

# Wei-Sheng Lai

## (Jason)

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## Education

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- **Doctor of Philosophy**, National Taiwan University (NTU), Taipei, Taiwan Sep. 2014 - Present  
*Graduate Institute of Networking and Multimedia*
- **Master of Science**, National Taiwan University (NTU), Taipei, Taiwan Sep. 2012 - Jun. 2014  
*Graduate Institute of Communication Engineering*, GPA: 4.24/4.3, Rank: 4/104
- **Bachelor of Science**, National Taiwan University (NTU), Taipei, Taiwan Sep. 2008 - Jun. 2012  
*Electrical Engineering Department*, GPA: 3.79/4.0

## Research Interests

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Computer Vision, Computational Photography, Machine Learning

## Publication

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- [1] **Wei-Sheng Lai**, Jian-Jiun Ding, Yen-Yu Lin, and Yung-Yu Chuang, "Blur Kernel Estimation using Normalized Color-Line Priors", In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2015, accepted.
- [2] Yu Chen, Jian-Jiun Ding, **Wei-Sheng Lai**, Ying-Jou Chen, Chir-Wei Chang, and Chuan-Chung Chang, "High Quality Image Deblurring Scheme Using the Pyramid Hyper-Laplacian L2 Norm Priors Algorithm," In *Proceedings of Pacific-Rim Conference on Multimedia (PCM)*, pp. 134-145, 2013.
- [3] **Wei-Sheng Lai**, Chi-Jung Tseng, and Jian-Jiun Ding, "Improved structural similarity measurement for vocal signals," In *Proceedings IEEE International Symposium on Circuits and Systems (ISCAS)*, pp. 301-304, 2013.

## Research Experience

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- **Natural Image Deblurring** Feb. 2013 - Present
  - Studied the statistic property of the color-line model in image deblurring problems.
  - Proposed a normalized color-line prior for single-image blur kernel estimation, and achieved the state-of-the-art performance.
- **Deep Learning for Dimensionality Reduction** Oct. 2014 - Present
  - Integrated Convolutional Neural Network (CNN) and dimensionality reduction methods which are expressible by graph embedding.
  - Proposed a unified framework, CNN-DR, which can be applied to supervised, unsupervised and semi-supervised learning problems.
- **Classification On Animations and Real-World Photographs** Sep. 2013 - Jan. 2014
  - Investigated image classification on large-scale datasets. Designed and built a system with SVM classifiers that achieved 93% accuracy on classifying animation images and natural images in a 1-million image dataset.
- **Quality Assessment of Vocal Signals** Mar. 2012 - Sep. 2012
  - Proposed a vocal signal quality assessment metric by Structural Similarity (SSIM) and non-uniform sampling of Fourier Transform coefficients.

## Honors and Awards

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- **Class A Scholarship** in Graduate Institute of Communication Engineering, NTU Sep. 2013 - Jun. 2014  
(top 10% of students in one academic year)
- **Presidential Award** in Electrical Engineering department, NTU Sep. 2008 - Jun. 2009  
(top 5% of students in one semester)

## Working and Teaching Experience

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- **Teaching Assistant** at Computer Science Department, NTU Sep. 2014 - Present  
Digital Visual Effects (Spring 2014), Digital Image Synthesis (Fall 2014)
- **Research Assistant** at Academia Sinica, Taipei, Taiwan Jul. 2014 - Present
- **Teaching Assistant** at Electrical Engineering Department, NTU Sep. 2013 - Jun. 2014  
Time-Frequency Analysis and Wavelet Transform (Fall 2013)  
Advanced Digital Signal Processing (Spring 2014)
- **Research Assistant** intern at Yotta Labs, Taipei, Taiwan Jul. 2012 - Aug. 2012  
Designed and implemented an integration embedded system on DE2-115 for a real-time video conference project.

## Selected Term Projects

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- **Machine Learning** Sep. 2013 - Jan. 2014
  - Designed a Chinese character recognition system that achieved 94% accuracy by using libSVM and feature selection.
- **3D Multimedia System Design** Feb. 2013 - Jun. 2013
  - Used OpenCL to parallelize two stereo matching algorithms and speeded up to 30 times faster than CPU version.
- **Digital Visual Effect** Feb. 2013 - Jun. 2013
  - Studied and implemented several image matting algorithms.
  - Designed a system that synthesizes motion blur background and keep foreground on focus from two successive pictures by using grab cut and optical flow algorithms.
- **Digital Image Synthesis** Sep. 2012 - Jan. 2013
  - Extended PBRT to render color dispersion effects, including refracted rainbows and camera color aberration.
- **Multimedia Analysis and Indexing** Sep. 2012 - Jan. 2013
  - Designed a system to classify the painting style of animations and comics by using libSVM.

## Skills

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- **Programming Languages** C/C++, Python
- **Tools and Library** MATLAB, OpenCV, L<sup>A</sup>T<sub>E</sub>X, scikit-learn
- **Languages** Chinese(native), English(fluent), Japanese(JLPT N2 passed, Jul. 2013)

## Activities

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- Student Volunteer, ACM SIGGRAPH Asia 2013, *Hong Kong* Nov. 2013
- Leader of Photography Section, NTU Yun-Lin and Chia-Yi Area Alumni Association Aug. 2010 - Jul. 2011
- Leader of Activities Section, NTU Yun-Lin and Chia-Yi Area Alumni Association Aug. 2009 - Jul. 2010