

WEI-LUN (HARRY) CHAO

CONTACT INFORMATION

587 Drees Laboratories,
2015 Neil Avenue,
Columbus, OH 43210

chao.209@osu.edu
<http://www-scf.usc.edu/~weilunc/>
<https://github.com/pujols>

CURRENT POSITION

**Tenure-track Assistant Professor in Computer Science and Engineering,
The Ohio State University (OSU), OH, USA**

Aug. 2019 – present

EDUCATION

University of Southern California (USC), CA, USA

Aug. 2013 – Jul. 2018

- Ph.D., Department of Computer Science
- Advisor: Prof. Fei Sha
- GPA: 4.0/4.0
- *Thesis: Transfer Learning for Intelligent Systems in the Wild*

National Taiwan University (NTU), Taipei, Taiwan

Sep. 2011 – Jul. 2012

- Ph.D., Graduate Institute of Communication Engineering (transfer)
- Advisor: Prof. Jian-Jiun Ding

National Taiwan University (NTU), Taipei, Taiwan

Sep. 2009 – Jun. 2011

- M.S., Graduate Institute of Communication Engineering
- Advisor: Prof. Jian-Jiun Ding
- *Thesis: Integrated Machine Learning Algorithms for Human Age Estimation*

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

Jan. 2009 – May 2009

- Exchange Student, College of Engineering
- Individual Study Advisor: Prof. Pierre Moulin

National Chiao Tung University (NCTU), Hsinchu, Taiwan

Sep. 2005 – Jun. 2009

- B.S., Department of Communication Engineering

WORK EXPERIENCE

Postdoctoral Associate in Computer Science, Cornell University

Aug. 2018 – Jul. 2019

- Advisor: Prof. Kilian Q. Weinberger and Prof. Mark Campbell

Visiting Assistant Professor in Computer Science and Engineering, The Ohio State University (OSU)	Jan. 2019 – Jul. 2019
Summer Internship, Microsoft Research, Redmond	May 2017 – Aug. 2017
• Mentors: Hoifung Poon, Chris Quirk, and Xiaodong He	
Military Service, Ministry of National Defense, Taiwan	Aug. 2012 – Jul. 2013
• Second Lieutenant, Chief Counselor of Company	

RESEARCH INTERESTS

Machine Learning, Computer Vision, and Artificial Intelligence

CURRENT RESEARCH

Machine Learning as the Basis Laboratory (MLB Lab), OSU (Aug. 2019 – present):

- Learning with limited and imbalanced supervision
- Meta-learning and transfer learning
- Robust perception for autonomous driving
- Vision and language
- Healthcare and medical applications

RESEARCH EXPERIENCE

Autonomous Driving, with K. Q. Weinberger and M. Campbell, Cornell (Aug. 2018 – Jul. 2019):

- Robust perception for autonomous driving
- Defense of adversarial examples

Theoretical and Empirical Data Sciences Laboratory (TEDS Lab), USC (Aug. 2013 – Jul. 2018):

- Transfer learning for visual question answering and vision-language related topics
- Zero-shot learning for large-scale object recognition
- Video summarization with determinantal point processes and recurrent neural networks
- Hamiltonian Markov chain Monte Carlo
- Large margin determinantal point processes

Digital Image and Signal Processing Laboratory (DISP Lab), NTU (Sep. 2009 – Jul. 2012):

- Facial age estimation and expression recognition based on manifold and metric learning
- Anti-symmetric Fourier descriptors for boundary compression

Other Research Projects at NTU (Sep. 2009 – Jul. 2012):

- Video retargeting based on seam carving (with Prof. Winston Hsu)
- Color constancy and color correction (with Prof. Soo-Chang Pei)

UIUC (Jan. 2009 – May 2009):

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- Video fingerprinting (with Prof. Pierre Moulin)

PUBLICATION

Ph.D. Thesis

Wei-Lun Chao, "Transfer learning for intelligent systems in the wild," USC, Dec. 2018.

M.S. Thesis

Wei-Lun Chao, "Integrated machine learning algorithms for human age estimation," NTU, Jun. 2011.

Preprints

[P3] Wei-Lun Chao*, Han-Jia Ye*, De-Chuan Zhan, Mark Campbell, and Kilian Q. Weinberger, "Revisiting Meta-Learning as Supervised Learning," arXiv preprint arXiv:2002.00573, 2020

[P2] Han-Jia Ye, Hong-You Chen, De-Chuan Zhan, and Wei-Lun Chao, "Identifying and Compensating for Feature Deviation in Imbalanced Deep Learning," arXiv preprint arXiv:2001.01385, 2020

[P1] Yan Wang, Wei-Lun Chao, Kilian Q Weinberger, and Laurens van der Maaten, "SimpleShot: Revisiting Nearest-Neighbor Classification for Few-Shot Learning," arXiv preprint arXiv:1911.04623, 2019

Journals

[J7] Vikram Shree, Wei-Lun Chao, and Mark Campbell, "Interactive Natural Language-based Person Search," *IEEE Robotics and Automation Letters (RA-L)*, vol. 5 (2), pp. 1851–1858, 2020

[J6] Soravit Changpinyo*, Wei-Lun Chao*, Boqing Gong, and Fei Sha, "Classifier and Exemplar Synthesis for Zero-Shot Learning," *International Journal of Computer Vision (IJCV)*, vol. 128, pp. 166–201, 2020

[J5] Brian Wang, Wei-Lun Chao, Yan Wang, Bharath Hariharan, Kilian Q. Weinberger, and Mark Campbell, "LDLS: 3D Object Segmentation through Label Diffusion from 2D Images," *IEEE Robotics and Automation Letters (RA-L)*, vol. 4 (3), pp. 2902–2909, 2019

[J4] Wei-Lun Chao, Hanisha Manickavasagan, and Somashekar G Krishna, "Application of artificial intelligence in the detection and differentiation of colon polyps: a technical review for physicians," *Diagnostics*, 2019

[J3] Wei-Lun Chao, Jian-Jiun Ding, Jun-Zuo Liu, "Facial expression recognition based on improved local binary pattern and class-regularized locality preserving projection," *Signal Processing*, vol. 117, pp. 1–10, 2015

[J2] Wei-Lun Chao, Jun-Zuo Liu, and Jian-Jiun Ding, "Facial age estimation based on label-sensitive learning and age-oriented regression," *Pattern Recognition*, vol. 46, no. 3, pp. 628–641, 2013

[J1] Feng-Ju Chang, Soo-Chang Pei, and Wei-Lun Chao, "Color constancy by chromaticity neutralization," *Journal of the Optical Society of America A*, vol. 29, no. 10, pp. 2217–2225, 2012

Conferences

[C27] Yan Wang*, Xiangyu Chen*, Yurong You*, Li Erran Li, Bharath Hariharan, Mark Campbell, Kilian Q. Weinberger, and Wei-Lun Chao, "Train in Germany, Test in the USA: Making 3D Object Detectors Generalize," to appear in CVPR 2020

- [C26] Rui Qian*, Divyansh Garg*, Yan Wang, Yurong You, Serge Belongie, Bharath Hariharan, Mark Campbell, Kilian Q. Weinberger, and Wei-Lun Chao, "End-to-end Pseudo-LiDAR for Image-Based 3D Object Detection," to appear in CVPR 2020
- [C25] Vikram Shree, Wei-Lun Chao, and Mark Campbell, "Interactive Natural Language-based Person Search," to appear in ICRA, 2020
- [C24] Yurong You*, Yan Wang*, Wei-Lun Chao*, Divyansh Garg, Geoff Pleiss, Bharath Hariharan, Mark Campbell, and Kilian Q. Weinberger, "Pseudo-LiDAR++: Accurate Depth for 3D Object Detection in Autonomous Driving," to appear in ICLR, 2020
- [C23] Shih-Han Chou, Wei-Lun Chao, Wei-Sheng Lai, Min Sun, and Ming-Hsuan Yang, "Visual Question Answering on 360 Images," WACV, 2020
- [C22] Shengyuan Hu, Tao Yu, Chuan Guo, Wei-Lun Chao, and Kilian Q. Weinberger, "A New Defense Against Adversarial Images: Turning a Weakness into a Strength," NeurIPS, 2019
- [C21] Cheng Zhang, Wei-Lun Chao, and Dong Xuan, "An Empirical Study on Leveraging Scene Graphs for Visual Question Answering," BMVC, 2019
- [C20] Vikram Shree, Wei-Lun Chao, and Mark Campbell, "An Empirical Study of Person Re-Identification with Attributes," RO-MAN, 2019
- [C19] Carlos Diaz-Ruiz, Yan Wang, Wei-Lun Chao, Kilian Q. Weinberger, and Mark Campbell, "Vision-Only 3D Tracking for Self-Driving Cars," CASE, 2019
- [C18] Brian Wang, Wei-Lun Chao, Yan Wang, Bharath Hariharan, Kilian Q. Weinberger, and Mark Campbell, "LDLS: 3D Object Segmentation through Label Diffusion from 2D Images," IROS, 2019
- [C17] Yan Wang, Wei-Lun Chao, Divyansh Garg, Bharath Hariharan, Mark Campbell, and Kilian Q. Weinberger, "Pseudo-LiDAR from visual depth estimation: bridging the gap in 3D object detection for autonomous driving," CVPR, 2019
- [C16] Wei-Lun Chao*, Hexiang Hu*, and Fei Sha, "Cross-dataset adaptation for visual question answering," CVPR, 2018
- [C15] Hexiang Hu*, Wei-Lun Chao*, and Fei Sha, "Learning answer embeddings for visual question answering," CVPR, 2018
- [C14] Wei-Lun Chao*, Hexiang Hu*, and Fei Sha, "Being negative but constructively: lessons learnt from creating better visual question answering datasets," NAACL, 2018 (Oral presentation)
- [C13] Soravit Changpinyo, Wei-Lun Chao, and Fei Sha, "Predicting visual exemplars of unseen classes for zero-shot learning," ICCV, 2017
- [C12] Wei-Lun Chao*, Soravit Changpinyo*, Boqing Gong, and Fei Sha, "An empirical study and analysis of generalized zero-Shot learning for object recognition in the wild," ECCV, 2016 (Spotlight)
- [C11] Ke Zhang*, Wei-Lun Chao*, Fei Sha, and Kristen Grauman, "Video summarization with long short-term memory," ECCV, 2016
- [C10] Soravit Changpinyo*, Wei-Lun Chao*, Boqing Gong, and Fei Sha, "Synthesized classifiers for zero-shot

learning,” CVPR, 2016 (Oral presentation)

- [C9] Ke Zhang*, Wei-Lun Chao*, Fei Sha, and Kristen Grauman, “Summary transfer: exemplar-based subset selection for video summarization,” CVPR, 2016
- [C8] Wei-Lun Chao*, Boqing Gong*, Kristen Grauman, and Fei Sha, “Large-margin determinantal point processes,” UAI, 2015
- [C7] Wei-Lun Chao, Justin Solomon, Dominik Michels, and Fei Sha, “Exponential Integration for Hamiltonian Monte Carlo,” ICML, 2015 (Oral presentation)
- [C6] Boqing Gong*, Wei-Lun Chao*, Kristen Grauman, and Fei Sha, “Diverse sequential subset selection for supervised video summarization,” NIPS, 2014
- [C5] Wei-Lun Chao, Jun-Zuo Liu, Jian-Jiun Ding, and Po-Hung Wu, “Facial expression recognition using expression-specific local binary patterns and layer denoising mechanism,” ICICS, 2013
- [C4] Wei-Lun Chao, Jun-Zuo Liu, and Jian-Jiun Ding, “Facial age estimation based on label-sensitive learning and age-specific local regression,” ICASSP, 2012 (Oral presentation)
- [C3] Jian-Jiun Ding, Yu-Hsiang Wang, Lee-Lin Hu, Wei-Lun Chao, and Yio-Wha Shau, “Muscle injury determination by image segmentation,” VCIP, 2011 (Oral presentation)
- [C2] Wei-Lun Chao, Hsiao-Hang Su, Shao-Yi Chien, Winston Hsu, and Jian-Jiun Ding, “Coarse-to-fine temporal optimization for video retargeting based on seam carving,” ICME, 2011 (Oral presentation)
- [C1] Jian-Jiun Ding, Wei-Lun Chao, Jiun-De Huang, and Cheng-Jin Kuo, “Asymmetric Fourier descriptor of non- closed segments,” ICIP, 2010 (Oral presentation)

Abstracts

- [A1] Somashekar G. Krishna, Wei-Lun Chao, Sarah poland, Victoria Alexander, Tassiana Maloof, Kelly Dubai, Olivia Ueltschi, Dana M. Middendorf, Muhammed O. Jajeh, Aadit Vishwanath, Kyle Porter, David Carlyn, Tai-Yu Pan, Georgios Papachristou, Phil A. Hart, Zobeida Cruz-Monserrate, Darwin L. Conwell, "Computer-Aided Detection of Advanced Neoplasia in Intraductal Papillary Mucinous Neoplasms Using Confocal Laser Endomicroscopy," Digestive Disease Week (DDW) – lecture presentation, 2020
- [A2] Somashekar G. Krishna, Wei-Lun Chao, Sebastian G. Strobel, Peter Stanich, Anand Patel, Anjuli Luthra, Megan Q. Chan, Alecia Blaszcak, Dana Lee, Kyle Porter, Phil A. Hart, Zobeida Cruz-Monserrate, Darwin L. Conwell, "Application Of Machine Learning and Artificial Intelligence in the Detection of Dysplasia in IPMNs Using EUS-guided Needle-Based Confocal Laser Endomicroscopy," Digestive Disease Week (DDW), 2019

AWARDS AND FUNDING

Assistant Professor at Ohio State University

AWS Cloud Credits for Research

Project Title: A Unifying Framework for Zero-Shot Learning, Few-Shot Learning, and Learning with The Long-Tail Distribution by Integrating Multi-Modal and Multi-Domain Information.

Role: PI

10/31/2019-present

Amount: 20,000 AWS credits

GI Development funds, OSU

Project Title: Development of a Computer Based (Artificial Intelligence) Algorithm to Predict High Grade Dysplasia / Early Cancer in Pre-Cancerous Pancreatic Cystic Lesions

Role: Co-PI (PI: Dr. Somashekar G. Krishna)

08/01/2019-present

Amount: total \$25,000

TEACHING

Advanced topics in machine learning and computer vision

- 2020 Spring, OSU

AWARDS AND HONORS

Assistant Professor at Ohio State University

- Outstanding reviewer, NeurIPS 2019

Postdoctoral Associate at Cornell university

- Outstanding reviewer, NeurIPS 2018

Ph.D. at University of Southern California (USC)

- CVPR 2018 Doctoral Consortium
- USC Annenberg Graduate Fellowship (Aug. 2013 – Jul. 2017)
- Studying Abroad Scholarship, Ministry of Education, Taiwan

M.S. at National Taiwan University (NTU)

- Avg. Grade: Rank 1 in the Grad. Inst. Communication Engineering, NTU (1/122)
- Honor Student Member of the Phi Tau Phi Scholastic Honor Society of the Republic of China, 2011
- Graduate Student Scholarship, NTU, 2010 – 2011
- Long-Term Scholarship for Talented Students, Hsing Tian Kong Culture and Education Development Foundation, 2010 – 2017

B.S. at National Chiao Tung University (NCTU)

- Avg. Grade: Rank 3 in the Dept. Communication Engineering, NCTU (3/90; 2/43 in the class)
- President's Award, NCTU (3 times)
- Exchange Student Scholarship to UIUC, 2009

Other Scholarships for outstanding academic performance

- From Dung Guang Education Foundation, 2010; Chin-Chih, 2008; Datatronics Technology, Inc., 2007.

PROFESSIONAL EXPERIENCE

Conference/Workshop Services

- Workshop Organizer: 2020 ECCV Workshop on Perception for Autonomous Driving
- Workshop Organizer: 2019 ICML Workshop on AI for Autonomous Driving

Teaching Assistant

- Machine Learning (CSCI 567), USC, Fall 2017 and Spring 2018
- Signals and Systems, NTU, Spring 2011
- Time Frequency Analysis and Wavelet Transforms, NTU, Fall 2010

Invited Talk and Lectures

- Transfer Learning towards Intelligent Systems in the Wild, *at OSU, ASU, TTIC, UofA, Cornell, USC, NVIDIA, and FAIR*, 2018
- Zero-shot Learning for Visual Recognition, *at NTHU, Academia Sinica, USC, Cornell, and Google*, 2017 – 2018
- What, Where, and How to Share for Computer Vision and Machine Learning, *NCTU*, 2017
- Video Summarization and Hamiltonian Monte Carlo, *in MiRA group, NTU*, 2015
- Dimensionality Reduction and Manifold Learning, *in the Advance Multimedia Analysis and Indexing course instructed by Prof. Winston Hsu, NTU*, 2011 – 2012 (totally 4 weeks)
- Experience and Preparation for Studying Abroad, *in the Career Planning course, NCTU*, 2014 – 2016

Conference Attendance

- Oral/Spotlight Presentation: CVPR 2017 (workshop), ECCV 2016, CVPR 2016, ICML 2015, ICASSP 2012, ICME 2011, ICIP 2010
- Poster Presentation: NeurIPS 2019, CVPR 2019, CVPR 2018, UAI 2015, NIPS 2014

Summer school Attendance

- Deep Learning Summer School 2016, Montreal, Canada (registration fee waived)

REVIEWER EXPERIENCE

- **IEEE Transactions:** on Pattern Analysis and Machine Intelligence, on Image Processing, on Multimedia, on Cybernetics, on Information Forensics & Security, and on Circuits and Systems for Video Technology
- **Elsevier:** Pattern Recognition, Expert Systems with Applications
- **Springer:** International Journal of Computer Vision, Machine Vision and Applications
- **Conferences:** NeurIPS (2018, 2019), ICML (2019, 2020), NAACL (2019), CVPR (2018, 2019, 2020), ICLR (2019, 2020), WACV 2019, ACCV 2018, AAAI (2017, 2020), AAMAS (2020)