

BIHAN WEN

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EDUCATION

University of Illinois at Urbana-Champaign (UIUC), USA

Aug 2012 – Aug 2017

PhD / MS, Electrical & Computer Engineering (ECE)

(Expected)

- Advisor: Yoram Bresler
- GPA: 3.87 / 4.0

Nanyang Technological University (NTU), Singapore

Aug 2008 – Jun 2012

Bachelor of Engineering, Electrical & Electronic Engineering (EEE), 1st Class Honor

- Advisor: Yilong Lu, Meng-Joo Er
- GPA: 4.94 / 5.0

WORK EXPERIENCE

- [ECE Department, UIUC](#), *Research Assistant*

Aug 2012 – Present

- Work with [Yoram Bresler](#) on *Sparse Representation, Machine Learning, and Signal Processing*.
- Proposed novel sparse signal learning models, reducing complexity from $O(n^3)$ to $O(n^2)$.
- Proposed efficient online learning method for fast implementation.
- Developed learning algorithms with state-of-the-art performance in image/video processing, compressed sensing, and imaging, etc. More details in [TL project website](#).
- Produced patents, papers, and software toolboxes in *Matlab, Python, C/C++ and CUDA*.

- [Dolby Laboratories](#), *Research Intern*

May – Aug 2016

- Worked with [Guan-Ming Su](#) in Dolby Vision Team.
- Worked on High Dynamic Range (HDR) video imaging project, using various machine learning based signal-processing technologies in real industry applications.
- Produced various programs and patents, which are used in Dolby Codec.

- [Advanced Digital Science Center \(ADSC\)](#), *Research Intern*

May – Aug 2015

- Worked with [Stefan Winkler](#) and [Rama Ratnam](#) on Multi-modal Profiling Analytics project.
- Proposed multi-model learning and processing scheme for the Human-Computer Interaction (HCI) system, which processes multimedia, eye tracking, and EEG data simultaneously, generating improved performance.

- [Plunify](#), *Software Engineer Intern*

May – Aug 2011

- Worked with start-up company for big data analytics and SaaS cloud computing.
- Participated in the [EDAXtend](#) platform development and optimization, reducing the system power consumption by 25%, and run time by 30% in average.
- Worked with the back-end team implementing real-time analytics using *Perl*.

RESEARCH INTERESTS

- Machine Learning
- Image/Video Processing
- Inverse Problem
- Sparse and Low-rank Representation
- Compressed Sensing
- Computer Vision

PUBLICATIONS

Journal

1. **B. Wen**, S. Ravishankar and Y. Bresler, "HighTransform - Training High-dimensional Sparsifying Transform with Online Learning and Block Matching," submitted to *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*.
2. **B. Wen**, S. Ravishankar and Y. Bresler, "FRIST – Flipping and Rotational Invariant Sparsifying Transform Learning and Applications to Inverse Problems," submitted to *Inverse Problems*. [Preprint](#)
3. D. Liu, Z. Wang, **B. Wen**, J. Yang, W. Han and T. Huang, "Robust Image Super-Resolution via Deep Networks with Sparse Prior," *IEEE Trans. Image Processing (TIP)*, 2016, [Link](#)
4. S. Dev, **B. Wen**, Y-H Lee, and S. Winkler, "Ground-Based Image Analysis: A Tutorial on Machine-Learning Techniques and Applications," *IEEE Geo. and Remote Sensing Magazine (GRSM)*, 2016, [Link](#)
5. **B. Wen**, S. Ravishankar and Y. Bresler, "Structured Overcomplete Sparsifying Transform Learning with Convergence Guarantees and Applications," *Int. Journal of Computer Vision (IJCV)*, 2015. [Link](#)
6. S. Ravishankar, **B. Wen** and Y. Bresler, "Online Sparsifying Transform Learning – Part I: Algorithms," *IEEE Journal of Selected Topics in Signal Processing (JSTSP)*, 2015. [Link](#)

Conference

7. **B. Wen**, S. Ravishankar and Y. Bresler, "When Sparsity meets Low-Rankness: Transform Learning with Non-local Low-rank Constraint for Image Restoration" submitted to *IEEE Int. Conf. on Acous., Speech and Sig. Proc. (ICASSP)*, 2017
8. **B. Wen**, S. Ravishankar and Y. Bresler, "Learning Flipping and Rotational Invariant Sparsifying Transform" in *Proc. IEEE Int. Conf. Image Processing (ICIP)*, 2016. [Link](#)
9. **B. Wen**, Y. Zhu, R. Subramanian, T. Ng, X. Shen, and S. Winkler, "COVERAGE – A Novel Database for Copy-move Forgery Detection," in *Proc. IEEE Int. Conf. Image Processing (ICIP)*, 2016. [Link](#)
10. Y. Zhu, T. Ng, X. Shen, and **B. Wen**, "Revisiting Copy-move Forgery Detection by Considering Realistic Image With Similar-but-genuine Objects", [Preprint](#)
11. **B. Wen**, S. Ravishankar and Y. Bresler, "Video Denoising Using Online 3D Sparsifying Transform Learning," in *Proc. IEEE Int. Conf. Image Processing (ICIP)*, 2015. [Link](#)
12. S. Ravishankar, **B. Wen** and Y. Bresler, "Online Sparsifying Transform Learning for Big Data Signal Processing," in *Proc. IEEE Global Conf. on Sig. & Info. Processing (GlobalSIP)*, 2015. [Link](#)
13. **B. Wen**, S. Ravishankar and Y. Bresler, "Learning Overcomplete Sparsifying Transforms with Block Cosparsity," in *Proc. IEEE Int. Conf. Image Processing (ICIP)*, 2014. [10% Best Paper](#), [Link](#)
14. **B. Wen** and Y. Lu, "A study of synthetic aperture radar imaging with compressed sensing," in *Proc. IEEE Asia-Pacific Conf. on Antennas and Propagation (APCAP)*, 2012. [Link](#)
15. **B. Wen** and Y. Lu, "MATLAB tools for EnviSAT ASAR data visualization and image enhancement," in *Proc. SPIE Int. Symp. Lidar and Radar Mapping Tech.*, 2011. [Link](#)

PATENTS

16. **B. Wen, H. Kadu and G. Su**, “Inverse Luma/Chroma Mappings With Histogram Transfer And Approximation,” *US Provisional Patent with Dolby*.
17. **B. Wen, and G. Su**, “Statistics Transfer Across Different EOTF domains via Noise Estimation, Injection and Suppression in Dolby Vision Codec,” *US Provisional Patent with Dolby*.
18. **B. Wen, S. Ravishankar and Y. Bresler**, “Data-Driven Adaptation of a Union of Sparse Models and its Applications,” *US Provisional Patent Application, UIUC2015-137-01, filed Nov 10, 2015*.
19. **B. Wen, S. Ravishankar, and Y. Bresler**, “Efficient Online Data-Driven Learning of Sparsifying Transforms for Large-Scale Signal Processing Applications,” *US Provisional Patent Application, UIUC2015-175-01, filed Dec 2, 2015*.

AWARDS / HONORS

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| 1. Yee Fellowship Award | 2016 |
| 2. UIUC Conference Travel Award | 2016 |
| 3. Top 10% Best Paper Award, IEEE Int. Conf. Image Processing (ICIP) | 2014 |
| 4. Carl Storm Fellowship, Gordon Research Conference (GRC) | 2014 |
| 5. Nomination of Harold L. Olesen Award for undergraduate teaching | 2013 |
| 6. On the list of “Teachers Ranked as Excellent” | 2013 |
| 7. Professional Engineers Board (PEB) Gold Medal | 2012 |
| 8. Peer Tutoring Scheme Best Tutor Award | 2012 |
| 9. EEE Department Excellence Award | 2012 |
| 10. Motorola Book Prize | 2012 |
| 11. President Research Scholarship (PRS) | 2011 |
| 12. Peer Tutoring Scheme Best Tutor Award | 2011 |
| 13. URECA poster presentation competition Titanium Prize Award | 2010 |
| 14. Ministry of Education Scholarship for Outstanding, Singapore | 2008 |

TEACHING EXPERIENCE

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|--|----------------------------|
| • Teaching Assistant | Jan 2016 – May 2016 |
| Course: Vector Space Signal Processing (ECE 513) | Coordinator: Yoram Bresler |
| • Head Teaching Assistant | Jan 2014 – May 2015 |
| Course: Analog Signal Processing (ECE 210) | Coordinator: Erhan Kudeki |
| • Teaching Assistant / Lab Instructor | Jan 2013 – Jan 2014 |
| Course: Analog Signal Processing Lab (ECE 211) | Coordinator: Erhan Kudeki |
| • Student Tutor | Aug 2011 – May 2012 |
| Course: Engineering Mathematics (EE2006) | Coordinator: Kah-Chan Teh |

PROFESSIONAL SERVICES

Regular Reviewer for the following journals:

1. IEEE Transactions on Signal Processing (**TSP**)
2. IEEE Transactions on Image Processing (**TIP**)
3. IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**)
4. Elsevier Neurocomputing
5. IET Radar, Sonar & Navigation
6. IEEE Electronics Letters

Conference Organization:

- 12nd Coordinated Science Laboratory Student Conference (**CSLSC**), 2017, Main Committee.
- Conference Area Chair (AC): Machine Learning and Signal Processing.

Professional Society Memberships:

- Institute of Electrical and Electronics Engineers (**IEEE**), student member
- IEEE Signal Processing Society (**SPS**), student member
- Society for Information Display (**SID**), student member

SKILLS / COURSES

- Programming: Matlab; C/C++; Python; CAFFE; MatConvNet; CUDA
- Courseworks list in my homepage. [Link](#)

ORAL / POSTER PRESENTATIONS

1. 23rd IEEE International Conference on Image Processing (ICIP)
Poster Presentation. *Date: Sep 28, 2016*
Presentation Title: Learning Flipping and Rotational Invariant Sparsifying Transform.
2. 23rd IEEE International Conference on Image Processing (ICIP)
Oral Presentation. *Date: Sep 25, 2016*
Presentation Title: COVERAGE – A Novel Database for Copy-move Forgery Detection.
3. Coordinated Science Laboratory Social Hour Seminar (**invited**)
Oral Presentation. *Date: Sep 16, 2016*
Presentation Title: Sparsifying Transform Learning for Signal Processing Applications.
4. Dolby laboratories Seminar (**invited**)
Oral Presentation. *Date: Aug 1, 2016*
Presentation Title: Statistics Transfer Across Different EOTF domains via Noise Estimation, Injection and Suppression.
5. 11st Coordinated Science Laboratory Student Conference (CSLSC), University of Illinois at Urbana-Champaign
Poster Presentation. *Date: February 18, 2016*

Presentation Title: Union of Sparsifying Transforms: Learning and Applications.

6. 22nd IEEE International Conference on Image Processing (ICIP)

Poster Presentation.

Date: September 30, 2015

Presentation Title: Video Denoising by 3D Sparsifying Transform Learning.

7. Advanced Digital Science Center Seminar (**invited**)

Oral Presentation.

Date: June 12, 2015

Presentation Title: Sparsifying Transform Learning for Signal Processing and Big Data Applications.

8. 10th Coordinated Science Laboratory Student Conference (CSLSC), University of Illinois at Urbana-Champaign

Oral Presentation.

Date: February 28, 2015

Presentation Title: Online Sparsifying Transform Learning and Video Applications.

9. 3rd IEEE Global Conference on Signal and Information Processing (GlobalSIP)

Poster Presentation.

Date: October 28, 2014

Presentation Title: Learning Online Sparsifying Transform Learning for Signal Processing.

10. 21st IEEE International Conference on Image Processing (ICIP), **Top 10% Award**

Oral Presentation.

Date: October 28, 2014

Presentation Title: Learning Overcomplete Sparsifying Transforms with Block Cosparsity.

11. Image Science Gordon Research Conference (GRC), **Carl Storm Fellowship**

Poster Presentation.

Date: June 9, 2014

Presentation Title: Online Sparsifying Transform Learning.

12. IEEE Global Conference on Signal and Information Processing (APCAP)

Oral Presentation.

Date: Aug 27, 2012

Presentation Title: A Study of Synthetic Aperture Radar Imaging with Compressed Sensing.

13. Undergraduate Research Poster Presentation Competition (URECA), Nanyang Technological University

Poster Presentation.

Date: March 11, 2012

Presentation Title: Compressed Sensing for Synthetic Aperture Radar Imaging.

14. International Symposium on Lidar and Radar Mapping

Oral Presentation.

Date: May 27, 2011

Presentation Title: EnviSAT ASAR Data Visualization and Image Enhancement.

15. Undergraduate Research Poster Presentation Competition (URECA), Nanyang Technological University, **Titanium Prize**

Poster Presentation.

Date: March 8, 2011

Presentation Title: Toolbox for EnviSAT ASAR Data Visualization and Enhancement.

Useful Links to My Projects, Presentations, Papers, Software, etc.

1. Transform Learning Webpage: <http://transformlearning.csl.illinois.edu/>
2. COVERAGE database: <https://github.com/wenbihan/coverage>
3. Google Scholar Page: <https://scholar.google.com/citations?user=yPkClpwAAAAJ&hl=en>