

# Zheng (Thomas) Tang

APPLIED SCIENTIST, METROPOLIS AT NVIDIA · EXPERT IN COMPUTER VISION AND MACHINE LEARNING

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## Summary

Current Applied Scientist, Metropolis at NVIDIA · Previous Research Scientist, Amazon One at Amazon (2019 - 2021) · Ph.D. in Electrical & Computer Engineering at the University of Washington · 3 filed U.S. patents and 17 publications · Associate Editor of T-CSVT · Organizing Committee member of the AI City Challenge Workshops in CVPR · 9-month internship at NVIDIA with 2 papers accepted to CVPR'19 and ICCV'19 · Leader of the winning team at the 2nd AI City Challenge Workshop in CVPR'18 · Finalist of 2 Best Student Paper Awards at ICPR'16

## 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) at the Information Processing Lab
- Dissertation topic: 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

- GPA: 88.73/100

## Work Experience

### NVIDIA

APPLIED SCIENTIST, METROPOLIS

Redmond, WA, USA

May 2021 - PRESENT

- Developed **NVIDIA MDX** (Metropolis Data Analytics Toolkit) based on Kafka providing analytics for streaming sensor perception metadata
- Organizing the **AI City Challenge Workshops** in conjunction with **CVPR** that have attracted 1,000+ participating teams across 40+ countries

### Amazon

RESEARCH 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**
- Created a 3D human pose estimator to enable overlaying AR for medical simulation under 6-DoF camera motion (funded by ArchieMD Inc.)
- Proposed evolutionary camera self-calibration from tracking, a finalist of **2 Best Student Paper Awards** at **ICPR'16** (funded by Prism Skylabs)
- Invented adaptive segmentation and tracking with top accuracy (**74.82%**) on the **NLPR\_MCT** benchmark (funded by Madrona Venture Group)

## Professional Service

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

ASSOCIATE EDITOR

Remote

Jan. 2021 - PRESENT

- Promptly assigned papers for review and offered decisions that helped reduce decision-making time by **52.5 days** compared to 2019
- Provided constructive feedback on the innovation, coverage and quality of papers that helped improve the impact factor (4.133 → **4.685**)

## Selected Publications

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### JOURNAL ARTICLE

Online-learning-based human tracking across non-overlapping cameras

Young-Gun Lee, Zheng Tang, Jenq-Neng Hwang

*T-CST* 28.10 (2018) pp. 2870–2883. 2018

### CONFERENCE PAPERS

The 5th AI City Challenge

Milind Naphade, Shuo Wang, David C. Anastasiu, Zheng Tang, Ming-Ching Chang, Xiaodong Yang, Yue Yao, Liang Zheng, Pranamesh Chakraborty, Christian E. Lopez, Anuj Sharma, Qi Feng, Vitaly Ablavsky, Stan Sclaroff

*Proc. CVPR Workshops*, pp. 4263–4273, 2021, Virtual

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 Anastasiu, Jenq-Neng Hwang

*Proc. CVPR*, pp. 8797–8806, 2019, Long Beach, CA, USA

Joint multi-view people tracking and pose estimation for 3D scene reconstruction

Zheng Tang, Renshu Gu, Jenq-Neng Hwang

*Proc. ICME*, pp. 1–6, 2018, San Diego, CA, USA

Single-camera and inter-camera vehicle tracking and 3D speed estimation based on fusion of visual and semantic features

Zheng Tang, Gaoang Wang, Hao Xiao, Aotian Zheng, Jenq-Neng Hwang

*Proc. CVPR Workshops*, pp. 108–115, 2018, Salt Lake City, UT, USA

Inter-camera tracking based on fully unsupervised online learning

Young-Gun Lee, Zheng Tang, Jenq-Neng Hwang, Zhijun Fang

*Proc. ICIP*, pp. 2607–2611, 2017, Beijing, China

Multiple-kernel adaptive segmentation and tracking (MAST) for robust object tracking

Zheng Tang, Jenq-Neng Hwang, Yen-Shuo Lin, Jen-Hui Chuang

*Proc. ICASSP*, pp. 1115–1119, 2016, Shanghai, China

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

## Patents

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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

Neural Network System for Object Identification

Zheng Tang, Stan Birchfield, William Hodge, Ratnesh Kumar, Milind Naphade, Jonathan Tremblay, Shuo Wang, Xiaodong Yang

U.S. Patent Application No. 16/442,375 (Pending), 2019

## Honors & Awards

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2019 **People's Choice Award**, Code for the Kingdom (C4TK) Hackathon

Seattle, WA, USA

2018 **Winner of Track 1 (Traffic Flow Analysis)**, 2nd AI City Challenge Workshop in CVPR'18

Salt Lake City, UT, USA

2018 **Winner of Track 3 (Multi-camera Vehicle Detection & ReID)**, 2nd AI City Challenge Workshop in CVPR'18

Salt Lake City, UT, USA

2017 **Winner of Track 2 (AI City Applications)**, 1st AI City Challenge Workshop in SmartWorld'17

San Francisco, CA, USA

2016 **Finalist IBM Best Track 3 Student Paper Award**, ICPR'16

Cancún, México

2016 **Finalist Intel Best Track 3 Student Paper Award**, ICPR'16

Cancún, México

## Skills

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