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

Software Engineer **Google**, Mountain View, CA, USA
- Aug. 2019 – Present
- Develop core computational photography algorithms to improve the quality of photos and videos for mobile cameras.

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 $\mathbf{360}^\circ$ 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

Journal Publications (Google Scholar profile)

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

arXiv 2021 **Stylizing 3D Scene via Implicit Representation and HyperNetwork**
Pei-Ze Chiang, Meng-Shiun Tsai, Hung-Yu Tseng, Wei-Sheng Lai, and Wei-Chen Chiu
arXiv, 2021
paper website

arXiv 2021 **Deep Online Fused Video Stabilization**
Zhenmei Shi, Fuhao Shi, Wei-Sheng Lai, Chia-Kai Liang and Yingyu Liang
arXiv, 2021
paper website

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

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
paper 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
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
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
arXiv 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
arXiv 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
paper 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
paper 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
paper 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
paper 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
paper 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
- 2^{nd} 360° Perception and Interaction (**360PI**) Workshop, ICCV 2019 webpage
- 1^{st} 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 (**TVCJ**)

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

References

Ph.D. Advisor **Ming-Hsuan Yang**, *Professor*, University of California, Merced
✉ mhyang@ucmerced.edu ℹ homepage

Research Mentor **Jia-Bin Huang**, *Assistant Professor*, Virginia Tech, Virginia
✉ jbhuang@vt.edu ℹ homepage

Research Mentor **Deqing Sun**, *Senior Research Scientist*, Nvidia
✉ deqings@nvidia.com ℹ homepage

Research Mentor **Jinwei Gu**, *Senior Research Scientist*, Nvidia
✉ jinweig@nvidia.com ℹ homepage

Research Mentor **Sing Bing Kang**, *Principal Researcher*, Microsoft Research, Redmond
✉ sbkang@microsoft.com ℹ homepage

Research Mentor **Yung-Yu Chuang**, *Professor*, National Taiwan University, Taiwan
✉ cyy@csie.ntu.edu.tw ℹ homepage

Research Mentor **Yen-Yu Lin**, *Associate Research Fellow*, Academia Sinica, Taiwan
✉ yylin@citi.sincia.edu.tww ℹ homepage