

TIANFAN XUE

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Research Interests

- Computer vision, image processing, machine learning, and computer graphics

Education

- **Ph.D. (Computer Sci.), Massachusetts Institute of Technology** Aug. 2012 – Aug. 2017
– Supervisor: Prof. William T. Freeman
- **M.Phil. (Information Eng.), Chinese University of Hong Kong** Aug. 2009 – Jul. 2011
– GPA: 4.0/4.0, Supervisor: Prof. Xiaoou Tang
- **B. Eng. (Computer Sci. & Tech.), Tsinghua University** Aug. 2005 – Jul. 2009
– GPA: 92.06/100.00, Ranking: 3/162

Working Experience

- **Software Engineer, Google** Aug. 2017 – Current
– Mission: Research on better image and video processing algorithms
– Manager: Dr. Sam Hasinoff
- **Research Intern, Facebook** May. 2016 – Aug. 2016
– Mission: Research on image-based rendering techniques
– Mentor: Dr. Richard Szeliski
- **Research Intern, Microsoft Research** Jun. 2015 – Sept. 2015
– Mentor: Dr. Richard Szeliski
- **Research Intern, Microsoft Research** Jun. 2014 – Aug. 2014
– Mentor: Dr. Ce Liu
- **Research Assistant, Chinese University of Hong Kong** Aug. 2011 – Jul. 2012
– Supervisor: Prof. Xiaoou Tang

Research Experience

- **Facebook, Research Intern** May. 2016 – Aug. 2016
– Large scale 3D reconstruction.
- **Microsoft Research, Research Intern** Jun. 2015 – Sept. 2015
– **Multi-frame Stereo.** Proposed a fast multi-frame stereo algorithm that based on sparse edge matching.
- **Microsoft Research, Research Intern** Jun. 2014 – Aug. 2014
– **Obstruction-free imaging.** Proposed a unified computational approach for taking photos through reflecting or occluding visual obstructions, such as windows and fences.
- **Massachusetts Institute of Technology, Research Assistant** Aug. 2012 – Current

- **Fluid measurement.** Proposed an algorithm for measuring the velocity and 3D location of refractive fluids (e.g hot air), from natural sequences.
- **The Chinese University of Hong Kong, Research Assistant** Aug. 2009 – Jul. 2012
 - **3D Reconstruction from Single Image.** Proposed an automatic 3D reconstruction algorithm from a single image taking advantage of symmetry.
 - **3D Reconstruction from Line Drawing.** Proposed an example-based reconstruction that recovers the 3D geometry from a line drawing by combining basic shapes in a 3D database. Also improve the efficiency and accuracy of the algorithm using a divide-and-conquer method.
 - **Depth Map Enhancement.** Proposed a super-resolution based depth map enhancement method to boost the quality of depth maps using sparse coding.
- **Undergraduate Final Year Research Project, Tsinghua University** Jan. 2009 – Jul. 2009
Supervisor: Prof. Bo Zhang, State Key Laboratory of Intelligent Technology and Systems
 - **Pedestrian tracking.** Designed a human tracking framework using particle filter and HOG features (*Outstanding undergraduate thesis* of Tsinghua Univ).

Publications

- **Conference and Journals**

- X. Sun, J. Wu, X. Zhang, Z. Zhang, C. Zhang, **T. Xue**, J. B. Tenenbaum, W. T. Freeman, “Pix3D: Dataset and Methods for Single-Image 3D Shape Modeling,” in Proc. of IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2018.
- J. Wu*, **T. Xue***, J. Lim, Y. Tian, J. Tenenbaum, A. Torralba, W. T. Freeman, “3D Interpreter Networks for Viewer-Centered Wireframe Modeling,” International Journal of Computer Vision (**IJCV**), 2018.
- **T. Xue**, B. Chen, J. Wu, D. Wei, W. T. Freeman, “Video Enhancement with Task-Oriented Flow,” arXiv 1711.09078, 2017.
- J. Yin, H. Zhu, D. Yuan, **T. Xue**, “Sparse representation over discriminative dictionary for stereo matching,” Pattern Recognition, 2017.
- J. Wu, Y. Wang, **T. Xue**, X. Sun, W. T. Freeman, J. B. Tenenbaum, “Marrnet: 3d shape reconstruction via 2.5 d sketches,” in Proc. of the Annual Conference on Neural Information Processing Systems (**NIPS**) 2017.
- C. Zou, **T. Xue**, X. Peng, H. Li, B. Zhang, P. Tan, J. Liu, “An example-based approach to 3D man-made object reconstruction from line drawings,” Pattern Recognition, 2017.
- S. Oron, T. Dekel, **T. Xue**, W. T. Freeman, S. Avidan, “Best-Buddies Similarity – Robust Template Matching using Mutual Nearest Neighbors,” IEEE Transactions on Pattern Analysis and Machine Intelligence (**T-PAMI**), 2017.
- **T. Xue***, J. Wu*, K. L. Bouman, W. T. Freeman, “Visual Dynamics: Probabilistic Future Frame Synthesis via Cross Convolutional Networks,” in Proc. of the Annual Conference on Neural Information Processing Systems (**NIPS**) 2016.¹
- J. Wu*, **T. Xue***, J. Lim, Y. Tian, J. B. Tenenbaum, A. Torralba, W. T. Freeman, “Single Image 3D Interpreter Network,” in Proc. of European Conference on Computer Vision (**ECCV**) 2016.

¹* indicates equal contribution.

- J. Wu, C. Zhang, T. Xue, W. T. Freeman, J. B. Tenenbaum, “Learning a Probabilistic Latent Space of Object Shapes via 3D Generative-Adversarial Modeling”, in Proc. of the Annual Conference on Neural Information Processing Systems (**NIPS**), 2016
 - **T. Xue**, M. Rubinstein, C. Liu, W. T. Freeman, “A Computational Approach for Obstruction-Free Photography,” ACM **SIGGRAPH**, 2015.
 - **T. Xue**, H. Mobahi, F. Durand, W. T. Freeman, “The Aperture Problem for Refractive Motion,” in Proc. of IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2015.
 - **T. Xue**, M. Rubinstein, N. Wadhwa, A. Levin, F. Durand, W. T. Freeman, “Refraction Wiggles for Measuring Fluid Depth and Velocity from Video,” in Proc. of European Conference on Computer Vision (**ECCV**), 2014.
 - **T. Xue**, J. Liu, X. Tang, “Example-Based 3D Object Reconstruction for Line Drawing,” in Proc. of IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2012.
 - Y. Li, **T. Xue**, L. Sun, J. Liu, “Joint Example-based Depth Map Super-Resolution,” in Proc. of IEEE International Conference on Multimedia & Expo (**ICME**), 2012.
 - **T. Xue**, J. Liu, X. Tang, “Symmetric Piecewise Planar Object Reconstruction from a Single Image,” in Proc. of IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**) 2011.
 - Y. Jie, L. Sun, **T. Xue**, “Fast Frame-rate Up-conversion of Depth Video via Video Coding,” in Proc. of ACM Multimedia 2011 (**ACM MM**), 2011.
 - **T. Xue**, J. Liu, X. Tang, “3D Modeling from a Single View of a Symmetric Object,” Transactions on Image Processing (**TIP**), 2012.
 - **T. Xue**, J. Liu, X. Tang, “Object Cut: Complex 3D object reconstruction through line drawing separation,” in Proc. of IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**) 2010.
 - Y. Tang, **T. Xue**, J. Jiang, B. Liu, “Deflation DFA: Remembering History is Adequate,” in Proc. of IEEE International Conference on Communications (**ICC**), 2010.
- **Patent**
 - W. T. Freeman, F. Durand, T. Xue, M. Rubinstein, N. Wadhwa, “Devices for refractive field visualization,” US Patent App. 15819791, 2018
 - W. T. Freeman, F. Durand, T. Xue, M. Rubinstein, N. Wadhwa, “Methods and apparatus for refractive flow measurement,” US Patent PN/9710917, 2017

Honors and Awards

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| • Postgraduate Studentship in the Chinese University of Hong Kong | 2009–2011 |
| • Outstanding TA Award in the Chinese University of Hong Kong | 2010 |
| • Outstanding undergraduate thesis of Tsinghua University | 2009 |
| • National Scholarship | 2007 |
| • First Class Scholarship of Tsinghua University | 2007 |

Services

- **Conference reviewers**
 - Pacific Graphics 2018

- European Conference on Computer Vision, 2018
- Conference on Computer Vision and Pattern Recognition, 2018 (Outstanding Reviewer Award)
- ACM SIGGRAPH, 2018
- ACM SIGGRAPH Asia, 2017
- International Conference on Computer Vision, 2017
- Conference on Computer Vision and Pattern Recognition, 2017
- International Conference on Intelligent Robots, 2017
- IEEE International Symposium on Circuits & Systems, 2017
- Conference on Neural Information Processing Systems, 2016
- European Conference on Computer Vision, 2016
- Conference on Computer Vision and Pattern Recognition, 2016

- **Journal reviewers**

- IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)
- IEEE Transactions on Systems, Man, and Cybernetics
- IEEE Transactions on Computational Imaging (TCI)
- IEEE Transactions on Multimedia (TMM)
- IEEE Transactions on Image Processing (TIP)
- Artificial Intelligence
- Image and Vision Computing (IVC)
- Cognitive Computation
- Computers and Electrical Engineering
- Machine Vision and Applications
- IEEE Computer Graphics and Applications
- Journal of the Optical Society of America
- Pattern Recognition Letter