agrawal, Sujit Biswas, Tim Meinhardt, Laura Leal-Taixe  
U.S. Patent Application No. 18/898,120 (Pending), 2024

Utilizing sensor data for automated user identification

Zheng Tang, Prithviraj Banerjee, Manoj Aggarwal, Gerard Medioni  
U.S. Patent Application No. 17/209,845 (Pending), 2021

Updating identification data in automated user-identification systems

Zheng Tang, Lior Zamir, Prithviraj Banerjee, Manoj Aggarwal, Gerard Medioni, Dilip Kumar  
U.S. Patent Application No. 17/361,811 (Pending), 2021

# Honors & Awards

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2022	<b>T-CVST Best Associate Editor Award</b> , IEEE Circuits and Systems Society (CASS)	<i>Remote</i>
2019	<b>People's Choice Award</b> , Code for the Kingdom (C4TK) Hackathon	<i>Seattle, WA, USA</i>
2018	<b>Winner of Track 1 (Traffic Flow Analysis)</b> , 2nd AI City Challenge Workshop in CVPR'18	<i>Salt Lake City, UT, USA</i>
2018	<b>Winner of Track 3 (Multi-camera Vehicle Detection &amp; ReID)</b> , 2nd AI City Challenge Workshop in CVPR'18	<i>Salt Lake City, UT, USA</i>
2016	<b>Finalist in IBM &amp; Intel Best Track 3 Student Paper Awards</b> , ICPR'16	<i>Cancún, México</i>

# Skills

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<b>Programming</b>	Python (expert), C/C++ (proficient), Java (proficient), JavaScript (proficient), MATLAB (expert), $\LaTeX$ (expert)
<b>Frameworks &amp; Tools</b>	PyTorch (expert), TensorFlow (expert), Git (expert), Docker (expert), OpenCV (expert), Kafka (expert), Unity (proficient)
<b>Languages</b>	English (proficient), Mandarin (native), Cantonese (native), Spanish (elementary)