XIAOWEI HU

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ACADEMIC QUALIFICATIONS

Ph.D. in Computer Science and Engineering 08/2016 - 07/2020
The Chinese University of Hong Kong (CUHK)
Advisors: Prof. Pheng-Ann Heng & Prof. Chi-Wing Fu
⋆ Awardee of the Hong Kong Ph.D. Fellowship Scheme (HKPFS)

B.Eng. in Computer Science and Technology 09/2012 - 07/2016
South China University of Technology (SCUT)
GPA: 3.95/4.0 (**rank** 1st in All-English-Teaching Union Class)
⋆ Selected by SCUT for a special class for the most promising students

RESEARCH INTERESTS

My research interests cover **computer vision** and **deep learning**, with special emphasis on **low-level vision**. Specifically, I am dedicated to designing learning frameworks by exploring the physical properties of various vision applications, including shadow image analysis, rain removal, and saliency detection. I am also interested in exploring robust learning algorithms with less human supervision for image recognition and restoration, which helps to improve scene understanding and enhance camera capability.

HONORS AND AWARDS

Hong Kong Ph.D. Fellowship (the **highest** scholarship for students studying in Hong Kong)	2016 - 2020
CVPR Doctoral Consortium Award (31 awardees **globally**)	2020
Best Oral Presentation Award of Hong Kong Computer Vision Workshop (the **only** winner)	2019
ICCV Outstanding Reviewer Award (top **3.6%**)	2019
Excellent Teaching Assistant at CSE Department, CUHK	2018
Top 10 Outstanding Students at SCUT (**rank** 1st, the **highest** award for students at SCUT)	2016
Gold Award of Pan-Pearl-River-Delta University IT Project Competition in China	2016
Google Excellence Scholarship (one of 58 winners in **China**)	2015
Tencent Outstanding Scholarship (the **only** undergraduate winner at SCUT)	2015
National Scholarship (the **highest** national wide scholarship for undergraduate students in China)	2013
First Prize of Adolescents Science & Technology Innovation Contest in Hebei Province	2011

PUBLICATION HIGHLIGHTS

Summary: TPAMI/CVPR/ICCV/ECCV (7), IEEE Transactions (9).

Refereed Conference Papers

[C1] *Instance Shadow Detection*
Tianyu Wang⋆, **Xiaowei Hu**⋆, Qiong Wang, Pheng-Ann Heng, and Chi-Wing Fu. (⋆joint 1st authors)
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020.

[C2] *GrabAR: Occlusion-aware Grabbing Virtual Objects in AR*
Xiao Tang, **Xiaowei Hu**, Chi-Wing Fu, and Daniel Cohen-Or.
ACM Symposium on User Interface Software and Technology (**UIST**), 2020.

[C3] *Mask-ShadowGAN: Learning to Remove Shadows from Unpaired Data*
Xiaowei Hu, Yitong Jiang, Chi-Wing Fu, and Pheng-Ann Heng.
IEEE International Conference on Computer Vision (**ICCV**), 2019.

[C4] *Deep Multi-Model Fusion for Single-Image Dehazing*
Zijun Deng, Lei Zhu, **Xiaowei Hu**, Chi-Wing Fu, Xuemiao Xu, Qing Zhang, Jing Qin, and Pheng-Ann Heng.
IEEE International Conference on Computer Vision (**ICCV**), 2019.

[C5] *Depth-Attentional Features for Single-Image Rain Removal*
Xiaowei Hu, Chi-Wing Fu, Lei Zhu, and Pheng-Ann Heng.
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2019.

[C6] *Probabilistic Multilayer Regularization Network for Unsupervised 3D Brain Image Registration*
Lihao Liu, **Xiaowei Hu**, Lei Zhu, and Pheng-Ann Heng.
International Conference on Medical Image Computing and Computer Assisted Intervention (**MICCAI**), 2019.

[C7] *Enhancing Augmented VR Interaction via Egocentric Scene Analysis*
Yang Tian, Chi-Wing Fu, Shengdong Zhao, Ruihui Li, Xiao Tang, **Xiaowei Hu**, and Pheng-Ann Heng.
Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (**Ubicomp**), 2019.

[C8] *Direction-Aware Spatial Context Features for Shadow Detection*
Xiaowei Hu, Lei Zhu, Chi-Wing Fu, Jing Qin, and Pheng-Ann Heng.
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2018. (**Oral**)

[C9] *Recurrently Aggregating Deep Features for Salient Object Detection*
Xiaowei Hu, Lei Zhu, Jing Qin, Chi-Wing Fu, and Pheng-Ann Heng.
AAAI Conference on Artificial Intelligence (**AAAI**), 2018. (**Spotlight**)

[C10] *R^3Net: Recurrent Residual Refinement Network for Saliency Detection*
Zijun Deng⋆, **Xiaowei Hu**⋆, Lei Zhu, Xuemiao Xu, Jing Qin, Guoqiang Han, and Pheng-Ann Heng. (⋆joint 1st authors)
International Joint Conference on Artificial Intelligence (**IJCAI**), 2018. (**Oral**)

[C11] *Bidirectional Feature Pyramid Network with Recurrent Attention Residual Modules for Shadow Detection*
Lei Zhu, Zijun Deng, **Xiaowei Hu**, Chi-Wing Fu, Xuemiao Xu, Jing Qin, and Pheng-Ann Heng.
European Conference on Computer Vision (**ECCV**), 2018.

[C12] *Deep Attentional Features for Prostate Segmentation in Ultrasound*
Yi Wang, Zijun Deng, **Xiaowei Hu**, Lei Zhu, Xin Yang, Xuemiao Xu, Pheng-Ann Heng, and Dong Ni.
International Conference on Medical Image Computing and Computer Assisted Intervention (**MICCAI**), 2018.

Refereed Journal Papers

[J1] *SAC-Net: Spatial Attenuation Context for Salient Object Detection*
Xiaowei Hu, Chi-Wing Fu, Lei Zhu, Tianyu Wang, and Pheng-Ann Heng.
IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**, IF: 4.133), 2020.

[J2] *Saliency-Aware Texture Smoothing*
Lei Zhu⋆, **Xiaowei Hu**⋆, Chi-Wing Fu, Jing Qin, and Pheng-Ann Heng. (⋆joint 1st authors)
IEEE Transactions on Visualization and Computer Graphics (**TVCG**, IF: 4.558), 2020.

[J3] *Ψ-Net: Stacking Densely Convolutional LSTMs for Sub-cortical Brain Structure Segmentation*
Lihao Liu⋆, **Xiaowei Hu**⋆, Lei Zhu, Chi-Wing Fu, Jing Qin, and Pheng-Ann Heng. (⋆joint 1st authors)
IEEE Transactions on Medical Imaging (**TMI**, IF: 6.685), 2020.

[J4] *CANet: Cross-disease Attention Network for Joint Diabetic Retinopathy and Diabetic Macular Edema Grading*
Xiaomeng Li, **Xiaowei Hu**, Lequan Yu, Lei Zhu, Chi-Wing Fu, and Pheng-Ann Heng.
IEEE Transactions on Medical Imaging (**TMI**, IF: 6.685), 2020.

[J5] *SALMNet: A Structure-Aware Lane Marking Detection Network*
Xuemiao Xu, Tianfei Yu, **Xiaowei Hu**, Wing W. Y. Ng, Pheng-Ann Heng.
IEEE Transactions on Intelligent Transportation Systems (**TITS**, IF: 6.319), 2020.

[J6] *Direction-Aware Spatial Context Features for Shadow Detection and Removal*
Xiaowei Hu, Chi-Wing Fu, Lei Zhu, Jing Qin, and Pheng-Ann Heng.
IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**, IF: 17.861), 2019.

[J7] *SINet: A Scale-Insensitive Convolutional Neural Network for Fast Vehicle Detection*
Xiaowei Hu, Xuemiao Xu, Yongjie Xiao, Hao Chen, Shengfeng He, Jing Qin, and Pheng-Ann Heng.
IEEE Transactions on Intelligent Transportation Systems (**TITS**, IF: 6.319), 2019.

[J8] *Deep Attentive Features for Prostate Segmentation in 3D Transrectal Ultrasound*
Yi Wang, Haoran Dou, **Xiaowei Hu**, Lei Zhu, Xin Yang, Ming Xu, et al.
IEEE Transactions on Medical Imaging (**TMI**, IF: 6.685), 2019.

[J9] *Aggregating Attentional Dilated Features for Salient Object Detection*
Lei Zhu, Jiaxing Chen, **Xiaowei Hu**, Chi-Wing Fu, Xuemiao Xu, Jing Qin, and Pheng-Ann Heng.
IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**, IF: 4.133), 2019.

[J10] *CATARACTS: Challenge on Automatic Tool Annotation for cataRACT Surgery*
Hassan Al Hajj, Mathieu Lamard, Pierre-Henri Conze, Soumali Roychowdhury, **Xiaowei Hu**, et al.
Medical Image Analysis (**MedIA**, IF: 11.148), 2019.

Papers under Review

[U1] *Revisiting Shadow Detection: A New Benchmark Dataset for Complex World*
Xiaowei Hu, Tianyu Wang, Chi-Wing Fu, Yitong Jiang, Qiong Wang, and Pheng-Ann Heng.
Submitted to IEEE Transactions on Image Processing (**TIP**, IF: 9.340).

[U2] *Single-Image Real-Time Rain Removal Based on Depth-Guided Non-Local Features*
Xiaowei Hu, Lei Zhu, Tianyu Wang, Chi-Wing Fu, and Pheng-Ann Heng.
Submitted to IEEE Transactions on Image Processing (**TIP**, IF: 9.340).

[U3] *Rotation-Oriented Collaborative Self-Supervised Feature Learning for Fundus Disease Diagnosis*
Xiaomeng Li, **Xiaowei Hu**, Xiaojuan Qi, Lequan Yu, Pheng-Ann Heng, and Lei Xing.
Submitted to Medical Image Analysis (**MedIA**, IF: 11.148).

[U4] *Recurrent Residual Refinement Network for Saliency Detection*
Zijun Deng, Lei Zhu, **Xiaowei Hu**, Xuemiao Xu, Jing Qin, Guoqiang Han, and Pheng-Ann Heng.
Submitted to IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**, IF: 4.133).

[U5] *Learning Gated Global Residual for Single-Image Rain Streak Removal*
Lei Zhu, Zijun Deng, **Xiaowei Hu**, Xuemiao Xu, Jing Qin, and Pheng-Ann Heng.
Submitted to IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**, IF: 4.133).

[U6] *Dually Guided Non-Local Network for Breast Lesion Segmentation in Ultrasound*
Cheng Xue, Lei Zhu, Yunzhu Wu, **Xiaowei Hu**, Xiaomeng Li, Hai Zhang, and Pheng-Ann Heng.
Submitted to Medical Image Analysis (**MedIA**, IF: 11.148).

WORK EXPERIENCE

Research Intern, The Chinese University of Hong Kong   06/2015 - 08/2015
Advisor: Prof. Pheng-Ann Heng
Worked on the deep learning techniques for vehicle detection.

Research Intern, Hong Kong Baptist University   08/2014
⋆ Selected by the outstanding undergraduate research opportunity program
Advisor: Prof. Yiu-Wing Leung & Doc. Hai Liu
Worked on the fault-tolerant algorithms for cognitive radio networks.

Undergraduate Research Assistant, South China University of Technology   01/2013 - 07/2016
Advisor: Prof. Xuemiao Xu
Led a team and worked on the intelligent transportation system (authorized three Chinese invention patents).

TEACHING AND SUPERVISION

Teaching Assistant at CUHK

⋄ Advanced Topics in Computer Graphics and Visualization (Excellent Teaching Assistant)   Spring 2018
⋄ Digital Logic and Systems   Fall 2016-2018
⋄ Linear Algebra and Vector Calculus for Engineers   Spring 2017

Supervision

⋄ Supervise junior Ph.D. (Tianyu Wang and Xiao Tang), M.Phil. (Zijun Deng, Lihao Liu, and Tianfei Yu), and undergraduate (Yitong Jiang) students to publish research papers on top-tier conferences and journals.

PROFESSIONAL ACTIVITIES

Invited Talks

⋄ Peng Cheng Laboratory Overseas Young Scientist Forum,
"Shadow Detection and Removal with Deep Learning"   July 2020
⋄ Talk at Shantou University, "Deep Learning for Shadow Detection and Removal"   December 2019
⋄ Hong Kong Computer Vision Workshop, "Mask-ShadowGAN: Learning to Remove Shadows from Unpaired Data"
(Best Oral Presentation Award)   October 2019
⋄ AI Massive Open Online Course, "Direction-Aware Spatial Context Features for Shadow Detection"   July 2018

Conference Reviews

⋄ ECCV'20, CVPR'20, AAAI'20, PG'20, MICCAI'20, ICCV'19 (Outstanding Reviewer), CVPR'19, MICCAI'19.

Journal Reviews

⋄ IJCV, IEEE TIP, IEEE TMM, IEEE TITS, IEEE TMI, IEEE TCSVT, Neurocomputing, IEEE Access, etc.