University of Southampton

Biography

Full name incl. title	Dr. Zhiwu Huang
Present post	Lecturer
Faculty	Physical Sciences and Engineering
School / Department	Electronics and Computer Science

Qualifications

Date	Subject	Title of award	Awarding body
04.12.2024	Education	HEA Fellow	University of Southampton
01.07.2015	Computer Science	PhD degree	University of Chinese Academy of Sciences

Employment

Appointment	Institution / Department	Date from	Date to
Lecturer	University of Southampton	04.01.2023	Present
Assistant Professor	Singapore Management University	01.09.2021	31.12.2022
Guest Researcher	ETH Zurich	01.06.2021	31.07.2021
Postdoctoral Researcher	ETH Zurich	01.09.2015	31.05.2021

Research outputs

Contribution to journal

1. *Ziheng Chen*, *Yue Song*, Tianyang Xu, *Zhiwu Huang*, Xiao-Jun Wu, Nicu Sebe. Adaptive Log-Euclidean Metrics for SPD Matrix Learning. *IEEE Transactions on Image Processing (TIP), 2024.*
2. *Yuan Tian*, Klaus-Rudolf Kladny, Qin Wang, *Zhiwu Huang*, Olga Fink. Multi-agent Actor-critic with Time Dynamical Opponent Model. *Neurocomputing*, 2023.
3. *Dario Fuoli*, *Zhiwu Huang*, Danda Pani Paudel, Luc Van Gool, Radu Timofte. An Efficient Recurrent Adversarial Framework for Unsupervised Real-time Video Enhancement. *International Journal of Computer Vision (IJCV)*, 2022.
4. *Zhiwu Huang*, *Ruiping Wang*, Shiguang Shan, Luc Van Gool, Xilin Chen. Cross Euclidean-to-Riemannian Metric Learning with Application to Face Recognition from Video. *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2018.
5. *Wen Wang*, *Ruiping Wang*, *Zhiwu Huang*, Shiguang Shan, Xilin Chen. Discriminant Analysis on Riemannian Manifold of Gaussian Distributions for Face Recognition with Image Sets. *IEEE Transactions on Image Processing (TIP)*, 2018.

6. *Zhiwu Huang, Ruiping Wang*, Xianqiu Li, Wenxian Liu, Shiguang Shan, Luc Van Gool, Xilin Chen. Geometry-aware Similarity Learning on SPD Manifolds for Visual Recognition. *IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)*, 2017.
7. *Mengyi Liu, Ruiping Wang*, Shaoxin Li, Zhiwu Huang, Shiguang Shan, Xilin Chen. Video Modeling and Learning on Riemannian Manifold for Emotion Recognition in the Wild. *Journal on Multimodal User Interfaces (JMUI)*, 2016.
8. *Zhiwu Huang, Shiguang Shan*, Ruiping Wang, Haihong Zhang, Shihong Lao, Alifu Kuerban, Xilin Chen. A Benchmark and Comparative Study of Video-based Face Recognition on COX Face Database. *IEEE Transactions on Image Processing (TIP), vol. 24, no. 12, pp. 5967-5981*, 2015.
9. *Zhiwu Huang, Ruiping Wang*, Shiguang Shan, Xilin Chen. Face Recognition on Large-scale Video in the Wild with Hybrid Euclidean-and-Riemannian Metric Learning. *Pattern Recognition (PR), vol. 48, no. 10, pp. 3113-3124*, 2015.

Contribution to conference

1. *Yabin Wang, Zhiwu Huang#*, Xiaopeng Hong. *(#indicates corresponding author). OpenSDI: Spotting Diffusion-Generated Images in the OpenWorld.* In *Computer Vision and Pattern Recognition (CVPR), 2025.*
2. **Han Xue, Zhiwu Huang*, Qianru Sun, Li Song, Wenjun Zhang. Freestyle Layout-to-Image Synthesis. Accepted as a **highlight** (10% of accepted papers, 2.5% of submissions). In *Computer Vision and Pattern Recognition (CVPR), 2023.*
3. *Ziheng Chen, Tianyang Xu*, Xiao-Jun Wu, Rui Wang, Zhiwu Huang, Josef Kittler. Riemannian Local Mechanism for SPD Neural Networks. In *Association for the Advancement of Artificial Intelligence (AAAI)*, 2023.
4. *Yabin Wang#, Zhiheng Ma#, Zhiwu Huang*, Yaowei Wang, Zhou Su, *Xiaopeng Hong. (#indicates equal contribution)* . Isolation and Impartial Aggregation: A Paradigm of Incremental Learning without Interference. In *Association for the Advancement of Artificial Intelligence (AAAI)* , 2023.
5. **Yabin Wang, Zhiwu Huang*, Xiaopeng Hong. S-Prompts Learning with Pre-trained Transformers: An Occam's Razor for Domain Incremental Learning. In *Conference on Neural Information Processing Systems (NeurIPS)*, 2022.
6. *Chuqiao Li, Zhiwu Huang#*, Danda Pani Paudel, Yabin Wang, Mohamad Shahbazi, Xiaopeng Hong, Luc Van Gool. *(#indicates corresponding author)*. A Continual Deepfake Detection Benchmark: Dataset, Methods, and Essentials. In *Winter Conference on Applications of Computer Vision (WACV)* , 2023.
7. *Yan Wu, Zhiwu Huang*, Suryansh Kumar, Rhea Sanjay Sukthanker, Radu Timofte, Luc Van Gool. Trilevel Neural Architecture Search for Efficient Single Image Super-Resolution. In *Computer Vision and Pattern Recognition (CVPR) NAS workshop* , 2022.
8. *Rhea Sanjay Sukthanker, Zhiwu Huang*, Suryansh Kumar, Radu Timofte, Luc Van Gool. Generative Flows with Invertible Attentions. In *Computer Vision and Pattern Recognition (CVPR), 2022.*
9. *Aoming Liu, Zehao Huang, Zhiwu Huang*, Naiyan Wang. Direct Differentiable Augmentation Search. In *International Conference on Computer Vision (ICCV), 2021.*
10. *Rhea Sanjay Sukthanker, Zhiwu Huang*, Suryansh Kumar, Erik Goron Endsjo, Yan Wu, Luc Van Gool. Neural Architecture Search of SPD Manifold Networks. In *International Joint Conference on Artificial Intelligence (IJCAI)*, 2021.

11. *Mohamad Shahbazi, Zhiwu Huang*, Danda Pani Paudel, Ajad Chhatkuli, Luc Van Gool. Efficient Conditional GAN Transfer with Knowledge Propagation across Classes. In *Computer Vision and Pattern Recognition (CVPR)*, 2021.

12. *Stefano D'Apolito, Danda Pani Paudel, Zhiwu Huang*, Andres Romero Vergara, Luc Van Gool. GANmut: Learning Interpretable Conditional Space for a Gamut of Emotions. In *Computer Vision and Pattern Recognition (CVPR)*, 2021.

13. *Anton Obukhov*, Maxim Rakhuba, Alexander Liniger, Zhiwu Huang, Stamatios Georgoulis, Dengxin Dai, Luc Van Gool. Spectral Tensor Train Parameterization of Deep Learning Layers. In *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2021.

14. *Yan Wu#, Aoming Liu#, Zhiwu Huang*, Siwei Zhang, Luc Van Gool. (#indicates equal contributions). Neural Architecture Search as Sparse Supernet. In *Association for the Advancement of Artificial Intelligence (AAAI)*, 2021.

15. *Siwei Zhang, Zhiwu Huang*, Danda Pani Paudel, Luc Van Gool. Facial Emotion Recognition with Noisy Multi-task Annotations. In *Winter Conference on Applications of Computer Vision (WACV), 2021*.

16. *Marc Yanlong Zhang, Zhiwu Huang*, Danda Pani Paudel, Janine Thoma, Luc Van Gool. Weakly Paired Multi-Domain Image Translation. In *British Machine Vision Conference (BMVC), 2020.*

17. *Dario Fuoli, Zhiwu Huang*, Radu Timofte and et al. AIM 2020 Challenge on Video Extreme Super-Resolution: Methods and Results. In *European Conference on Computer Vision (ECCV) workshop, 2020 .*

18. *Yuan Tian#, Qin Wang#, Zhiwu Huang*, Wen Li, Dengxin Dai, Minghao Yang, Jun Wang, Olga Fink. *(#indicates equal contributions).* Off-Policy Reinforcement Learning for Efficient and Effective GAN Architecture Search. In *European Conference on Computer Vision (ECCV), 2020 .*

19. *Dario Fuoli, Zhiwu Huang*, Martin Danelljan, Radu Timofte and et al. NTIRE 2020 Challenge on Video Quality Mapping: Methods and Results. In *Computer Vision and Pattern Recognition (CVPR) workshop, 2020.*

20. Sohyeong Kim, Guanju Li, Dario Fuoli, Martin Danelljan, Zhiwu Huang, Shuhang Gu, Radu Timofte. The Vid3oC and IntVID Datasets for Video Super Resolution and Quality Mapping. In *International Conference on Computer Vision (ICCV) workshop*, 2019.

21. **Jiqing Wu#, Zhiwu Huang#*, Dinesh Acharya, Wen Li, Janine Thoma, Danda Pani Paudel, Luc Van Gool. Sliced Wasserstein Generative Models. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019. (#indicates equal contributions)

22. *Zhiwu Huang*, Jiqing Wu, Luc Van Gool. Manifold-valued Image Generation with Wasserstein Generative Adversarial Nets. *Association for the Advancement of Artificial Intelligence (AAAI)*, 2019.

23. **Jiqing Wu, Zhiwu Huang*, Janine Thoma, Dinesh Acharya, Luc Van Gool. Wasserstein Divergence for GANs. *European Conference on Computer Vision (ECCV)*, 2018.

24. *Dinesh Acharya, Zhiwu Huang*, Danda Pani Paudel, Luc Van Gool. Covariance Pooling for Facial Expression Recognition. *The workshop DiffCVML in IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018.

25. *Zhiwu Huang*, Jiqing Wu, Luc Van Gool. Building Deep Networks on Grassmann Manifolds. *Association for the Advancement of Artificial Intelligence (AAAI)*, 2018.

26. **Zhiwu Huang*, Chengde Wan, Thomas Probst, Luc Van Gool. Deep Learning on Lie Groups for Skeleton-based Action Recognition. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017.

27. *Zhiwu Huang*, Luc Van Gool. A Riemannian Network for SPD Matrix Learning. *Association for the Advancement of Artificial Intelligence (AAAI)*, 2017.

28. *Zhiwu Huang, Ruiping Wang*, Shiguang Shan, Xianqiu Li, Xilin Chen. Log-Euclidean Metric Learning on S Manifold with Application to Image Set Classification. *International Conference on Machine Learning (ICML)*, 2015.

29. *Zhiwu Huang, Ruiping Wang*, Shiguang Shan, Xilin Chen. Projection Metric Learning on Grassmann Manifold with Application to Video based Face Recognition. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2015.

30. *Yan Li, Ruiping Wang, Zhiwu Huang*, Shiguang Shan, Xilin Chen. Face Video Retrieval with Image Query via Hashing across Euclidean Space and Riemannian Manifold. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2015.

31. *Wen Wang, Ruiping Wang, Zhiwu Huang*, Shiguang Shan, Xilin Chen. Discriminant Analysis on Riemannian Manifold of Gaussian Distributions for Face Recognition with Image Sets. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2015.

32. J. Ross Beveridge, Hao Zhang, Bruce A. Draper, Patrick J. Flynn, Zhenhua Feng, Patrick Huber, Josef Kittler, Zhiwu Huang, Shaoxin Li, Yan Li, Meina Kan, Ruiping Wang, Shiguang Shan, Xilin Chen , Haoxiang Li, Gang Hua, Vitomir Struc, Janez Krizaj, Changxing Ding, Dacheng Tao, P. Jonathon Phillips. Report on the FG 2015 Video Person Recognition Evaluation. *IEEE International Conference on Automatic Face and Gesture Recognition (FG)*, 2015.

33. *Zhiwu Huang, Ruiping Wang*, Shiguang Shan, Xilin Chen. Hybrid Euclidean-and-Riemannian Metric Learning for Image Set Classification. *Asian Conference on Computer Vision (ACCV*, 2014.

34. Mengyi Liu, Ruiping Wang, Shaoxin Li, Shiguang Shan, Zhiwu Huang, Xilin Chen. Combining Multiple Kernel Methods on Riemannian Manifold for Emotion Recognition in the Wild. *ACM International Conference on Multimodal Interaction (ICMI)*, 2014.

35. *Zhiwu Huang, Ruiping Wang*, Shiguang Shan, Xilin Chen. Learning Euclidean-to-Riemannian Metric for Point-to-Set Classification. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2014.

36. *Mengyi Liu, Ruiping Wang, Zhiwu Huang*, Shiguang Shan, Xilin Chen. Partial Least Squares Regression on Grassmannian Manifold for Emotion Recognition. *ACM International Conference on Multimodal Interaction (ICMI)*, 2013. (ACM EmotiW Challenge Second Runner-Up Award)

37. *Zhiwu Huang, Xiaowei Zhao*, Shiguang Shan, Ruiping Wang, Xilin Chen. Coupling Alignments with Recognition for Still-to-Video Face Recognition. *IEEE International Conference on Computer Vision (ICCV)*, 2013.

38. *Zhiwu Huang, Shiguang Shan*, Haihong Zhang, Shihong Lao, Alifu Kuerban, Xilin Chen. Benchmarking Still-to-Video Face Recognition via Partial and Local Linear Discriminant Analysis on COX-S2V Dataset. In *Asian Conference on Computer Vision (ACCV)*, 2012.

39. *Zhiwu Huang, Shiguang Shan*, Haihong Zhang, Shihong Lao, Xilin Chen. Cross-view Graph Embedding. In *Asian Conference on Computer Vision (ACCV)*, 2012.

Press/Media

Summary of press and media contributions, including title, collaborators, coverage and dates
In August 2024, *Nature* published the News article *AI 'Deepfake' Faces Detected Using Astronomy Methods*, featuring my expert commentary as an AI researcher at the University of Southampton. I noted that my research had not identified inconsistent light patterns in the eyes of deepfake images but emphasized the potential of analyzing subtle anomalies in lighting, shadows, and reflections across an image. I explained that while the specific technique of detecting inconsistent reflections in eyeballs might not be broadly applicable, such methods could complement existing approaches and enhance the overall accuracy of deepfake detection.

Awards

Title	Award holder(s)	Funding body	Value	Dates
Lectureship Startup Grant	Zhiwu Huang	University of Southampton	£5,000	04.01.2023-03.01.2024
Academic Research Found Grant (MSS21C002)	Zhiwu Huang (PI)	Singapore Ministry of Education	S$100,000	01.01.2022-31.12.2022
Amazon Web Services (AWS) GPU Grant	Zhiwu Huang (PI)	AWS Europe (Zurich)	$25,000	01.08.2019-31.07.2021

Prizes

Honour / Distinction	Date awarded
PGCAP Module 2 (Case Study) - Pass with Distinction	17.06.2024
Highlight paper (top 2.5% of submissions) in CVPR 2023 [Note: CVPR is ranked 2nd in terms of Google Scholar's H5-index]	21.03.2023
One of the best publications of the Week in DeepAI Publication	20.04.2019
Excellent Doctoral Thesis Award Final List (China Computer Foundation)	01.05.2017

Teaching

Year	2024-Present		
Modules (name and code)	Deep Learning Technologies	COMP6252	University of Southampton
Number of students (UG/PG/Other)	PG		
Contact hours of module overall	150 (total study time)		
My contribution of hours	6 (I've taught 6 lectures)		
Summary of teaching & assessment responsibilities	I primarily taught four core lectures, along with one introductory session and one revision session. I contributed 20% to the teaching of this module and was responsible for designing exam papers, with 20% of the exam content focusing on the material I taught.		

Year	2024-Present		
Modules (name and code)	Data Mining	COMP6237	University of Southampton
Number of students (UG/PG/Other)	PG		
Contact hours of module overall	150 (total study time)		
My contribution of hours	14 (I've taught 14 lectures)		
Summary of teaching & assessment responsibilities	I taught 13 core lectures, in addition to one introductory session and one revision session. My contribution to the teaching of this module was 40%, and I was also responsible for designing the exam papers, with 40% of the exam content based on the material I covered.		

Year	2025-Present		
Modules (name and code)	Data Analytics	AICE1006	University of Southampton
Number of students (UG/PG/Other)	UG		
Contact hours of module overall	150 (total study time)		
My contribution of hours	15 (I've taught 15 lectures)		
Summary of teaching & assessment responsibilities	I contributed 50% to the teaching of this module, delivering 15 core lectures in addition to one introductory and one revision session. I was also responsible for designing the exam papers, with 50% of the exam content based on the material I covered.		

Year	2021-2022		
Modules (name and code)	Data Mining and Business Analytics	IS424	*SMU Singapore*
Number of students (UG/PG/Other)	UG		
Contact hours of module overall	150 (total study time)		
My contribution of hours	42 (I've taught 14 lectures, each taking 3 hours)		
Summary of teaching & assessment responsibilities	I taught 14 core lectures, which included one introductory session and one revision session. I was fully responsible for the teaching of this module, contributing 100% to its delivery. Additionally, I designed the exam papers, with 50% of the exam content based on the material I covered, while another lecturer was responsible for the remaining 50%.		

Section B: Postgraduate Supervision

Number of Students:

Degree	Current	Completed	Total to date
PhD	4	2	6
Master	0	25	25

Details of the three most recent higher degree students supervised to completion:

Student	Degree and title of thesis	Start date	Completion date
Yuan Tian	PhD (*ETH Zurich*), Prescriptive Maintenance and Operation with Deep Reinforcement Learning	02.2020	02.2023
Jiqing Wu	PhD (*ETH Zurich*), Improving Wasserstein Generative Models for Image Synthesis and Enhancement	11.2016	03.2020