

# WEIJIAN DENG

Email: [weijian.deng@anu.edu.au](mailto:weijian.deng@anu.edu.au) ◊ <http://weijiandeng.xyz> ◊ [Google Scholar](#)

Research Fellow ◊ Australian National University

## RESEARCH INTERESTS

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**Machine Learning Safety:** Concentrated on the safety of large language models and multimodal models, focusing on improving resilience and reliability. Emphasis on developing robust models for varied environments and creating monitoring mechanisms to detect misuse and analyze failure patterns.

**3D Content Modeling & Generation:** Focused on the advancement of 3D modeling and generation, specifically for refractive objects. By applying optical principles, aims to significantly enhance the realism and accuracy of 3D objects and scenes.

## EDUCATION

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**Australian National University, Australia** *Jul 2019 - Jan 2023*

Research Topic: Predicting Modeling Generalization

Supervisors: Prof. Stephen Gould, Dr. Yumin Suh, Dr. Liang Zheng

**University of Chinese Academy of Sciences, China** *Sep 2016 - Jun 2019*

Master of Science in Computer Science

Research Topic: Object Recognition

Supervisor: Prof. Jianbin Jiao

**Beijing Jiaotong University, China** *Sep 2012 - Jun 2016*

Bachelor of Engineering

## EXPERIENCE

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**Research Fellow** *Jan 2023 - Now*

Australian National University, Australia

Advisor: Prof. Stephen Gould

**HEX International Singapore** *Jan 2024*

Youth Business Entrepreneurship Programs

**Lecturer at SDUW** *Nov - Dec 2023*

Joint ANU-SDUW Program, Winter Semester

*Introduction to Computer Science, 24 lectures*

**NEC Laboratories America, INC.** *Jun 2020 - Sep 2020*

Research Intern (Remote) on Multi-task Learning

Hosted by Dr. Yumin Suh

**Singapore University of Technology and Design** *Aug 2019 - Nov 2019*

Research Assistant on Domain Adaptation

Hosted by Dr. Liang Zheng

## PROFESSIONAL SERVICE

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**ACM MM 2024 Area Chair**

**Co-organizer:** CVPR'22 Tutorial on Evaluating Models Beyond the Textbook: Out-of-distribution and Without Labels (<https://sites.google.com/view/evalmodel>)

**Co-organizer:** ECCV'20 Visual Domain Adaptation Challenge (<http://ai.bu.edu/visda-2020>)

**Conference Reviewer:** NeurIPS'22-23; ICML'22-24; ICLR'22-24; ICCV'21,23; CVPR'21-24; ECCV'20  
**Journal Reviewer:** IEEE-TPAMI; IEEE-TIP; IJCV  
**Guest Lecturer:** SUTD Dec 2018 (*Image-Image Translation*); ANU Sep 2019 (*SVDNet*)  
**Research Talks:** *Model Evaluation With Self-Supervision*, SYSU, Jun 2022; *Predicting Model Generalization*, NUS, Jan 2024; *Unsupervised Model Evaluation*, A\* Star, Jan 2024

## AWARDS & HONORS

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NeurIPS 2023 Top Reviewer, 2023  
NeurIPS 2022 Scholar Award, 2022  
ICML 2022 Top 10% Reviewer, 2022  
ECCV 2020 Outstanding Reviewer, 2022  
Australian Government Research Training Program (AGRTP) Scholarship, 2019-2023  
The Third Place in Vehicle Re-identification track of CVPR 2019 AI-City Challenge, 2019  
China National Scholarship (Master), 2018  
China National Scholarship (Bachelor), 2014, 2015

## PUBLICATIONS

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*Summary.* Published > 16 papers in top computer vision and machine learning venues such as CVPR, ICCV, ICML, NeurIPS, TPAMI, TIP, and TCSVT. Google Scholar Citations = 2,500.

### Predicting Model Generalization

- [1] Confidence and Dispersity Speak: Characterising Prediction Matrix for Unsupervised Accuracy Estimation  
**Weijian Deng**, Yumin Suh, Liang Zheng, Stephen Gould  
International Conference on Machine Learning (**ICML**), 2023
- [2] AutoEval: Are Labels Always Necessary for Classifier Accuracy Evaluation?  
**Weijian Deng** and Liang Zheng  
IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**), 2022
- [3] Are Labels Always Necessary for Classifier Accuracy Evaluation?  
**Weijian Deng** and Liang Zheng  
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2021
- [4] What Does Rotation Prediction Tell Us about Classifier Accuracy under Varying Testing Environments?  
**Weijian Deng**, Stephen Gould, and Liang Zheng  
International Conference on Machine Learning (**ICML**), 2021
- [5] A Bag-of-Prototypes Dataset Representation  
Weijie Tu, **Weijian Deng**, Tom Gedeon, Liang Zheng  
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2023

### Monitoring Model Reliability

- [6] On the Strong Correlation Between Model Invariance and Generalization  
**Weijian Deng**, Stephen Gould, and Liang Zheng  
Neural Information Processing Systems (**NeurIPS**), 2022
- [7] Adaptive Calibrator Ensemble for Model Calibration under Distribution Shift  
Yuli Zou\*, **Weijian Deng\*** (equal contribution), Liang Zheng  
IEEE/CVF International Conference on Computer Vision (**ICCV**), 2023
- [9] A Closer Look at the Robustness of Contrastive Language-Image Pre-Training (CLIP)  
Weijie Tu, **Weijian Deng**, Tom Gedeon,  
Neural Information Processing Systems (**NeurIPS**), 2023

[10] An Empirical Study Into What Matters for Calibrating Vision-Language Models  
Weijie Tu, **Weijian Deng**, Dylan Campbell, Stephen Gould, Tom Gedeon  
*Under Review*

[12] Ranking Models in Unlabeled New Environments  
Xiaoxiao Sun, Yunzhong Hou, **Weijian Deng**, Hongdong Li, Liang Zheng  
IEEE/CVF International Conference on Computer Vision (**ICCV**), 2021

### 3D Modeling & Generation

[13] Ray Deformation Networks for Novel View Synthesis of Refractive Objects  
**Weijian Deng**, Dylan Campbell, Chunyi Sun, Shubham Kanitkar, Matthew Shaffer, Stephen Gould  
IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**), 2024

[14] Differentiable Neural Surface Refinement for Transparent Objects  
**Weijian Deng**, Dylan Campbell, Chunyi Sun, Shubham Kanitkar, Matthew Shaffer, Stephen Gould  
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2024

[15] 3D-GPT: Procedural 3D Modeling with Large Language Models  
Chunyi Sun, Junlin Han, **Weijian Deng**, Xinlong Wang, Zishan Qin, Stephen Gould  
*Under Review*

### Enhancing Visual Recognition

[16] Image-Image Domain Adaptation with Preserved Self-Similarity and Domain-Dissimilarity for Person Re-identification  
**Weijian Deng**, Liang Zheng, Qixiang Ye, Guoliang Kang, Yi Yang, and Jianbin Jiao  
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2018

[17] Split to Learn: Gradient Split for Multi-Task Human Image Analysis  
**Weijian Deng**, Yumin Suh, Xiang Yu, Masoud Faraki, Liang Zheng, Manmohan Chandraker  
IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**), 2023

[18] Fine-grained Classification via Categorical Memory Networks  
**Weijian Deng**, Joshua Marsh, Stephen Gould, and Liang Zheng  
IEEE Transactions on Image Processing (**TIP**), 2022

[19] Rethinking Triplet Loss for Domain Adaptation  
**Weijian Deng**, Liang Zheng, Yifan Sun, and Jianbin Jiao  
IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**), 2020

[20] SVDNet for Pedestrian Retrieval  
Yifan Sun, Liang Zheng, **Weijian Deng**, Shengjin Wang  
IEEE/CVF International Conference on Computer Vision (**ICCV**), 2017

### Technical Report

[21] Similarity-preserving Image-Image Domain Adaptation for Person Re-Identification  
**Weijian Deng**, Liang Zheng, Qixiang Ye, Yi Yang, and Jianbin Jiao  
arXiv preprint arXiv:1811.10551

[22] Domain alignment with triplets  
**Weijian Deng**, Liang Zheng, and Jianbin Jiao  
arXiv preprint arXiv:1812.00893

[23] Vehicle Re-Identification with Location and Time Stamps  
Kai Lv, Heming Du, Yunzhong Hou, **Weijian Deng**, Hao Sheng, Jianbin Jiao, and Liang Zheng  
CVPR workshop on AI-City, 2019 (Win 3rd place out of 84 participants)