

Wei-Sheng Lai

Curriculum Vitae

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Education

- Ph.D. **University of California, Merced, CA, USA**
- 2015 – 2019, Electrical Engineering and Computer Science
 - Advisor: Ming-Hsuan Yang
 - Thesis: Learning Spatial and Temporal Visual Enhancement
- M.S. **National Taiwan University, Taipei, Taiwan**
- 2012 – 2014, Communication Engineering
- B.S. **National Taiwan University, Taipei, Taiwan**
- 2008 – 2012, Electrical Engineering

Research and Work Experience

- Senior Software Engineer **Google, Mountain View, CA, USA**
- Nov. 2019 – Present
 - Develop core computational photography algorithms to improve the quality of photos and videos for mobile cameras.
- Software Engineer **Google, Mountain View, CA, USA**
- Aug. 2019 – Oct. 2021
 - Product: Face Unblur in Google Pixel 6/6-Pro [📺 demo video](#)
- Student Researcher **Google Could AI, Sunnyvale, CA, USA**
- Dec. 2018 – May 2019
 - Mentors: Yichang Shih, Chia-Kai Liang, and Ming-Hsuan Yang
 - Project: Correcting Face Distortion in Wide-Angle Videos
- Research Intern **Nvidia Research, Santa Clara, CA, USA**
- May 2018 – Nov. 2018
 - Mentors: Deqing Sun, Jinwei Gu, and Orazio Gallo
 - Project: Learning to Stitch Videos for Linear Camera Arrays
- Research Intern **Nvidia Research, Santa Clara, CA, USA**
- Sep. 2017 – Nov. 2017
 - Mentors: Ming-Hsuan Yang and Jan Kautz
 - Project: Aliasing-Aware Image Super-Resolution
- Research Intern **Adobe Research, San Jose, CA, USA**
- May 2017 - Aug. 2017
 - Mentors: Ersin Yumer, Oliver Wang and Eli Shechtman
 - Project: Learning Blind Video Temporal Consistency
- Research Intern **Microsoft Research, Redmond, WA, USA**
- May 2016 - Aug. 2016
 - Mentors: Sing Bing Kang, Neel Joshi and Chris Buehler
 - Project: Semantic-Driven Hyperlapse Generation from 360° Videos
- Research Assistant **CSIE, National Taiwan University, Taipei, Taiwan**
- Jul. 2014 – Jul. 2015
 - Advisor: Yung-Yu Chuang
 - Projects: Content-Aware Wide-angle Image Warping, Blind Image Deblurring

Research Assistant **Academia Sinica**, Taipei, Taiwan

- Jul. 2014 – Jun. 2015
- Mentor: Yen-Yu Lin
- Projects: Convolutional Neural Network for Dimensionality Reduction

Preprints ([Google Scholar profile](#))

arXiv 2021 **Portrait Neural Radiance Fields from a Single Image**
Chen Gao, YiChang Shih, [Wei-Sheng Lai](#), Chia-Kai Liang and Jia-Bin Huang
arXiv, 2021
[paper](#) [website](#)

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

- TPAMI 2021 **Learning to See Through Obstructions with Layered Decomposition**
Yu-Lun Liu*, [Wei-Sheng Lai](#)*, Ming-Hsuan Yang, Yung-Yu Chuang, and Jia-Bin Huang
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2021
[arXiv](#) [website](#)
- TPAMI 2021 **Toward Real-World Super-Resolution via Adaptive Downsampling Models**
Sanghyun Son*, Jaeha Kim*, [Wei-Sheng Lai](#), Ming-Hsuan Yang, and Kyoung Mu Lee
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2021
[paper](#) [supp](#)
- IJCV 2020 **Exploiting Semantics for Face Image Deblurring**
Ziyi Shen, [Wei-Sheng Lai](#), Tingfa Xu, Jan Kautz, and Ming-Hsuan Yang
International Journal of Computer Vision (IJCV), 2020
[arXiv](#) [paper](#)
- IJCV 2020 **Gated Fusion Network for Degraded Image Super-Resolution**
Xinyi Zhang, Hang Dong, Zhe Hu, [Wei-Sheng Lai](#), Fei Wang, and Ming-Hsuan Yang
International Journal of Computer Vision (IJCV), 2020
[paper](#)
- TIP 2020 **Dynamic Scene Deblurring by Depth Guided Model**
Lerenhan Li, Jinshan Pan, [Wei-Sheng Lai](#), Changxin Gao, Nong Sang, and Ming-Hsuan Yang
IEEE Transactions on Image Processing (TIP), 2020
[paper](#)
- TPAMI 2019 **MEMC-Net: Motion Estimation and Motion Compensation Driven Neural Network for Video Interpolation and Enhancement**
Wenbo Bao, [Wei-Sheng Lai](#), Xiaoyun Zhang, Zhiyong Gao, Ming-Hsuan Yang
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
[paper](#) [arXiv](#) [website](#)
- IJCV 2019 **Blind Image Deblurring vis Deep Discriminative Priors**
Lerenhan Li, Jinshan Pan, [Wei-Sheng Lai](#), Changxin Gao, Nong Sang, and Ming-Hsuan Yang
International Journal of Computer Vision (IJCV), 2019
[paper](#) [website](#)
- TPAMI 2019 **Fast and Accurate Image Super-Resolution with Deep Laplacian Pyramid Networks**
[Wei-Sheng Lai](#), Jia-Bin Huang, Narendra Ahuja, and Ming-Hsuan Yang
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2019
[paper](#) [arXiv](#) [website](#)
- TVCG 2018 **Semantic-driven Generation of Hyperlapse from 360° Video**
[Wei-Sheng Lai](#), Yujia Huang, Neel Joshi, Chris Buehler, Ming-Hsuan Yang and Sing Bing Kang
IEEE Transactions on Visualization and Computer Graphics (TVCG), 2018.
[paper](#) [arXiv](#) [website](#)

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

- WACV 2022 **Stylizing 3D Scene via Implicit Representation and HyperNetwork**
Pei-Ze Chiang, Meng-Shiun Tsai, Hung-Yu Tseng, [Wei-Sheng Lai](#), and Wei-Chen Chiu
IEEE Winter Conference on Applications of Computer Vision (WACV), 2022
[i](#) paper [i](#) website
- WACV 2022 **Deep Online Fused Video Stabilization**
Zhenmei Shi, Fuhao Shi, [Wei-Sheng Lai](#), Chia-Kai Liang and Yingyu Liang
IEEE Winter Conference on Applications of Computer Vision (WACV), 2022
[i](#) paper [i](#) website
- 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
IEEE International Conference on Computer Vision (ICCV), 2021
[i](#) paper [i](#) website
- WACV 2021 **Real-time Localized Photorealistic Video Style Transfer**
Xide Xia, Tianfan Xue, [Wei-Sheng Lai](#), Zheng Sun, Abby Chang, Brian Kulis and Jiawen Chen
IEEE Winter Conference on Applications of Computer Vision (WACV), 2021
[i](#) paper
- WACV 2021 **Dual-Stream Fusion Network for Spatiotemporal Video Super-Resolution**
Min-Yuan Tseng, Yen-Chung Chen, Yi-Lun Lee, [Wei-Sheng Lai](#), Yi-Hsuan Tsai and Wei-Chen Chiu
IEEE Winter Conference on Applications of Computer Vision (WACV), 2021
[i](#) paper
- 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
IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2020
[i](#) arXiv [i](#) website
- CVPR 2020 **Learning to See Through Obstructions**
Yu-Lun Liu*, [Wei-Sheng Lai](#)*, Ming-Hsuan Yang, Yung-Yu Chuang, and Jia-Bin Huang
IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2020
[i](#) arXiv [i](#) website
- WACV 2020 **Visual Question Answering on 360° Images**
Shih-Han Chou, Wei-Lun Chao, [Wei-Sheng Lai](#), Min Sun, and Ming-Hsuan Yang
IEEE Winter Conference on Applications of Computer Vision (WACV), 2020
[i](#) paper [i](#) website
- BMVC 2019 **Video Stitching for Linear Camera Arrays**
[Wei-Sheng Lai](#), Deqing Sun, Jinwei Gu, Orazio Gallo, Ming-Hsuan Yang, and Jan Kautz
British Machine Vision Conference (BMVC), 2019
[i](#) paper [i](#) website
- SIGGRAPH 2019 **Distortion-Free Wide-Angle Portraits on Camera Phones**
YiChang Shih, [Wei-Sheng Lai](#), and Chia-Kai Liang
ACM Transactions on Graphics (Proceedings of SIGGRAPH), 2019
[i](#) paper [i](#) website
- CVPR 2019 **Depth-Aware Video Frame Interpolation**
Wenbo Bao, [Wei-Sheng Lai](#), Chao Ma, Xiaoyun Zhang, Zhiyong Gao, and Ming-Hsuan Yang
IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2019
[i](#) paper [i](#) website
- ECCV 2018 **Learning Blind Video Temporal Consistency**
[Wei-Sheng Lai](#), Jia-Bin Huang, Oliver Wang, Eli Shechtman, Ersin Yumer, and Ming-Hsuan Yang
European Conference on Computer Vision (ECCV), 2018
[i](#) paper [i](#) website

- BMVC 2018 **Gated Fusion Network for Joint Image Deblurring and Super-Resolution**
Oral Xinyi Zhang, Hang Dong, Zhe Hu, Wei-Sheng Lai, Fei Wang, and Ming-Hsuan Yang
 British Machine Vision Conference (BMVC), 2018
[📄 paper](#) [🌐 website](#)
- CVPR 2018 **Deep Semantic Face Deblurring**
 Ziyi Shen, Wei-Sheng Lai, Tingfa Xu, Jan Kautz, and Ming-Hsuan Yang
 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018
[📄 paper](#) [🌐 website](#)
- CVPR 2018 **Learning a Discriminative Prior for Blind Image Deblurring**
 Lerenhan Li, Jinshan Pan, Wei-Sheng Lai, Changxin Gao, Nong Sang, and Ming-Hsuan Yang
 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018
[📄 paper](#) [🌐 website](#)
- NIPS 2017 **Semi-Supervised Learning for Optical Flow with Generative Adversarial Networks**
Wei-Sheng Lai, Jia-Bin Huang, and Ming-Hsuan Yang
 Neural Information Processing Systems (NIPS), 2017
[📄 paper](#) [🌐 website](#)
- CVPR 2017 **Deep Laplacian Pyramid Networks for Fast and Accurate Super-Resolution**
Wei-Sheng Lai, Jia-Bin Huang, Narendra Ahuja, and Ming-Hsuan Yang
 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2017
[📄 paper](#) [🌐 website](#)
- CVPR 2017 **Learning Fully Convolutional Networks for Iterative Non-blind Deconvolution**
 Jiawei Zhang, Jinshan Pan, Wei-Sheng Lai, Rynson Lau, Ming-Hsuan Yang
 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2017
[📄 paper](#)
- CVPR 2016 **A Comparative Study for Single-Image Blind Deblurring**
Spotlight Wei-Sheng Lai, Jia-Bin Huang, Zhe Hu, and Ming-Hsuan Yang
 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016
[📄 paper](#) [🌐 website](#) [🗣️ Talk](#)
- CVPR 2015 **Blur Kernel Estimation using Normalized Color-Line Priors**
Wei-Sheng Lai, Jian-Jiun Ding, Yen-Yu Lin, and Yung-Yu Chuang
 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015
[📄 paper](#) [🌐 website](#)

Talks

- Guest Lecture **Learning Low-Level Vision**
 EECS286, UC Merced, USA, Oct. 2019.
- Invited Talk **Semi-Supervised Learning for Optical Flow with Generative Adversarial Networks**
 CSIE, NTU, Taipei, Taiwan, Jan. 2018.
- Invited Talk **Fast and Accurate Image Super-Resolution with Laplacian Pyramid Networks**
 Advanced Computer Vision Workshop, Academia Sinica, Taipei, Taiwan, Dec. 2017.
- Guest Lecture **Deep Laplacian Pyramid Networks for Fast and Accurate Super-Resolution**
 EECS282, UC Merced, USA, Aug. 2017.
- Guest Lecture **Introduction to Single-Image Super Resolution**
 EECS286, UC Merced, USA, Oct. 2016.
- Spotlight **A Comparative Study for Single-Image Blind Deblurring**
 CVPR, Las Vegas, USA, Jun. 2016.

Professional Activities

- Organizer
- 2nd 360° Perception and Interaction (**360PI**) Workshop, ICCV 2019 [📘 webpage](#)
 - 1st 360° Perception and Interaction (**360PI**) Workshop, ECCV 2018 [📘 webpage](#)
- Conference Reviewer
- ACM SIGGRAPH, 2021
 - IEEE International Conference on Computer Vision (**ICCV**), 2017, 2019, 2021
 - IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2017, 2018, 2019, 2021
 - European Conference on Computer Vision (**ECCV**), 2016, 2018, 2020
 - Asian Conference on Computer Vision (**ACCV**), 2016, 2018
 - IEEE Winter Conference on Applications of Computer Vision (**WACV**), 2020
 - Association for the Advancement of Artificial Intelligence (**AAAI**), 2020
 - Neural Information Processing Systems (**NIPS**), 2016, 2020
 - Pacific Graphics (**PG**), 2016
- Journal Reviewer
- Computer Vision and Image Understanding (**CVIU**)
 - Digital Signal Processing (**DSP**)
 - International Journal of Computer Vision (**IJCV**)
 - IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**)
 - IEEE Transactions on Multimedia (**TMM**)
 - IEEE Transaction on Image Processing (**TIP**)
 - IEEE Transactions on Circuits and Systems for Video Technology (**TCVST**)
 - IEEE Transactions on Geoscience and Remote Sensing (**TGRS**)
 - IEEE Signal Processing Letters (**SPL**)
 - IEEE Access
 - Journal of Electronic Imaging
 - Neurocomputing
 - Pattern Recognition (**PR**)
 - Signal, Image and Video Processing (**SIVP**)
 - Transactions on Computational Imaging (**TCI**)
 - The Visual Computer (**TVCI**)

Honors and Awards

- Award **Doctoral Consortium Travel Award**, CVPR 2019
- Finalist **Facebook PhD Fellowship**, Facebook Inc, Jan. 2018
- Honorable Mention **Snap Research Fellowship**, Snap Inc, Dec. 2017
- Scholarship **Class A Scholarship**, National Taiwan University, Sep. 2013
Top 10% of students in one academic year
- Award **Presidential Award**, National Taiwan University, Jan. 2009, Jun. 2009
Top 5% of students in one semester

Teaching Experience

- Teaching Assistant **EECS, University of California**, Merced, CA, USA
- CSE 140: Computer Architecture (Spring 2018)
 - CSE 165: Object Oriented Programming [C++ Programming] (Spring 2017)
 - CSE 030: Data Structure [C++ Programming] (Fall 2016)
 - CSE 185: Introduction to Computer Vision [MATLAB programming] (Spring 2016)
 - CSE 020: Introduction to Computing [Java Programming] (Fall 2015)

Teaching Assistant **EE/CSIE, National Taiwan University**, Taipei, Taiwan

- CSIE 7694: Digital Visual Effects (Spring 2015)
- CSIE 5098: Digital Image Synthesis (Fall 2014)
- EE 5163: Advanced Digital Signal Processing (Spring 2014)
- CommE 5030: Time-Frequency Analysis and Wavelet Transform (Fall 2013)

Technical Skills

Programming C/C++, Python

Toolbox / Software MATLAB, OpenCV, PyTorch, TensorFlow