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Jia-Bin Huang

Education

2012–Present   **Ph.D. Candidate**, *University of Illiniois, Urbana-Champaign*, Illinois.
Electrical and Computer Engineering
Advisor: Narendra Ahuja ⓘ link
Thesis: Physically Grounded Visual Constraints for Inverse Problems in Image and Video Processing
UIUC Graduate College Dissertation Completion Fellowship
Thesis committee: Narendra Ahuja, Thomas S. Huang, Derek Hoiem, Minh N. Do, and Mark Hasegawa-Johnson

2010–2012   **Masters of Science**, *University of Illiniois, Urbana-Champaign*, Illinois.
Electrical and Computer Engineering
Thesis: Saliency Detection via Divergence Analysis: A Unified Perspective
ICPR 2012 Best Student Paper Award
Advisor: Narendra Ahuja ⓘ link

2002–2006   **Bachelor of Science**, *National Chiao-Tung University*, Hsin-Chu, Taiwan.
Undergraduate thesis: Information Preserving Color Transformation for the Colorblind
Advisor: Sheng-Jyh Wang ⓘ link

Research Interests

I am interested in the area of computer vision and computational photography, including

- Object recognition and detection
- Low-level vision
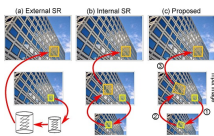- 3D reconstruction and recognition
- Image/video enhancement

Research Experience

2010–Present   **Electrical and Computer Engineering, University of Illinois, Urbana-Champaign**.
Graduate Research Assistant with Prof. Narendra Ahuja
- Proposed a single image super-resolution algorithm by exploiting self-similarity in the transformed space. Achieved state-of-the-art on both urban and natural scens.
- Developed a image completion algorithm using planar structure constraints.
- Proposed a new perspective for exisiting bottom-up saliency detection algorithms.

Summer 2014   **Disney Research Pittsburgh**.
Summer Research Intern with Dr. Sung-Ju Hwang and Dr. Leonid Sigal
- Developing multiview object detection algorithms.

Summer 2013   **Multimedia, Interaction, and Communication (MIC) Group, Microsoft Research**.
Summer Research Intern with Dr. Qin Cai, Dr. Zicheng Liu, Dr. Zhengyou Zhang
- Develop graphical user inerface in Matlab for eye tracking simulation.
- Develop a learning-based method to compensate spatiall-varying and head pose dependent gaze errors.

Summer 2012	**Interactive Visual Media (IVM) Group, Microsoft Research**.
	Summer Research Intern with Dr. Johannes Kopf and Dr. Sing Bing Kang
	○ Designed graphical user interface for generating guidance map.
	○ Developed a transformation guided image completion algorithm for handling chanllenging scenes.
	○ Developing structure extraction algorithms for automatic image completion. (ongoing)
Spring 2009	**Electrical Engineering and Computer Science, University of California, Merced**.
	Visiting student researcher host by Prof. Ming-Hsuan Yang
	○ Developed fast sparse coding algorithm using prototype learning.
	○ Developed a 3D human pose estimation method robust to partial occlusion.
2008 – 2009	**Intitute of Information Science, Academia Sinica**.
	Research Assistant with Dr. Chu-Song Chen
	○ Developed an effective shadow detection algorithm for video surveillance using physics-based features
2005–2006	**Electronics Engineering, National Chiao-Tung University**.
	Undergraduate Research Assistant with Prof. Sheng-Jyh Wang
	○ Proposed an information preserving color transformation for color deficient people.
	○ Proposed a general framework for image recolorization.

Publications (ⓘ Google Scholar profile)

Single Image Super-Resolution with Transformed Self-Exemplars.
Jia-Bin Huang, Abhishek Singh, and Narendra Ahuja,
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2015
Oral Presentation ⓘ paper ⓘ project

Image Completion using Planar Structure Guidance.
Jia-Bin Huang, Sing Bing Kang, Narendra Ahuja, and Johannes Kopf
ACM Transactions on Graphics (Proceedings of SIGGRAPH 2014)
Oral Presentation ⓘ paper ⓘ project

Towards Accurate and Robust Cross-Ratio based Gaze Trackers Through Learning From Simulation.
Jia-Bin Huang, Qin Cai, Zicheng Liu, Narendra Ahuja, and Zhengyou Zhang
Proceedings of ACM Symposium on Eye Tracking Research & Applications, (**ETRA**), 2014
Oral Presentation ⓘ paper ⓘ project
ETRA 2014 Best Paper Award

Transformation Guided Image Completion.
Jia-Bin Huang, Johannes Kopf, Narendra Ahuja, and Sing Bing Kang
Proceedings of IEEE Conference on International Conference on Computational Photography (**ICCP**), 2013
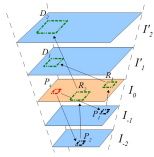**Oral Presentation** ⓘ paper ⓘ project

Saliency Detection via Divergence Analysis: A Unified Perspective.
Jia-Bin Huang and Narendra Ahuja
Proceedings of International Conference on Pattern Recognition (**ICPR**), 2012
Oral Presentation ⓘ paper ⓘ project
ICPR 2012 Best Student Paper Award (Computer Vision and Robotics track)

Exploiting Self-Similarities for Single Frame Super-Resolution .
Chih-Yuan Yang, Jia-Bin Huang, and Ming-Hsuan Yang
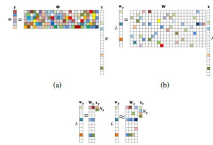Proceedings of Asian Conference on Computer Vision (**ACCV**), 2010 ⓘ paper ⓘ project

Single Image Deblurring with Adaptive Dictionary Learning.
Zhe Hu, Jia-Bin Huang, and Ming-Hsuan Yang
Proceedings of IEEE International Conference on Image Processing (**ICIP**), 2010
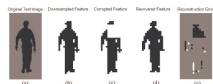ⓘ paper ⓘ project

Fast Sparse Representation with Prototypes.
Jia-Bin Huang and Ming-Hsuan Yang
Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2010
ⓘ paper ⓘ project

Estimating Human Pose from Occluded Images.
Jia-Bin Huang and Ming-Hsuan Yang
Proceedings of Asian Conference on Computer Vision (**ACCV**), 2009
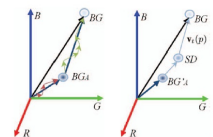Oral Presentation
ⓘ paper ⓘ project

Moving Cast Shadow Detection Using Physics-based Features.
Jia-Bin Huang and Chu-Song Chen
Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2009
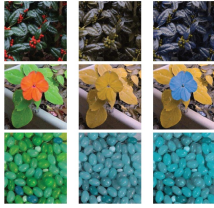ⓘ paper ⓘ project

A Physical Approach to Moving Cast Shadow Detection.
Jia-Bin Huang and Chu-Song Chen
Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing, (**ICASSP**), 2009
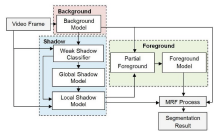Oral Presentation
ⓘ paper

Image Recolorization For The Colorblind.
Jia-Bin Huang, Chu-Song Chen Tzu-Cheng Jen, and Sheng-Jyh Wang
Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing, (**ICASSP**), 2009
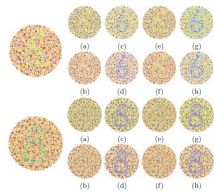ⓘ paper

Learning Moving Cast Shadows for Foreground Detection.
Jia-Bin Huang and Chu-Song Chen
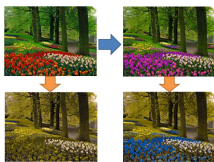Eighth International Workshop on Visual Surveillance (**VS**), 2008
ⓘ paper

Enhancing Color Representation for the Color Vision Impaired.
Jia-Bin Huang and Chu-Song Chen
Workshop on Computer Vision Applications for the Visually Impaired (**CVAVI**), 2008
Oral Presentation
ⓘ paper

Information Preserving Color Transformation for Protanopia and Deuteranopia.
Jia-Bin Huang, Yu-cheng Tseng, Se-In Wu, and Sheng-Jyh Wang
IEEE Signal Processing Letters, Vol. 14, No.10, October 2007 ⓘ paper ⓘ project

Teaching and Mentoring Experiences

Spring 2015 **Teaching Assistant of ECE 549/CS 543 Computer Vision with Prof. Derek Hoiem**, *Computer Science, University of Illinois, Urbana-Champaign*.
- Designed and developed 4 new homework problems.
- Covered two lectures:
  1. Image features and categorization ⓘ slide
  2. Convolutional neural networks ⓘ slide
- Hold weekly office hours

Summer 2015 **Shumian Xin**, *ECE, CMU*.
- Project: Automated video looping in the wild

Spring 2015 **Shun Zhang**, *EECS, UC Merced* , with Prof. Ming-Hsuan Yang.
- Project: Multi-face tracking

Spring 2015 **Chao Ma**, *EECS, UC Merced*, with Prof. Ming-Hsuan Yang.
- Project: Robust visual tracking with convolutional features

Fall 2014 **Michael Qiu**, *CE, UIUC*.
- Project: Enhancing Portrait Photographs
  Best PURE project award

Fall 2013 **Le Wang**, *ECE, UIUC.*
- Project: Video-based Physiology Signal Monitoring
- Now a Master student at Stanford University

Spring 2013 **Zelun Luo**, *ECE, UIUC.*
- Project: Video-based identity and expression recognition (with Anarghya Mitra)
  Best PURE project award
- Now a Master student at Stanford University

Spring 2013 **Anarghya Mitra**, *ECE, UIUC.*
- Project: Video-based identity and expression recognition (with Zelun Luo)
- Now a software engineer at Google

Fall 2012 **JunYoung Gwak**, *CS, UIUC.*
- Project: Pose-aware online visual tracking ℹ poster
- Now a Master student at Stanford University

Fall 2012 **Linjia Chang**, *ECE, UIUC.*
- Project: Image smoothing for structure extraction ℹ poster
- Now a Master student at University of Illinois, Urbana-Champaign

Fall 2012 **Sakshi Srivastava**, *ECE, UIUC.*
- Project: Face expression enhancement ℹ poster
  Best PURE project award
- Now a Master student at University of Illinois, Urbana-Champaign

Spring 2012 **Kevin Han**, *ECE, UIUC.*
- Project: Static and dynamic hand gesture recognition ℹ poster ℹ demo ℹ code
- Now a PhD student at UC Berkeley

Spring 2012 **Danyang (Mike) Wang**, *ECE, UIUC.*
- Project: Real-time face detection, tracking and attribute recognition ℹ poster
- Now a Master student at University of Illinois, Urbana-Champaign

Awards

May 2015 **Dissertation Completion Fellowship**, *Graduate College*, University of Illinois at Urbana-Champaign, ℹ link.

May 2015 **Cognitive Science / Artificial Intelligence Award**, *CS/AI Steering Committee, Beckman Institute*, University of Illinois at Urbana-Champaign.

April 2015 **First place**, *NASA Jet Propulsion Laboratory Team Space Design Competition*, NASA Jet Propulsion Laboratory, ℹ link.

April 2015 **Thomas and Margaret Huang Award for Graduate Research**, *Beckman Institute*, University of Illinois, Urbana-Champaign, ℹ link.

March 2015 **Conference Travel Award**, *Graduate College*, University of Illinois, Urbana-Champaign, ℹ link.

Dec 2014 **Best Project Award (with Michael Qiu)**, *Promoting Undergraduate Research in Engineering*, University of Illinois, Urbana-Champaign.

July 2014 **High-Tech Talent Scholarship** , *Ministry of Education*, Taiwan.
Annual scholarship 42,000 USD for three years

March 2014 **Best Paper Award** , *ACM Symposium on Eye Tracking Research*, ETRA 2014, ℹ Certificate.

March 2014	**Sundaram Seshu International Student Fellowship** , *Department of Electrical and Computer Engineering*, University of Illinois, Urbana-Champaign, ⓘ Certificate.
May 2013	**Best Project Award (with Zelun Luo and Anarghya Mitra)**, *Promoting Undergraduate Research in Engineering*, University of Illinois, Urbana-Champaign.
Dec 2012	**Best Project Award (with Sakshi Srivastava)**, *Promoting Undergraduate Research in Engineering*, University of Illinois, Urbana-Champaign.
Dec 2012	**Best Mentor of the Semester**, *Promoting Undergraduate Research in Engineering*, University of Illinois, Urbana-Champaign.
Nov 2012	**Best Student Paper Award (Computer Vision and Robotics Track)**, *International Conference on Pattern Recognition 2012*, ICPR 2012.
Aug 2008	**Best Paper Award Runner Up**, *Computer Vision, Graphics, and Image Processing (CVGIP) Conference*, CVGIP 2008, Taiwan.
Aug 2006	**Best Paper Award Runner Up**, *Computer Vision, Graphics, and Image Processing (CVGIP) Conference*, CVGIP 2006, Taiwan.

Talks (ⓘ Slideshare profile)

May 2015	**Single Image Super-Resolution from Transformed Self-Exemplars**, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2015)*, ⓘ slides.
May 2015	**Convolutional Neural Networks**, *CS 543/ECE 549 Computer Vision*, Unversity of Illinois, Urbana-Champaign, ⓘ slides.
April 2015	**Image Features and Categorization**, *CS 543/ECE 549 Computer Vision*, Unversity of Illinois, Urbana-Champaign, ⓘ slides.
Feb 2015	**Writing Fast Matlab Code**, *CS 543/ECE 549 Computer Vision*, Unversity of Illinois, Urbana-Champaign, ⓘ slides.
Sept 2014	**Image Completion using Planar Structure Guidance**, *CS 591 Graphics Seminar*, Unversity of Illinois, Urbana-Champaign, ⓘ slides.
May 2014	**Image Completion using Planar Structure Guidance**, *Inistitue of Information Science, Acadmeia Sinica*, Taipei, Taiwan, ⓘ slides.
May 2014	**Image Completion using Planar Structure Guidance**, *Department of Computer Science and Information Engeineering, National Taiwan University*, Taipei, Taiwan, ⓘ slides.
May 2014	**Image Completion using Planar Structure Guidance**, *National Chiao-Tung University*, Hsinchu, Taiwan, ⓘ slides.
May 2014	**Image Completion using Planar Structure Guidance**, *Department of Computer Science, National Tsing Hua University*, Hsinchu, Taiwan, ⓘ slides.
March 2014	**Towards Accurate and Robust Cross-Ratio based Gaze Trackers Through Learning From Simulation**, *ACM Symposium on Eye Tracking Research & Applications (ETRA 2014)*, Florida, USA, ⓘ slides.
April 2013	**Transformation Guided Image Completion**, *International Conference on Computational Photography (ICCP 2013)*, Boston, USA, ⓘ slides.
Nov 2012	**Saliency Detection via Divergence Analysis: A Unified Perspective**, *International Conference on Pattern Recognition (ICPR 2012)*, Tsukuba, Japan ⓘ slides.

Sept 2012	**Saliency Detection via Divergence Analysis: A Unified Perspective**, *Beckman Institute student seminar*, University of Illinois, Urbana-Champaign ⓘ slides.
Jan 2011	**How to Read Academic Papers?**, *National Tsing-Hua University*, Hsinchu, Taiwan ⓘ slides .
Jan 2011	**How to Read Academic Papers?**, *National Taiwan University*, Taipei, Taiwan ⓘ slides .
Oct 2010	**What Makes a Creative Photograph?**, *Guest lecture, CS 498 Computational Photography*, University of Illinois, Urbana-Champaign ⓘ slides .
Oct 2010	**How to Come Up With New Research Ideas in Computer Vision?**, *Computer Vision and Robotics Laboratory*, University of Illinois, Urbana-Champaign, Illinois ⓘ slides .
June 2010	**How to Come Up With New Research Ideas in Computer Vision?**, *Institute of Information Science, Academia Sinica*, Taipei, Taiwan ⓘ slides .
May 2010	**How to Come Up With New Research Ideas in Computer Vision?**, *National Taiwan University*, Taipei, Taiwan ⓘ slides .
May 2010	**How to Come Up With New Research Ideas in Computer Vision?**, *National Tsing-Hua University*, Hsinchu, Taiwan ⓘ slides .
Sept 2009	**Estimating Human Pose from Occluded Images**, *Asian Conference on Computer Vision (ACCV 2009)*, Xi'an, China ⓘ slides .
April 2009	**A Physical Approach to Moving Cast Shadow Detection**, *International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2009)*, Taipei, Taiwan ⓘ slides .
Oct 2008	**Enhancing Color Representation for the Color Vision Impaired**, *Workshop on Computer Vision Applications for the Visually Impaired (ECCV Workshop 2008)*, Marseilles, France ⓘ slides .

Academic Services

Journal Reviewer	IEEE Pattern Analysis and Machine Intelligence (**TPAMI**)
	IEEE Transactions on Image Processing (**TIP**)
	IEEE Transactions on Circuits and Systems for Video Technology (**CSVT**)
	IEEE Transactions on Multimedia (**TMM**)
	IEEE Transactions on Visualization and Computer Graphics (**TVCG**)
	Computer Vision and Image Understanding (**CVIU**)
	The Visual Computer (**TVC**)
	ACM Transactions on Intelligent Systems and Technology (**ACM TIST**)
	Image and Vision Computing Journal (**IVC**)
	Journal of Information Science and Engineering (**JISE**)
	Journal of Electronic Imaging (**EI**)
	Journal of Selected Topics in Signal Processing (**JSTSP**)
	IET Transactions on Image Processing (**IETIP**)

Conference Program Committees	IEEE Conference on Computer Vision (**ICCV** 2015) IEEE Conference on Computer Vision and Pattern Recognition (**CVPR** 2015) IEEE Conference on Computational Photography (**ICCP** 2015) Eurographics (**EG** 2015) SIGGRAPH Asia (**SigAsia** 2014, 2015) International Conference on Multimedia & Expo (**ICME** 2015) Visual Communication and Image Processing (**VCIP** 2012, 2013, 2014, 2015) Conference on Graphics, Patterns and Images (**SIBGRAPI** 2014, 2015) Pacific Graphics 2014 (**PG** 2014, 2015) Asian Conference on Computer Vision (**ACCV** 2014) International Conference on Acoustics, Speech, and Signal Processing (**ICASSP** 2014, 2015) Winter Conference on Computer Vision (**WACV** 2014, 2015) Eye Tracking and Research Applications (**ETRA** 2014)
Research Mentor	Research Mentor for UIUC Promoting Undergrad Research in Engineering (P.U.R.E.) program, Spring 2012, Fall 2012 (**Best Mentor of the semester**), Spring 2013, and Fall 2014. ℹ️ link
Webmaster	Computer Vision Taiwanese Group ℹ️ link Computer Vision Resources ℹ️ link Computer Vision Genealogy ℹ️ link

References

M.S./Ph.D. Advisor	**Narendra Ahuja**, *Donald Biggar Willet Professor in Department of Electrical and Computer Engineering*, University of Illinois, Urbana-Champaign. ✉️ n-ahuja@illinois.edu ℹ️ homepage
Internship Mentor (Summer 2014)	**Leonid Signal**, *Senior Researcher in Computer Vision*, Disney Research, Pittsburgh. ✉️ lsigal@disneyresearch.com ℹ️ homepage
Internship Mentor (Summer 2013)	**Zhengyou Zhang**, *Principal Researcher in Multimedia, Interaction, and Communication (MIC) Group*, Microsoft Research in Redmond. ✉️ zhang@microsoft.com ℹ️ homepage
Internship Mentor (Summer 2012)	**Sing Bing Kang**, *Principal Researcher in Interactive Visual Media (IVM) Group*, Microsoft Research in Redmond. ✉️ sbkang@microsoft.com ℹ️ homepage
Course Instructor (2010–2011)	**Derek Hoiem**, *Assistant Professor in Department of Computer Science*, University of Illinois, Urbana-Champaign. ✉️ dhoiem@uiuc.edu ℹ️ homepage
Research Mentor (Spring 2009)	**Ming-Hsuan Yang**, *Associate Professor of Electric Engineering and Computer Science*, University of California, Merced. ✉️ mhyang@ucmerced.edu ℹ️ homepage