Yu-Lun Liu

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Research Interests

I work on *image/video processing*, *computer vision*, and *computational photography*, particularly on essential problems requiring *machine learning* with insights from *geometry* and *domain-specific knowledge*.

- 3D from multi-view and sensors
- Low-level vision
- Image and video synthesis and generation
- Computational imaging

Work Experience

Feb. 2023 –	**Department of Computer Science, National Yang Ming Chiao Tung University**. *Assistant Professor*
May 2022 – Oct. 2022	**Meta Reality Labs Research**. *Research Scientist Intern*
Jun. 2017 – Feb. 2022	**MediaTek Inc**. *Senior Algorithm Development Engineer*
Sep. 2014 – Jun. 2017	**MediaTek Inc**. *Algorithm Development Engineer*

Selected Honors and Awards

Aug. 2024	**Excellent Master Thesis Award**, *The Chinese Image Processing and Pattern Recognition Society (IPPR)*.
July 2024	**3rd place of the NYCU CS Undergraduate Research Competition**, *CS*, NYCU.
July 2024	**2nd place of the NYCU CS Undergraduate Research Competition**, *CS*, NYCU.
June 2024	**NSTC 2030 Emerging Young Scholar**, *National Science and Technology Council*, R.O.C. (Taiwan).
May 2024	**CVPR 2024 Outstanding Reviewer**.
April 2024	**Google Research Scholar Award**.
Jan. 2024	**1st place of the NYCU CS Undergraduate Research Competition**, *CS*, NYCU.
Aug. 2023	**Google's Research Grant**, *Google University Relations Programs*.
Aug. 2023	**Best Ph.D. Thesis Award**, *The Chinese Image Processing and Pattern Recognition Society (IPPR)*.
Jul. 2023	**Yushan Young Fellow Program**, *Ministry of Education*, R.O.C. (Taiwan).
Nov. 2013	**Academic Achievement Award**, *Institute of Electronics*, NCTU.
May. 2013	**Academic Achievement Award**, *Institute of Electronics*, NCTU.

Education

2017–2022	**Ph.D.**, *National Taiwan University*, Taipei, Taiwan. Department of Computer Science and Information Engineering, CMLAB Thesis: Restoring and Enhancing Images and Videos by Combining Modeling and Learning Advisor: Yung-Yu Chuang ⓘ link
2012–2014	**M.S.**, *National Chiao-Tung University*, Hsinchu, Taiwan. Institute of Electronics, CommLab Thesis: Wide-Angle Virtual View Synthesis with Depth-Based Background Modeling Advisor: Hsueh-Ming Hang ⓘ link
2008–2012	**B.S.**, *National Chiao-Tung University*, Hsinchu, Taiwan. Department of Electronics Engineering

Publications ([ⓘ Google Scholar profile](#))

Journal papers

IJCV 2024   **Portrait Distortion Correction with Perspective-Aware 3D GANs**.
Zhixiang Wang, <u>Yu-Lun Liu</u>, Jia-Bin Huang, Shin'ichi Satoh, Sizhuo Ma, Guru Krishnan, Jian Wang
arXiv, 2023   ⓘ paper ⓘ project

TPAMI 2021   **Learning to See Through Obstructions with Layered Decomposition**.
<u>Yu-Lun Liu</u>, Wei-Sheng Lai, Ming-Hsuan Yang, Yung-Yu Chuang, and Jia-Bin Huang
IEEE Transactions on Pattern Analysis and Machine Intelligence, 2021   ⓘ paper ⓘ project

Conference papers

IROS 2024   **Precise Pick-and-Place using Score-Based Diffusion Networks**.
Shih-Wei Guo, Tsu-Ching Hsiao, <u>Yu-Lun Liu</u>, Chun-Yi Lee
IEEE/RSJ International Conference on Intelligent Robots and Systems, 2024   ⓘ paper ⓘ project

ECCV 2024   **GenRC: 3D Indoor Scene Generation from Sparse Image Collections**.
Ming-Feng Li, Yueh-Feng Ku, Hong-Xuan Yen, Chi Liu, <u>Yu-Lun Liu</u>, Albert Y. C. Chen, Cheng-Hao Kuo, Min Sun
Proceedings of European Conference on Computer Vision, 2024   ⓘ paper ⓘ project

ICRA Workshop 2024   **DriveEnv-NeRF: Exploration of A NeRF-Based Autonomous Driving Environment for Real-World Performance Validation**.
Mu-Yi Shen, Chia-Chi Hsu, Hao-Yu Hou, Yu-Chen Huang, Wei-Fang Sun, Chia-Che Chang, <u>Yu-Lun Liu</u>, Chun-Yi Lee
IEEE International Conference on Robotics and Automation RoboNerF Workshop, 2024   ⓘ paper ⓘ project

SIGGRAPH 2024   **Matting by Generation**.
Zhixiang Wang, Baiang Li, Jian Wang, <u>Yu-Lun Liu</u>, Jinwei Gu, Yung-Yu Chuang, Shin'ichi Satoh
ACM SIGGRAPH 2024 Conference Papers, 2024   ⓘ paper ⓘ project

SIGGRAPH 2024   **BoostMVSNeRFs: Boosting MVS-based NeRFs to Generalizable View Synthesis in Large-scale Scenes**.
Chih-Hai Su*, Chih-Yao Hu*, Shr-Ruei Tsai*, Jie-Ying Lee*, Chin-Yang Lin, <u>Yu-Lun Liu</u>
ACM SIGGRAPH 2024 Conference Papers, 2024   ⓘ paper ⓘ project

CVPR 2024   **Image-Text Co-Decomposition for Text-Supervised Semantic Segmentation**.
Ji-Jia Wu, Andy Chia-Hao Chang, Chieh-Yu Chuang, Chun-Pei Chen, <u>Yu-Lun Liu</u>, Min-Hung Chen, Hou-Ning Hu, Yung-Yu Chuang, Yen-Yu Lin
Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2024   ⓘ paper

CVPR 2024   **HumanNeRF-SE: A Simple yet Effective Approach to Animate HumanNeRF with Diverse Poses**.
Caoyuan Ma, <u>Yu-Lun Liu</u>, Zhixiang Wang, Wu Liu, Xinchen Liu, Zheng Wang
Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2024   ⓘ paper ⓘ project

ICLR 2024   **Dual Associated Encoder for Face Restoration**.
Yu-Ju Tsai, <u>Yu-Lun Liu</u>, Lu Qi, Kelvin C.K. Chan, Ming-Hsuan Yang
The Twelfth International Conference on Learning Representations, 2024   ⓘ paper ⓘ project

AAAI 2024   **Improving Robustness for Joint Optimization of Camera Poses and Decomposed Low-Rank Tensorial Radiance Fields**.
Bo-Yu Cheng, Wei-Chen Chiu, <u>Yu-Lun Liu</u>
Proceedings of AAAI Conference on Artificial Intelligence, 2024   ⓘ paper ⓘ project

ICCV 2023   **Learning Continuous Exposure Value Representations for Single-Image HDR Reconstruction**.
Su-Kai Chen, Hung-Lin Yen, <u>Yu-Lun Liu</u>, Min-Hung Chen, Hou-Ning Hu, Wen-Hsiao Peng and Yen-Yu Lin
Proceedings of the IEEE/CVF International Conference on Computer Vision, 2023   ⓘ project

ICCV 2023   **ImGeoNet: Image-induced Geometry-aware Voxel Representation for Multi-view 3D Object Detection**.
Tao Tu, Shun-Po Chuang, <u>Yu-Lun Liu</u>, Cheng Sun, Ke Zhang, Donna Roy, Cheng-Hao Kuo, Min Sun
Proceedings of the IEEE/CVF International Conference on Computer Vision, 2023   ⓘ project

CVPR 2023   **Progressively Optimized Local Radiance Fields for Robust View Synthesis**.
Andreas Meuleman, <u>Yu-Lun Liu</u>, Chen Gao, Jia-Bin Huang, Changil Kim, Min H. Kim, Johannes Kopf
Proceedings of IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2023   ⓘ paper ⓘ project

CVPR 2023	**Robust Dynamic Radiance Fields**. Yu-Lun Liu, Chen Gao, Andreas Meuleman, Hung-Yu Tseng, Ayush Saraf, Changil Kim, Yung-Yu Chuang, Johannes Kopf, Jia-Bin Huang Proceedings of IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2023 ⓘ paper ⓘ project
ICLR 2022	**Denoising Likelihood Score Matching for Conditional Score-based Data Generation** . Chen-Hao Chao, Wei-Fang Sun, Bo-Wun Cheng, Yi-Chen Lo, Chia-Che Chang, Yu-Lun Liu, Yu-Lin Chang, Chia-Ping Chen, and Chun-Yi Lee International Conference on Learning Representations, 2022 ⓘ paper
ICCV 2021	**Bridging Unsupervised and Supervised Depth from Focusvia All-in-Focus Supervision**. Ning-Hsu Wang, Ren Wang, Yu-Lun Liu, Yu-Hao Huang, Yu-Lin Chang, Chia-Ping Chen, and Kevin Jou Proceedings of IEEE/CVF Conference on Computer Vision, 2021 ⓘ paper ⓘ project
ICCV 2021	**Hybrid Neural Fusion for Full-frame Video Stabilization**. Yu-Lun Liu, Wei-Sheng Lai, Ming-Hsuan Yang, Yung-Yu Chuang, and Jia-Bin Huang Proceedings of IEEE/CVF Conference on Computer Vision, 2021 ⓘ paper ⓘ project
ICPR 2020	**Explorable Tone Mapping Operators**. Chien-Chuan Su, Ren Wang, Hung-Jin Lin, Yu-Lun Liu, Chia-Ping Chen, Yu-Lin Chang, and Soo-Chang Pei Proceedings of the 25th International Conference on Pattern Recognition, 2020 ⓘ paper
ECCV 2020	**Learning Camera-Aware Noise Models**. Ke-Chi Chang, Ren Wang, Hung-Jin Lin, Yu-Lun Liu, Chia-Ping Chen, Yu-Lin Chang, and Hwann-Tzong Chen Proceedings of European Conference on Computer Vision, 2020 ⓘ paper ⓘ project
CVPR 2020	**Learning to See Through Obstructions**. Yu-Lun Liu, Wei-Sheng Lai, Ming-Hsuan Yang, Yung-Yu Chuang, and Jia-Bin Huang Proceedings of IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2020 ⓘ paper ⓘ project
CVPR 2020	**Single-Image HDR Reconstruction by Learning to Reverse the Camera Pipeline**. Yu-Lun Liu*, Wei-Sheng Lai*, Yu-Sheng Chen, Yi-Lung Kao, Ming-Hsuan Yang, Yung-Yu Chuang, and Jia-Bin Huang Proceedings of IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2020 ⓘ paper ⓘ project
AAAI 2020	**Attention-based View Selection Networks for Light-field Disparity Estimation**. Yu-Ju Tsai, Yu-Lun Liu, Yung-Yu Chuang, and Ming Ouhyoung Proceedings of AAAI Conference on Artificial Intelligence, 2020 ⓘ paper
AAAI 2019	**Deep Video Frame Interpolation using Cyclic Frame Generation**. Yu-Lun Liu, Yi-Tung Liao, Yen-Yu Lin, and Yung-Yu Chuang Proceedings of AAAI Conference on Artificial Intelligence, 2019 ⓘ paper ⓘ project Oral Presentation
APSIPA 2014	**Background modeling using depth information**. Yu-Lun Liu and Hsueh-Ming Hang Signal and Information Processing Association Annual Summit and Conference, 2014
PCS 2013	**Virtual view synthesis using backward depth warping algorithm**. Du-Hsiu Li, Hsueh-Ming Hang, and Yu-Lun Liu Picture Coding Symposium, 2013

Preprints

arXiv 2024	**DiffIR2VR-Zero: Zero-Shot Video Restoration with Diffusion-based Image Restoration Models**. Chang-Han Yeh, Chin-Yang Lin, Zhixiang Wang, Chi-Wei Hsiao, Ting-Hsuan Chen, Yu-Lun Liu arXiv, 2024 ⓘ paper ⓘ project
arXiv 2024	**Depth Anywhere: Enhancing 360 Monocular Depth Estimation via Perspective Distillation and Unlabeled Data Augmentation**. Ning-Hsu Wang, Yu-Lun Liu arXiv, 2024 ⓘ paper ⓘ project
arXiv 2024	**NaRCan: Natural Refined Canonical Image with Integration of Diffusion Prior for Video Editing**. Ting-Hsuan Chen, Jiewen Chan, Hau-Shiang Shiu, Shih-Han Yen, Chang-Han Yeh, Yu-Lun Liu arXiv, 2024 ⓘ paper ⓘ project
arXiv 2024	**DeNVeR: Deformable Neural Vessel Representations for Unsupervised Video Vessel Segmentation**. Chun-Hung Wu, Shih-Hong Chen, Chih-Yao Hu, Hsin-Yu Wu, Kai-Hsin Chen, Yu-You Chen, Chih-Hai Su, Chih-Kuo Lee, Yu-Lun Liu arXiv, 2024 ⓘ paper ⓘ project

Talks

Invited Talk	**Dynamic and Local Radiance Fields for Robust View Synthesis**. MediaTek Inc., Hsinchu, Taiwan, May. 2023.
Invited Talk	**Dynamic and Local Radiance Fields for Robust View Synthesis**. Institute of Communications Engineering, NTHU, Hsinchu, Taiwan, April. 2023.
Invited Talk	**Dynamic and Local Radiance Fields for Robust View Synthesis**. The 5th Augmented Intelligence and Interaction (AII) Workshop, Taoyuan, Taiwan, March. 2023.
Guest Lecture	**What School and the Workplace Didn't Teach Me**. NYCU, Hsinchu, Taiwan, March. 2023.
Invited Talk	**Learning to See the Unseen**. Taichung Municipal Taichung First Senior High School, Taichung, Taiwan, March. 2023.
Invited Talk	**Learning to See the Unseen**. Research Center for Information Technology Innovation, Academia Sinica, Taipei, Taiwan, January. 2023.
Invited Talk	**Learning to See the Unseen**. Institute of Information Systems and Applications, NTHU, Hsinchu, Taiwan, November. 2022.
Guest Lecture	**Recent Progress on Video Restoration**. CommE7005, NTU, Taipei, Taiwan, Mar. 2022.
Guest Lecture	**Rethinking Multimedia and IC Design in the Era of AI**. CommE7005, NTU, Taipei, Taiwan, Nov. 2021.
Guest Lecture	**CV Final Project - Video Frame Interpolation**. EEE5053, NTU, Taipei, Taiwan, May. 2021.
Guest Lecture	**Rethinking Multimedia and IC Design in the Era of AI**. DEE4592, NCTU, Hsinchu, Taiwan, Mar. 2021.
Invited Talk	**Learning to See Through Obstructions**. 2020 CVPR Taiwan Sharing Session, NTU, Taipei, Taiwan, July. 2020.
Invited Talk	**Single-Image HDR Reconstruction by Learning to Reverse the Camera Pipeline**. 2020 CVPR Taiwan Sharing Session, NTU, Taipei, Taiwan, July. 2020.
Guest Lecture	**CV Final Project - Depth Estimation**. EEE5053, NTU, Taipei, Taiwan, Jan. 2020.
Invited Talk	**Deep Video Frame Interpolation using Cyclic Frame Generation**. The 3rd Augmented Intelligence and Interaction (AII) Workshop, Taoyuan, Taiwan, July. 2019.
Oral	**Deep Video Frame Interpolation using Cyclic Frame Generation**. AAAI, Honolulu, Hawaii, USA, Jan. 2019.
Guest Lecture	**CV Final Project - Depth Estimation**. EEE5053, NTU, Taipei, Taiwan, Jan. 2019.

Academic Services

Organizer	2020 CVPR Taiwan Sharing Session
Thesis Committees	Yi-Hsin Chen (advisor: Wen-Hsiao Peng) – PhD, expected 2024 Cheng Sun (advisors: Hwann-Tzong Chen and Min Sun) – PhD, Jul 2023 Hitika Tiwari (advisors: K. S. Venkatesh and Yong-Sheng Chen) – PhD, Jul 2023 Cheng-Kun Yang (advisors: Yung-Yu Chuang and Yen Yu-Lin) – PhD, Jul 2023

Journal Reviewer	IEEE Transactions on Image Processing (**TIP**)
	ACM Computing Surveys (**CSUR**)
	Applied Soft Computing
	Pattern Recognition
	ACM Transactions on Graphics (**TOG**)
	Information Fusion
	IEEE Transactions on Multimedia
	International Journal of Computer Vision
	The Journal of Supercomputing
	Computer Vision and Image Understanding
	Computers & Graphics
	Multidimensional Systems and Signal Processing
	International Journal of Pattern Recognition and Artificial Intelligence
Conference Reviewer	ACM SIGGRAPH (**SIGGRAPH**), 2022, 2023
	IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2022, 2023
	IEEE Conference on Computer Vision (**ICCV**), 2021, 2023
	European Conference on Computer Vision (**ECCV**), 2020, 2022
	British Machine Vision Conference (**BMVC**), 2023
	Asian Conference on Computer Vision (**ACCV**), 2020, 2022
	International Conference on Learning Representations (**ICLR**), 2022, 2023
	Conference on Neural Information Processing Systems (**NeurIPS**), 2022, 2023
	International Conference on Machine Learning (**ICML**), 2023
	AAAI Conference on Artificial Intelligence (**AAAI**), 2021, 2022, 2023
	International Joint Conference on Artificial Intelligence (**IJCAI**), 2021, 2022, 2023
	ACM International Conference on Multimedia (**MM**), 2018
	IEEE International Conference on Multimedia and Expo Workshops (**ICMEW**), 2023
	International Conference on Robotics and Automation (**ICRA**), 2023
Research Mentor	Research Mentor for interns at MediaTek Inc., 2019, 2020, 2021, 2022.
Professional Societies	IEEE student member
	AAAI student member
	TAAI member
	IPPR member

Teaching Experiences

Fall 2023	**CSIC30107 Video Compression**, *Department of Computer Science, National Yang Ming Chiao Tung University*.
Spring 2023	**CSIC30107 Video Compression**, *Department of Computer Science, National Yang Ming Chiao Tung University*.
Spring 2013	**Teaching Assistant of DEE1315 Probability and Statistics with Prof. Hsueh-Ming Hang**, *Department of Electronics Engineering, National Chiao Tung University*.

References

Ph.D. Advisor	**Yung-Yu Chuang**, *Professor of Department of Computer Science and Information Engineering*, National Taiwan University. ✉ cyy@csie.ntu.edu.tw ⓘ homepage
M.S. Advisor	**Hsueh-Ming Hang**, *Professor of Department of Electronics Engineering*, National Chiao Tung University. ✉ hmhang@mail.nctu.edu.tw ⓘ homepage
Director	**Johannes Kopf**, *Director of the Computational Photography Group*, Meta. ✉ johannes.peter.kopf@gmail.com
Director	**Shaw-Min Lei**, *Director of the Multimedia Technology Development Division*, MediaTek Inc. ✉ shawmin.lei@mediatek.com

Manager of Department **Yu-Lin Chang**, *Manager of the Intelligent Vision Processing Department*, MediaTek Inc.
✉ yulinchang@google.com

Manager of Department **Chia-Ping Chen**, *Manager of the Intelligent Vision Processing Department*, MediaTek Inc.
✉ chiaping.chen@mediatek.com

Research Mentor **Ming-Hsuan Yang**, *Professor of Electrical Engineering and Computer Science*, University of California at Merced.
✉ mhyang@ucmerced.edu ⓘ homepage

Research Mentor **Jia-Bin Huang**, *Associate Professor of Department of Computer Science*, University of Maryland, College Park.
✉ jbhuang@umd.edu ⓘ homepage

Research Mentor **Yen-Yu Lin**, *Professor of Department of Computer Science*, National Yang Ming Chiao Tung University.
✉ lin@cs.nctu.edu.tw ⓘ homepage

Research Mentor **Wei-Sheng Lai**, *Software Engineer*, Google.
✉ wlai24@ucmerced.edu ⓘ homepage

Research Mentor **Changil Kim**, *Research Scientist*, Meta.
✉ changil@csail.mit.edu ⓘ homepage

Research Mentor **Hung-Yu Tseng**, *Research Scientist*, Meta.
✉ hytseng0509@gmail.com ⓘ homepage

Research Mentor **Chen Gao**, *Research Scientist*, Meta.
✉ gaochen@meta.com ⓘ homepage