Changsheng Lu Ph.D.

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Homepage

Education

The Australian National University (ANU) — Canberra, Australia
Ph.D. in Computer Science — 2020.10 - 2025.01
- Advisor: *Dr.* Piotr Koniusz, *Dr.* Liang Zheng, *Prof.* Stephen Gould

Shanghai Jiao Tong University (SJTU) — Shanghai, China
M.S. in Pattern Recognition and Intelligent System — 2017.09 - 2020.03
- Advisor: *Prof.* Xinping Guan (IEEE Fellow)

Southeast University (SEU), Department of Automation — Nanjing, China
B.E. in Automation — 2013.09 - 2017.06

Work Experience

Hong Kong University of Science and Technology (HKUST) — Hong Kong
Postdoc Research Fellow — 2025.07 - Present
- Advisor: *Prof.* Jiaya Jia (IEEE Fellow)
- Investigating multi-modal generic vision, VLM and VLA; Writing grant proposals; Teaching and supervising students

Australian Institute for Machine Learning, Adelaide University — Adelaide, Australia
Research Fellow — 2025.04 - 2025.07
- Advisor: *Prof.* Anton van den Hengel (Fellow of Australian Academy of Tech. and Eng.)
- Investigating efficient and compact ML architectures and multi-modal generic vision

Research Interest

I have wide research interests in **computer vision**, **machine learning**, **AI**, and **robotics**. My long-term pursuit is **artificial general intelligence**, *i.e.*, making the machine see, think and conduct more like a human.
Now I focus on **multimodal generic vision**, **foundation model**, **VLA**, **zero- and few-shot learning**, and **transfer learning**.

Selected Publications

* indicates equal contribution; † indicates corresponding author

1. **Changsheng Lu**, Hao Zhu, and Piotr Koniusz. Exploiting Class-agnostic Visual Prior for Few-shot Keypoint Detection. *International Journal of Computer Vision* (**IJCV**), 2025. (**Impact Factor: 19.5**)
2. Jiawei Cao, Chaochen Gu, Hao Cheng, Xiaofeng Zhang, Kaijie Wu†, **Changsheng Lu**†. "EFDTR: Learnable Elliptical Fourier Descriptor Transformer for Instance Segmentation." In *Proceedings of 42nd International Conference on Machine Learning* (**ICML**), 2025.
3. **Changsheng Lu**, Zheyuan Liu, Piotr Koniusz. "OpenKD: Opening Prompt Diversity for Zero- and Few-Shot Keypoint Detection." In *18th European Conference on Computer Vision* (**ECCV**), 2024. (code)
4. **Changsheng Lu**, Piotr Koniusz. "Detect Any Keypoints: An Efficient Light-weight Few-shot Keypoint Detector." In *Proceedings of 38th Annual AAAI Conference on Artificial Intelligence* (**AAAI**), 2024.
5. **Changsheng Lu**, Piotr Koniusz. "Few-shot Keypoint Detection with Uncertainty Learning for Unseen Species." In *IEEE/CVF Conference on Computer Vision and Pattern Recognition* (**CVPR**), 2022. (code)
6. **Changsheng Lu**, Siyu Xia, Ming Shao, and Yun Fu. Arc-support Line Segments Revisited: An Efficient and High-quality Ellipse Detection. *IEEE Transactions on Image Processing* (**TIP**), vol. 29, pp. 768-781, 2020, doi: 10.1109/TIP.2019.2934352. (**Impact Factor: 10.8**, code)

7. **Changsheng Lu***, Wenlong Shi*, Ming Shao, Yinjie Zhang, Siyu Xia, and Piotr Koniusz. "Few-shot Shape Recognition by Learning Deep Shape-aware Features." In *IEEE/CVF Winter Conference on Applications of Computer Vision* (**WACV**), 2024.
8. **Changsheng Lu**, Chaochen Gu, Kaijie Wu, Siyu Xia, Haotian Wang, Xinping Guan. Deep transfer neural network using hybrid representations of domain discrepancy. *Neurocomputing*, 2020. (**Impact Factor: 6.0**)
9. **Changsheng Lu**, Haotian Wang, Chaochen Gu, Kaijie Wu, and Xinping Guan. "Viewpoint Estimation for Workpieces with Deep Transfer Learning from Cold to Hot." In *International Conference on Neural Information Processing*, pp. 21-32. Springer, Cham, 2018. (**Oral**, code)
10. **Changsheng Lu**, Siyu Xia, Wanming Huang, Ming Shao, and Yun Fu. "Circle Detection by Arc-support Line Segments." In *IEEE International Conference on Image Processing* (ICIP), 2017. (**Oral**, code)
11. Rong Wang, Wei Mao, **Changsheng Lu**, and Hongdong Li. "Learning High-Fidelity Cloth Animation via Skinning-Free Image Transfer." In *13rd International Conference on 3D Vision* (**3DV**), 2026.
12. Rong Wang, Wei Mao, **Changsheng Lu**, and Hongdong Li. "Towards High-Quality 3D Motion Transfer for Stylized Characters with Realistic Apparel Animation." In *18th European Conference on Computer Vision* (**ECCV**), 2024. (code)
13. Xiaofeng Zhang, Yudi Zhao, Chaochen Gu, **Changsheng Lu**, Shanying Zhu. "SpA-Former: An effective and lightweight transformer for image shadow removal." In IJCNN 2023. (**Oral**, code)
14. Tongkun Guan, Chaochen Gu, **Changsheng Lu**, Jingzheng Tu, Qi Feng, Kaijie Wu, Xinping Guan. Industrial Scene Text Detection with Refined Feature-attentive Network. *IEEE Transactions on Circuits and Systems for Video Technology* (**TCSVT**), 2022. (**Impact Factor: 8.4**, code)
15. Tianhao Wang, **Changsheng Lu**, Ming Shao, Xiaohui Yuan, Siyu Xia. "Eldet: An anchor-free general ellipse object detector." In Asian Conference on Computer Vision, 2022. (code)
16. Mingjian Chen, Hao Zheng, **Changsheng Lu**, Enmei Tu, Jie Yang, and Nikola Kasabov. "A Spatio-Temporal Fully Convolutional Network for Breast Lesion Segmentation in DCE-MRI." In *International Conference on Neural Information Processing*, 2018. (**Oral**)

Representative Research

- **Few-shot keypoint detection:** Keypoint detection is a fundamental task in computer vision. To break the limitation of keypoint types to be detected, we are the first to expand few-shot learning to the field of keypoint detection and open the door to this new field. Now there are over 6 research groups globally working on this new topic.
- **Zero-shot keypoint detection:** To overcome the insufficient prompt diversity in modality, semantics (seen *vs*. unseen), and language, we propose a general keypoint detector which can perform both zero-shot and few-shot keypoint detection by exploiting the foundation models such as **CLIP** and **LLM** (*e.g*. GPT3.5, Vicuna).
- **High-quality circle/ellipse detector:** Circle/ellipse detection are fundamental problems in digital image processing. We propose an industry-level circle/ellipse detection algorithm which can detect circles/ellipses from digital images precisely, robustly, and fast, overcoming the long-standing issue of unsatisfactory detection in this field. This research has gained high recognition from the global experts in computer vision, robotics, and material science, *etc*. (Rank #1 in GitHub).

Selected Awards and Honors

Awards:

- **Outstanding award** for studying abroad, awarded by CSC 2023
- **Best thesis award** for masters, by Shanghai Association of Automation (SAA) 2021
- **PhD Fellowship**, awarded by ANU & Australian Government 2020
- **National Scholarship**, awarded by Ministry of Education of China (**top 2%**) 2019
- **National Scholarship**, awarded by Ministry of Education of China (**top 2%**) 2017

- **First-class thesis award** for undergraduates (**top 1%**) 2017
- **Envision Future Scholarship**, awarded by Envision Energy 2017
- **Top Ten Presentation** of the 7th student's academic presentation of Southeast University 2017
- **Principal's Scholarship**, awarded by Southeast University (**top 2%**) 2014

Honors:

- **Outstanding Reviewer for ECCV'22** 2022
- **Outstanding Master graduate** of SJTU in Shanghai (**top 1%**) 2020
- **Outstanding Undergraduate** of SEU 2017

Competition Awards:

- **First Prize of National Electronic Design Competition** 2016
- **First Prize of National Electronic Design Competition** 2015
- **First Prize in Advanced Mathematics Competition** 2014

Academic Services

Journal Services

- IEEE Trans. on Pattern Analysis and Machine Intelligence (TPAMI)
- International Journal of Computer Vision (IJCV)
- IEEE Transactions on Image Processing (IEEE T-IP)
- IEEE Trans. on Circuits and Systems for Video Technology (TCSVT)
- Pattern Recognition (PR)
- Neural Processing Letters (NPL)
- IEEE/CAA Journal of Automatica Sinica
- IEEE Robotics and Automation Letters (RA-L)

Conference Services

- CVPR, ICCV, ECCV
- AAAI, NeurIPS, ICML, ICLR
- WACV, BMVC, ICIP, IJCNN, ACCV, ICONIP, ICMLA, ICASSP

Talks

2024.10.03 "OpenKD: Opening Prompt Diversity for Zero- and Few-shot Keypoint Detection", *ECCV 2024*, Milan, Italy

2024.08.08 "General Keypoint Detection: Few-shot, Zero-shot and Beyond", *AI, ML and Friends Seminars, Australian National University (ANU)*, Australia

2024.04.17 "Few-Shot Keypoint Detection", *statML reading group, DATA61 / CSIRO*, Australia

2024.01.12 "Detect Any Keypoints: An Efficient Light-weight Few-shot Keypoint Detector", *AAAI 2024*

2022.06.24 "Few-shot Keypoint Detection with Uncertainty Learning for Unseen Species", *CVPR 2022*

2022.04.07 "Ellipse Detection: A Perspective from Low-level Vision to Deep Learning", *Dalian University of Technology (DLUT)*

2020.07.08 "High-precision steel ball surface defect detection", *Shanghai Steel Ball Plant Co. Ltd.*

2020.04.26 "How to do research?", *Southeast University (SEU)*

2020.01.13 "Reasearch on Technologies of Trasnfer Learning towards Virtual-real Viewpoint Estimation", *Shanghai Jiao Tong Uni. (SJTU)*

2019.10.24 "Brief Introduction of AI Hotspots and My works", *Shanghai Jiao Tong Uni. (SJTU)*

2019.07.14 "PointDoN: A shape pattern aggregation module for deep learning on point cloud", *IJCNN 2019*, Budapest, Hungary

2018.12.13 "Viewpoint estimation for workpieces with deep transfer learning from cold to hot", *ICONIP 2018*, Siem Reap, Cambodia

2018.06.27 "SNc Neuron Detection Method Based on Deep Learning for Efficacy Evaluation of Anti-PD Drugs", *2018 American Control Conference*, Milwaukee, USA

2017.09.18 "Circle Detection based on Arc-support Line Segments", *ICIP 2017*, Beijing, China

Professional Experience

Queensland University of Technology Brisbane
Remote Research Assistant 2024.10 - 2024.12
- Participating the research on multi-modal pre-training for 3D vision understanding.

Australian National University Canberra
PhD Candidate 2020.10 - 2024.09
- Studying and developing novel algorithms for few-shot, one-shot, and zero-shot keypoint detection; Participating the research of shape recognition, motion transfer, *etc*.

Shanghai Jiao Tong University Shanghai
Research Lead 2020.07 - 2022.10
- Advising students to do research; Developing algorithms for COVID-19 test bands detection and nanometer thin membrane defect detection.

Jiuding Automation Co. Ltd. Nanjing
Research Lead 2020.03 - 2020.06
- Studying and developing high-precision steel ball surface defect detection system.

Shanghai Jiao Tong University Shanghai
M.S. candidate 2017.09 - 2020.03
- Studying and developing deep transfer learning methods for virtual-real workpiece viewpoint estimation; Participating the research of breast lesion segmentation, 3D point cloud processing, and generic vision recognition such as classification, detection and segmentation.

Joint Stars Technology Co. Ltd Nanjing
Research Intern 2016.10 - 2017.05
- Developing industry-level defect inspection algorithms. During this period, I learned lots of skills and knowledge regarding industrial standards and engineering.

Huawei Nanjing Research Institute Nanjing
Engineer Intern 2016 Summer
- Participating the embedded communication software programming (C/C++); I was listed as a member in the first term of Huawei F(X) future scientist program and achieved the special offer.

Southeast University Nanjing
B.E. candidate 2013.09 - 2017.06
- Studying advanced mathematics, control theory, digital signal processing, etc; Establishing lots of interesting projects, including *software projects*: Tetrix, TSP (Traveling Salesman Problem), android travel software, etc., and *automatic controlled systems*: smart car system, inverted/wind pendulum control system, and laser targeted shooting system; Cultivating broad interests ranging from the hardware to high-level algorithms.

Teaching Experience

Hong Kong University of Science and Technology (HKUST)
Teaching Assistant & Administer (work with Prof. Jiaya Jia)
- Build Your First AI Starup (*COMP6211K*) 2025.07 - 2025.08

Shanghai Jiao Tong University (SJTU)
Teaching Assistant
- Advanced Academic Writing 2018.09 - 2019.01
- C++ Programming 2018.01 - 2018.06

Supervision

PhD students

Haoze Zheng	2025-Present	*w./* Prof. Harry Yang, HKUST
Yuxin Chen	2025-Present	*w./* Prof. Jiaya Jia, HKUST
Zixuan Wang	2025-Present	*w./* Prof. Jiaya Jia, HKUST
Rong Wang	2022-2026	*w./* Prof. Hongdong Li, ANU (**ECCV'24**, **3DV'26**)
Jiawei Cao	2023-Present	*w./* Prof. Kaijie Wu, SJTU (**ICML'25**)

Master students

Wenlong Shi	2021-2024	*w./* Prof. Siyu Xia, SEU (**WACV'24**)
Tianhao Wang	2020-2023	*w./* Prof. Siyu Xia, SEU (**ACCV'22**)
Jiawei Cao	2020-2023	*w./* Prof. Kaijie Wu, SJTU (**ICONIP'22**)
Tongkun Guan	2020-2023	*w./* Prof. Chaochen Gu, SJTU (**TCSVT'22**)
Xunjin Wu	2019-2022	*w./* Prof. Chaochen Gu, SJTU (**ICCAIS'21**)

Bachelor students

Yuanqi He	2020-2021	SJTU (*Topic: Transfer learning*)
Tongkun Guan	2019-2020	HNU (*Topic: Metal surface text detection*)
Xunjin Wu	2018-2019	SJTU (*Topic: Transfer learning*)