

# 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

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### 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 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

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## 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](#)

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## Conference Publications

- 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](#)
- 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<sup>nd</sup> 360° Perception and Interaction (**360PI**) Workshop, ICCV 2019 [📄 webpage](#)
  - 1<sup>st</sup> 360° Perception and Interaction (**360PI**) Workshop, ECCV 2018 [📄 webpage](#)
- Conference Reviewer
- 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

## References

- Ph.D. Advisor **Ming-Hsuan Yang**, *Professor*, University of California, Merced  
✉ [mhyang@ucmerced.edu](mailto:mhyang@ucmerced.edu) [f homepage](#)

- Research Mentor **Jia-Bin Huang**, *Assistant Professor*, Virginia Tech, Virginia  
✉ [jbhuang@vt.edu](mailto:jbhuang@vt.edu) [🌐 homepage](#)
- Research Mentor **Deqing Sun**, *Senior Research Scientist*, Nvidia  
✉ [deqings@nvidia.com](mailto:deqings@nvidia.com) [🌐 homepage](#)
- Research Mentor **Jinwei Gu**, *Senior Research Scientist*, Nvidia  
✉ [jinweig@nvidia.com](mailto:jinweig@nvidia.com) [🌐 homepage](#)
- Research Mentor **Sing Bing Kang**, *Principal Researcher*, Microsoft Research, Redmond  
✉ [sbkang@microsoft.com](mailto:sbkang@microsoft.com) [🌐 homepage](#)
- Research Mentor **Yung-Yu Chuang**, *Professor*, National Taiwan University, Taiwan  
✉ [cyy@csie.ntu.edu.tw](mailto:cyy@csie.ntu.edu.tw) [🌐 homepage](#)
- Research Mentor **Yen-Yu Lin**, *Associate Research Fellow*, Academia Sinica, Taiwan  
✉ [yylin@citi.sinica.edu.tw](mailto:yylin@citi.sinica.edu.tw) [🌐 homepage](#)