Lei Wang

Research Fellow

ARC Research Hub for Driving Farming Productivity and Disease Prevention, Griffith University

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I am a hardworking, passionate, and self-disciplined researcher.

Lei Wang received his M.E. in Software Engineering from the University of Western Australia (UWA), Perth, in 2018, and his Ph.D. in Engineering and Computer Science from the Australian National University (ANU), Canberra, in 2023. He is currently an ARC Hub Research Fellow (Grade 2) in the School of Engineering and Built Environment — Electrical and Electronic Engineering at Griffith University. He founded the Temporal Intelligence and Motion Extraction (TIME) Lab at ANU, a dynamic research team composed of master's and honours students. The lab has since become an integral part of the ARC Research Hub and the broader Griffith research community. Previously he was a Research Fellow (Level B) in the School of Computing at the ANU College of Engineering, Computing, and Cybernetics and a Visiting Scientist with the Machine Learning Research Group at Data61/CSIRO (formerly NICTA). He also held Visiting Researcher positions at both the Department of Computer Science and Software Engineering at UWA and Data61/CSIRO. Since 2018, he has worked as a full-time Computer Vision Researcher at iCetana Pty Ltd., Perth, and since 2021, he has also served as a Computer Scientist at Active Intelligence Australia Pty Ltd., Perth. Lei has authored numerous first-author papers in top-tier venues, including CVPR, ICCV, ECCV, ACM MM, TPAMI, IJCV, and TIP. His research was recognized with the Sang Uk Lee Best Student Paper Award at the Asian Conference on Computer Vision (ACCV 2022). Currently, he serves as a Guest Editor for the special issue on 'Motion-Centric Video Processing' in the MDPI open-access journal Electronics (Q2, h-index 83). He is also an Area Chair for the International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2025), the International Conference on Pattern Recognition (ICPR 2024), and ACM Multimedia 2024, where he was recognized as an Outstanding Area Chair.

Research Interests: motion-centric | data-centric | machine learning | video understanding | one- and few-shot learning | spectral and tensor learning | optimal transportation | domain adaptation and incremental learning

Education

Doctor of Philosophy (PhD), Engineering & Computer Science, *The Australian National University (ANU)* — *2019/07-2023/12*

Master of Professional Engineering, Software Engineering, *The University of Western Australia (UWA)* — *2016/02-2018/03*

Bachelor of Engineering, Software Engineering, *Yangzhou University (YZU)* — *2011/09-2015/06*

Experience

Research Fellow (Grade 2) | ARC Research Hub for Driving Farming Productivity and Disease Prevention, Griffith University — *2025/02-present*

Research Fellow (Level B) | ANU College of Engineering, Computing and Cybernetics — *2023/02-2025/02*

Visiting Scientist, Postgraduate research student, Visiting Researcher | CSIRO's Data61, Australia — *2018/09-2024/06*

Computer Scientist | Active Intelligence Australia Pty Ltd, Perth, Australia — *2021/07-2024/03*

Machine Learning Researcher | Ebenezer Technologies, Barranquilla, Colombia — *2020/09-2021/01*

Visiting Researcher | Department of Comput. Sci. and Softw. Eng., UWA, Perth, Australia — *2018/10-2019/10*

Computer Vision Researcher, Computer Vision Research Intern | iCetana Pty Ltd, Perth, Australia — *2018/07-2020/09*

Research Projects & Funding

- **Chief Investigator (CI)** / **Delegated lead CI**, "MotionNetLite: Video Dynamics Distillation for Scalable Models", **National Computational Merit Allocation Scheme (NCMAS 2025)**, Grant ID: NCMAS-2025-47, 1MSU and 10TB, 2025/01/01-2025/12/31
- **Lead Chief Investigator (Lead CI)**, "Efficient Video Models through Compression and Data Optimization", **ANU Merit Allocation Scheme 2025 (ANUMAS 2025)**, 1,400KSU, 2025/01/01-2025/12/31
- **Chief Investigator (CI)** / **Delegated lead CI**, "MotionNetLite: Video Dynamics Distillation for Scalable Models", **National Computational Merit Allocation Scheme (NCMAS 2024)**, Grant ID: NCMAS-2024-67, 1MSU and 10TB, 2024/01/01-2024/12/31

- **Lead Chief Investigator (Lead CI)**, "Robust anomaly detection in human-centric videos", The NCI **National AI Flagship Merit Allocation Scheme**, 100KSU and 5TB, 2024/01/01-2024/06/30
- **Co-Investigator (Co-I)**, "Review of Xailient's technical pipeline of facial recognition", **A$ 50,815**, 2023/10/30-2023/12/22 *[CI: Associate Professor Liang Zheng, Co-I: Dr Lei Wang]*
- ***Chief Investigator (CI)** / **Delegated lead CI**, "Towards building general-purpose multimodal foundation models", **NCI Adapter Scheme Q4 2023** (HPC funding scheme), Gadi allocation 100KSU and storage allocation 25KSU (4TB), 2023/10/01-2023/12/31*
- ***Grant / Project Award** (Oracle Cloud credits award), "Automatic, large-scale screening of failure cases in autonomous driving", **A$ 48,000**, 2023/07/26-2024/07/25*
- ***Co-Investigator (Co-I)**, "Sharing early insights for more resilient communities", **A$ 71,089**, 2023/04/19-2023/10/31 [CI: Professor Lorrae Van Kerkhoff, Co-I: Mr Takuya Iwanaga, Dr Steven Lade, Dr Wendy Merritt, Dr Lei Wang, Associate Professor Liang Zheng]*
- ***Research sponsorship** (Active Intelligence Corp.), **Principal Investigator / Project Lead**, "Detecting anomalies in video footage (stage 3)", **A$ 40,013**, 2023/07/01-2024/03/01*
- ***Research sponsorship** (Active Intelligence Corp.), **Principal Investigator / Project Lead**, "Detecting anomalies in video footage (stage 2)", **A$ 108,628**, 2022/07/01-2023/06/30*
- ***Research sponsorship** (Active Intelligence Corp.), **Principal Investigator / Project Lead**, "Detecting anomalies in video footage", **A$ 135,706**, 2021/07/01-2022/06/30*

Teaching

TechLauncher Examiner | School of Computing, ANU *2024/07-2024/10*
- ANU TechLauncher S2 2024, co-taught courses: COMP3500, COMP4500, COMP8715
- Course Convenors: Associate Professor Charles Gretton & Associate Professor Liang Zheng
- My Student Experience of Learning and Teaching (SELT) teacher survey results: 4.11 ± 0.80 (on a 5-point scale, 413 enrollments)

TechLauncher Examiner | School of Computing, ANU *2024/02-2024/05*
- ANU TechLauncher S1 2024, co-taught courses: COMP3500, COMP4500, COMP8715
- Course Convenors: Associate Professor Charles Gretton & Associate Professor Liang Zheng
- My SELT teacher survey results: 4.60 ± 0.80 (on a 5-point scale, 313 enrollments)

Teaching Assistant | Department of Comput. Sci. and Softw. Eng., UWA *2018/02-2018/06*
- CITS5508 Machine Learning
- Unit Coordinator(s): Associate Professor Du Huynh & Professor Mark Reynolds

Student Supervision

- I am the **primary supervisor** for two ANU master's students for their final year research projects (24-unit):
  - Gennie Nguyen, "Physiological signals, fake news, and phishing", *Master of Computing (Advanced)*, 2024/07/22-present
  - Yifan Chen, "In-depth analysis of video understanding models", *Master of Machine Learning and Computer Vision*, 2024/07/22-present
- I also serve as the **primary supervisor** for the following honours student on a 1-year, 12-unit research project:
  - Arjun Raj (1xICASSP'25), "Training video data optimisation", *Bachelor of Advanced Computing (R&D) (Honours)*, 2024/07/22-present
- I am an **associate supervisor** for three ANU master's students: Junliang Ye, Haodong Yang, and Meitong Liu, working on multimodal learning and video language models (2024/07/22–present).
- Research Assistant:
  - Xi Ding, "Do Language Models Understand Time?", *Master's Student*, 2024/11/13–present
- Former master's, honours, and internship students (**primary supervision**):
  - Dexuan Ding (1xICLR'25), "LEGO Fusion: Robust Video Anomaly Detection", *Bachelor of Advanced Computing (Honours)*, 2024/02/19 - 2024/10/25
  - Qixiang Chen (1xACML'24 oral), "A Closer Look at Motions", *Bachelor of Advanced Computing (Honours)*, 2024/02/19 - 2024/10/25
  - Huilin Chen, "When Spatial meets Temporal in Action Recognition", *Bachelor of Advanced Computing (Honours)*, 2024/02/19 - 2024/10/25
  - Liyun Zhu (1xNeurIPS'24), "Advancing Video Anomaly Detection", *Master of Machine Learning and Computer Vision*, 2024/02/19 - 2024/10/25
  - Jushang Qiu, "A Practical Guide to Skeletons and Taylor-transformed Skeletons in Action Recognition", *Master of Machine Learning and Computer Vision*, 2024/02/19 - 2024/10/25
  - Liwen Luo, "Human Motion Prediction via Spatio-temporal Correspondence Learning", *Master of Machine Learning and Computer Vision*, 2024/02/19 - 2024/10/25
  - Xiuyuan Yuan (1xICML'24), "Video dynamics distillation", Summer Research Internship (ANU Summer Research Scholars Program), *Bachelor of Advanced Computing (Honours)*, 2023/11/20 - 2024/02/02

Recognition & Honors

- **Outstanding Area Chair**, ACM Multimedia 2024, 2024/10/24

- **Australian AI Awards 2024** (ANU TechLauncher), AI Innovator - Information Technology, 2024/09/19
- **iAwards 2024 ACT Merit Receipt** (ANU TechLauncher), Student & Education category, Australian Information Industry Association (AIIA), 2024/06/12
- **iAwards 2024 Finalist** (ANU TechLauncher), Business & Industry category, AIIA, 2024/05/22
- **The Sang Uk Lee Best Student Paper Award**, ACCV 2022, 2022/12/08
- **The Incentive Unit Award**, Active Intelligence Corp., 2022/09/09-2032/09/08
- **Outstanding Reviewer Award**, ECCV 2022, 2022/10/19
- **Data61 Top-up Scholarship**, Data61/CSIRO, 2019/07/01-2023/06/30
- **Data61 PhD Scholarship**, Data61/CSIRO, 2019/07/01-2023/06/30
- **ANU HDR Fee Remission Merit Scholarship**, ANU, 2019/07/01-2023/06/30
- **Outstanding Graduate Award**, YZU, 2015/06
- **Jingwen Zhu Scholarship**, YZU, 2015/03
- **Principal's Scholarship (First Division)**, YZU, 2014/12
- **The Second Prize of Lanqiao Cup Competition (C/C++ Program Design)**, National Software and Information Technology Professional Talent Competition, 2014/04
- **Principal's Scholarship (Second Division)**, YZU, 2013/12

Professional Service

- Area Chair: ICASSP 2025, ACM Multimedia 2024, ICPR 2024
- Guest Editor: MDPI open-access journal Electronics (Special Issue entitled "Motion-centric Video Processing") [Q2, h-index 83]
- Reviewer:
  - Journals: TPAMI, IJCV, ACM CSUR, TCSVT, TMM, BDMA, PR, CVIU, Neurocomputing, NCAA, JVCI, SIVP, TVCJ, Algorithms, Multimedia Systems, Machine Learning and Knowledge Extraction (MAKE), International Journal of Clinical and Health Psychology (IJCHP), Sensors, Electronics, Journal of Imaging, Future Internet, Information, Healthcare, IET Computer Vision, Electronics Letters, AI Communications, Global Health Economics and Sustainability, PeerJ Computer Science
  - Conferences: ICLR 2023-2025, AAAI 2022-2025, NeurIPS 2022-2024, ICML 2022-2024, AISTATS 2025, CVPR 2022-2025, ICCV 2023, ECCV 2022-2024, WACV 2024-2025, BMVC 2020-2024, ACCV 2024, ICASSP 2025, ICME 2025, IJCNN 2025, IEEE CAI 2023
  - Workshops: 3rd Computer Vision for Metaverse Workshop (CV4Metaverse at ECCV 2024), The AI City Challenge Workshop (CVPR 2023-2024), Vision Datasets Understanding (CVPR 2022-2024), Deep Vision Workshop (CVPR 2020)
- Thesis Examiner for Honors and Master's Theses: ANU College of Engineering, Computing & Cybernetics, S1 & S2 2023, S1 & S2 2024.
- Workshop organizer: "TIME 2025: 1st International Workshop on Transformative Insights in Multi-faceted Evaluation" at The Web Conference (WWW 2025)

Invited Talk

- Action Recognition: Past, Present and Future | Department of Computer Science, Harbin Institute of Technology | 2023/08/12

Publications

†: Corresponding author.

Journals

- [j5] – **Lei Wang**† and Piotr Koniusz. "Feature Hallucination for Self-supervised Action Recognition." *International Journal of Computer Vision.* 2024. IF: 19.5, revision
  [j4] – **Lei Wang**†, Jun Liu, Liang Zheng, Tom Gedeon, and Piotr Koniusz. "Meet JEANIE: a Similarity Measure for 3D Skeleton Sequences via Temporal-Viewpoint Alignment." *International Journal of Computer Vision.* 2024. IF: 19.5
  [j3] – Zhenyue Qin, Yang Liu, Pan Ji, Dongwoo Kim, **Lei Wang**, R.I. (Bob) McKay, Saeed Anwar, and Tom Gedeon. "Fusing Higher-Order Features in Graph Neural Networks for Skeleton-Based Action Recognition." *IEEE Transactions on Neural Networks and Learning Systems* (2022): 4783-4797. IF: 14.255
  [j2] – Piotr Koniusz, **Lei Wang**, and Anoop Cherian. "Tensor Representations for Action Recognition." *IEEE Transactions on Pattern Analysis and Machine Intelligence* 44.2 (2021): 648-665. IF: 24.314
  [j1] – **Lei Wang**†, Du Q. Huynh, and Piotr Koniusz. "A Comparative Review of Recent Kinect-based Action Recognition Algorithms." *IEEE Transactions on Image Processing*, 29 (2019): 15-28. IF: 11.041
- Conferences
  [c15] – Dexuan Ding, **Lei Wang**†, Liyun Zhu, Tom Gedeon, Piotr Koniusz. "Learnable Expansion of Graph Operators for Multi-Modal Feature Fusion." *International Conference on Learning Representations (ICLR)*, 2025. A*
  [c14] – Arjun Raj, **Lei Wang**†, Tom Gedeon. "TrackNetV4: Enhancing Fast Sports Object Tracking with Motion Attention Maps." *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP).* IEEE, 2025. B
  [c13] – Liyun Zhu, **Lei Wang**†, Arjun Raj, Tom Gedeon, and Chen Chen. "Advancing Video Anomaly Detection: A Concise Review and a New Dataset." *NeurIPS D&B Track*. 2024. A*

[c12] – Qixiang Chen, **Lei Wang**†, Piotr Koniusz and Tom Gedeon. "Motion meets Attention: Video Motion Prompts." *Asian Conference on Machine Learning (ACML).* 2024. Long presentation, 5.67% acceptance rate (26% overall acceptance rate)
[c11] – Wenshuo Chen*, Hongru Xiao*, Erhang Zhang*, Lijie Hu, **Lei Wang**, Mengyuan Liu, Chen Chen. "SATO: Stable Text-to-Motion Framework." *ACM Multimedia*, 2024. A* (* denotes equal contribution.)
[c10] – **Lei Wang**†, Piotr Koniusz, Tom Gedeon, and Liang Zheng. "Adaptive Multi-head Contrastive Learning." *European Conference on Computer Vision.* 2024. A*
[c9] – **Lei Wang**†, Xiuyuan Yuan, Tom Gedeon, and Liang Zheng. "Taylor Videos for Action Recognition." *International Conference on Machine Learning (ICML).* 2024. A*
[c8] – **Lei Wang**, Ke Sun, and Piotr Koniusz. "High-order Tensor Pooling with Attention for Action Recognition." *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP).* IEEE, 2023. B, oral
[c7] – **Lei Wang** and Piotr Koniusz. "Flow Dynamics Correction for Action Recognition." *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP).* IEEE, 2023. B
[c6] – **Lei Wang** and Piotr Koniusz. "3Mformer: Multi-order Multi-mode Transformer for Skeletal Action Recognition." *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition.* 2023. A*
[c5] – **Lei Wang** and Piotr Koniusz. "Uncertainty-DTW for Time Series and Sequences." *European Conference on Computer Vision.* Cham: Springer Nature Switzerland, 2022. A*, oral
[c4] – **Lei Wang** and Piotr Koniusz. "Temporal-Viewpoint Transportation Plan for Skeletal Few-shot Action Recognition." *Proceedings of the Asian Conference on Computer Vision.* 2022. B, oral, **Best Student Paper Award**
[c3] – **Lei Wang** and Piotr Koniusz. "Self-supervising Action Recognition by Statistical Moment and Subspace Descriptors." *Proceedings of the 29th ACM international conference on multimedia.* 2021. A*
[c2] – **Lei Wang**, Piotr Koniusz, and Du Q. Huynh. "Hallucinating IDT Descriptors and I3D Optical Flow Features for Action Recognition with CNNs." *2019 IEEE/CVF International Conference on Computer Vision*, IEEE Computer Society, 2019. A*
[c1] – **Lei Wang**, Du Q. Huynh, and Moussa Reda Mansour. "Loss Switching Fusion with Similarity Search for Video Classification." *2019 IEEE International Conference on Image Processing (ICIP)*, IEEE, 2019. B, 1 AU patent

- Workshops

  [w3] – Xi Ding, **Lei Wang**†. "The Journey of Action Recognition." *Companion Proceedings of the ACM Web Conference (WWW Companion)*, 2025. Oral
  [w2] – Xi Ding, **Lei Wang**†. "Do Language Models Understand Time?" *Companion Proceedings of the ACM Web Conference (WWW Companion)*, 2025. Oral
  [w1] – Jushang Qiu, **Lei Wang**†. "Evolving Skeletons: Motion Dynamics in Action Recognition." *Companion Proceedings of the ACM Web Conference (WWW Companion)*, 2025.

- Patents

  [p3] – **Lei Wang**. "System and Method of Detecting Anomalies from Mass Data." (US provisional, SN 63/326,525)
  [p2] – **Lei Wang** and Graeme Woods. "Method and System for Classifying Video Data." (au 2019903775, provisional patent filed 07/10/2019)
  [p1] – **Lei Wang**, Moussa Reda Mansour, and Graeme Woods. "System and Method of Video Data Retrieval." (au 2019900316, provisional patent filed 01/02/2019)

- Theses

  [t2] – **Lei Wang**. "Robust Human Action Modelling." *PhD thesis*, The Australian National University, Canberra, ACT, Australia, Nov. 2023.
  [t1] – **Lei Wang**. "Analysis and evaluation of Kinect-based action recognition algorithms." *Master's thesis*, The University of Western Australia, Perth, WA, Australia, Nov. 2017.

- arXiv preprints

  [a6] – Xi Ding, **Lei Wang**†. "Quo Vadis, Anomaly Detection? LLMs and VLMs in the Spotlight." *arXiv*, 2024.
  [a5] – Huilin Chen, **Lei Wang**†, Yifan Chen, Tom Gedeon, Piotr Koniusz. "When Spatial meets Temporal in Action Recognition." *arXiv*, 2024.
  [a4] – Sen Fang, **Lei Wang**, Ce Zheng, Chunyu Sui, Mingyu Zhao, Yapeng Tian, Chen Chen. "SignLLM: Sign Languages Production Large Language Models." *arXiv*, 2024.
  [a3] – Yuchi Liu, **Lei Wang**, Yuli Zou, James Zou, and Liang Zheng. "Optimizing Calibration by Gaining Aware of Prediction Correctness." *arXiv*, 2024.
  [a2] – **Lei Wang**, Jun Liu, and Piotr Koniusz. "3D Skeleton-based Few-shot Action Recognition with JEANIE is not so Naïve." *arXiv*, 2021. An extended version has been accepted by ACCV'22 [oral] and has been awarded the Sang Uk Lee Best Student Paper Award. The further extension of ACCV'22 has been accepted for publication by the IJCV special issue.
  [a1] – **Lei Wang**. "AI in Software Engineering: Case Studies and Prospects." *arXiv*, 2017, technical report.