Zhile REN

Engineering Manager @ Apple

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EDUCATION

2013 – 2018 | **Ph.D. in Computer Science @ Brown University** | Providence, RI
- Thesis : Semantic Three-Dimensional Understanding of Dynamic Scenes
- Advisor : Prof. Erik Sudderth

2009 – 2013 | **B.S in Statistics @ Zhejiang University** | Hangzhou, China

WORK EXPERIENCES

2020 – Present | **Engineering Manager @ Apple** | Seattle, WA
- Current : Hardware-aware efficient-ML frameworks and algorithms. Optimization for large models and Apple Vision Pro/Camera applications
- Past : 3D vision research and engineering (Depth-API, RoomPlan, research papers)
- Manager : Dr. Qi Shan

2018 – 2020 | **Postdoctoral Researcher @ Georgia Tech** | Atlanta, GA
- Embodied AI, 3D scene understanding
- Supervising and collaborating with PhD students in computer vision projects, papers accepted in ICCV, NeurIPS, AAAI
- Supervisors : Profs. Dhruv Batra, Devi Parikh, Irfan Essa

2013 – 2018 | **Ph.D. Thesis Research @ Brown University** | Providence, RI
- 3D object detection and layout prediction on RGB-D images
- Proposed the Clouds of Oriented Gradients (COG) descriptor for 3D object detection systems, oral presentation at CVPR, and T-PAMI special issue on RGB-D vision
- Advisor : Prof. Erik Sudderth

Ph.D. Research @ Brown University | Providence, RI
- Attribute-based image editing algorithms
- Dataset and algorithm for style transformation, oral presentation at SIGGRAPH
- Advisor : Prof. James Hays

2016/2017 Summer | **Research Intern @ NVIDIA Research** | Santa Clara, CA/Westford, MA
- Semantic scene flow estimation, multi-frame optical flow
- State-of-the-art algorithms on both KITTI and MPI Sintel at the time of publications, oral presentation at 3DV, and open-source PyTorch code for PWC-Net
- Supervisors : Drs. Deqing Sun, Orazio Gallo, Jan Kautz, and Prof. Ming-Hsuan Yang

2015 Summer | **Research Intern @ Microsoft Research** | Redmond, WA
- Image completion and shadow removal algorithms
- Supervisors : Drs. Sing Bing Kang and Johannes Kopf

2013 Spring | **Research Intern @ National Laboratory of Pattern Recognition** | Beijing, China
- Agglomerative clustering algorithms for 3D mesh segmentation
- Supervisor : Prof. Huai-Yu Wu

2012 Summer | **Research Intern @ Toyota Technological Institute at Chicago (TTIC)** | Chicago, IL
- Agglomerative clustering algorithms for natural image segmentation
- Spotlight presentation at CVPR
- Supervisor : Prof. Greg Shakhnarovich

Publications

Peer-reviewed Papers

Google scholar page

CHI '24 🏆 **Talaria : Interactively Optimizing Machine Learning Models for Efficient Inference**
Fred Hohman, Chaoqun Wang, Jinmook Lee, Jochen Görtler, Dominik Moritz, Jeffrey P. Bigham
Zhile Ren, Cecile Foret, Qi Shan, Xiaoyi Zhang
ACM Conference on Human Factors in Computing Systems **(CHI 2024, Honorable Mention)**

ICML '23 **UPSCALE : Unconstrained Channel Pruning**
Alvin Wan, Hanxiang Hao, Kaushik Patnaik, Sam Xu, Omer Hadad, David Güera
Zhile Ren, Qi Shan
International Conference on Machine Learning **(ICML 2023)**

CVPR '23 **AutoFocusFormer : Image Segmentation off the Grid**
Chen Ziwen, Kaushik Patnaik, Shuangfei Zhai, Alvin Wan, **Zhile Ren**, Alexander G. Schwing
Alex Colburn, Li Fuxin
IEEE Conference on Computer Vision and Pattern Recognition **(CVPR 2023)**

ECCV '22 Oral 3% **Generative Multiplane Images : Making a 2D GAN 3D-Aware**
Xiaoming Zhao, Fangchang Ma, David Güera, **Zhile Ren**, Alexander G. Schwing, Alex Colburn
European Conference on Computer Vision **(ECCV 2022)**

CVPR '22 **FvOR : Robust Joint Shape and Pose Optimization for Few-view Object Reconstruction**
Zhenpei Yang, **Zhile Ren**, Miguel Angel Bautista, Zaiwei Zhang, Qi Shan, Qixing Huang
IEEE Conference on Computer Vision and Pattern Recognition **(CVPR 2022)**

CVPR '22 **MVS2D : Efficient Multi-view Stereo via Attention-Driven 2D Convolutions**
Zhenpei Yang, **Zhile Ren**, Qi Shan, Qixing Huang
IEEE Conference on Computer Vision and Pattern Recognition **(CVPR 2022)**

AAAI '21 **Semantic MapNet : Building Allocentric Semantic Maps and Representations from Egocentric Views**
Vincent Cartillier, **Zhile Ren**, Neha Jain, Stefan Lee, Irfan Essa, Dhruv Batra
AAAI Conference on Artificial Intelligence **(AAAI 2021)**

T-PAMI '20 **Clouds of Oriented Gradients for 3D Detection of Objects, Surfaces, and Indoor Scene Layouts**
Zhile Ren, Erik Sudderth
IEEE Transactions on Pattern Analysis and Machine Intelligence **(T-PAMI 2020)**

NeurIPS '19 **Cross-Channel Communication Networks**
Jianwei Yang, **Zhile Ren**, Chuang Gan, Hongyuan Zhu, Devi Parikh
Neural Information Processing Systems **(NeurIPS 2019)**

ICCV '19 **Embodied Amodal Recognition : Learning to Move to Perceive Objects**
Jianwei Yang*, **Zhile Ren***, Mingze Xu, Xinlei Chen, David Crandall, Devi Parikh, Dhruv Batra
(Equal Contribution*)
IEEE International Conference on Computer Vision **(ICCV 2019)**

ICCV '19 **3D Scene Reconstruction with Multi-layer Depth and Epipolar Transformers**
Daeyun Shin, **Zhile Ren**, Erik Sudderth, Charless Fowlkes
IEEE International Conference on Computer Vision **(ICCV 2019)**

WACV '19 **A Fusion Approach for Multi-Frame Optical Flow Estimation**
Zhile Ren, Orazio Gallo, Deqing Sun, Ming-Hsuan Yang, Jan Kautz, Erik Sudderth
IEEE Winter Conference on Applications of Computer Vision (**WACV 2019**)

CVPR '18 **3D Object Detection with Latent Support Surfaces**
Zhile Ren, Erik Sudderth
IEEE Conference on Computer Vision and Pattern Recognition **(CVPR 2018)**

3DV '17 Oral 7%
Cascaded Scene Flow Prediction using Semantic Segmentation
Zhile Ren, Deqing Sun, Jan Kautz, Erik Sudderth
International Conference on 3D Vision **(3DV 2017)**

CVPR '16 Oral 3%
3D Object Detection and Layout Prediction using Clouds of Oriented Gradients
Zhile Ren, Erik Sudderth
IEEE Conference on Computer Vision and Pattern Recognition **(CVPR 2016)**

IROS '15
Robust Graph SLAM in Dynamic Environments with Moving Landmarks
Lingzhu Xiang, **Zhile Ren**, Mengrui Ni, Chad Jenkins
International Conference on Intelligent Robots and Systems **(IROS 2015)**

SIGGRAPH 14'
Transient Attributes for High-Level Understanding and Editing of Outdoor Scenes
Pierre-Yves Laffont, **Zhile Ren**, Xiaofeng Tao, Chao Qian, James Hays
ACM Transactions on Graphics **(SIGGRAPH 2014)**

CVPR '13
Image Segmentation by Cascaded Region Agglomeration
Zhile Ren, Greg Shakhnarovich
IEEE Conference on Computer Vision and Pattern Recognition **(CVPR 2013)**

Workshop Papers

CVPR-W '19 Oral
Multi-layer Depth and Epipolar Feature Transformers for 3D Scene Reconstruction
Daeyun Shin, **Zhile Ren**, Erik Sudderth, Charless Fowlkes
SUMO : 360° Indoor Scene Understanding and Modeling **(CVPR Workshop 2019)**

ECCV-W '18
A Simple and Effective Fusion Approach for Multi-frame Optical Flow Estimation
Zhile Ren, Orazio Gallo, Deqing Sun, Ming-Hsuan Yang, Jan Kautz, Erik Sudderth
ECCV Workshop : What is optical flow for ? **(ECCV Workshop 2018)**

Academic Services

Reviewer

Meta Reviewer
- AAAI Conference on Artificial Intelligence **(AAAI)** 2022

Journal Reviewer
- IEEE Transactions on Pattern Analysis and Machine Intelligence **(T-PAMI)**
- ACM Transactions on Graphics **(TOG)**
- Journal of Machine Learning Research **(JMLR)**
- Computer Vision and Image Understanding **(CVIU)**
- IEEE Transactions on Image Processing **(TIP)**
- IEEE Robotics and Automation Letters **(RA-L)**
- Robotics and Autonomous Systems **(RAS)**
- Transactions on Machine Learning Research **(TMLR)**
- Journal of Machine Learning Research **(JMLR)**

Conference Reviewer
- IEEE International Conference on Computer Vision **(ICCV)**
- IEEE Conference on Computer Vision and Pattern Recognition **(CVPR)**
- European Conference on Computer Vision **(ECCV)**
- British Machine Vision Conference **(BMVC)**
- Asian Conference on Computer Vision **(ACCV)**
- IEEE Winter Conference on Applications of Computer Vision **(WACV)**
- International Conference on Learning Representations **(ICLR)**
- AAAI Conference on Artificial Intelligence **(AAAI)**
- Neural Information Processing Systems **(NeurIPS)**
- International Conference on Machine Learning **(ICML)**

Outstanding Reviewer Awards
- IEEE Conference on Computer Vision and Pattern Recognition **(CVPR)** 2021
- AAAI Conference on Artificial Intelligence **(AAAI)** 2021

Invited Talks

2019 | **Amodal Perception in 3D Environments**
- Seminar in **Horizon Robotics**, **Nuro**, **Vicarious**, **Apple**, **Google Research**, **Amazon Robotics**, **Uber ATG**, **Cruise**, **Samsung Research**, **Niantic Labs**

2018 | **Semantic Three-Dimensional Understanding of Dynamic Scenes**
- Seminar in **Amazon**, **Microsoft**, **UC San Diego**, **MIT**, **UC Irvine**, **Georgia Tech**

2017 | **Cascaded Scene Flow Prediction using Semantic Segmentation**
- International Conference on 3D Vision **(3DV)**; New England Computer Vision Workshop; Seminar at **NVIDIA**, **UC Irvine**, **Boston University**

2016 | **3D Object Detection and Layout Prediction using Clouds of Oriented Gradients**
- IEEE Conference on Computer Vision and Pattern Recognition **(CVPR)**; New England Computer Vision Workshop; Guest lecture at **Brown University**; Seminar at **NVIDIA**

2012 | **Image Segmentation by Cascaded Region Agglomeration**
- Midwest Vision Workshop

Teaching Experiences

Lecture | **Guest Lecturer**
- CS 4476 : Intro to Computer Vision, **Georgia Tech**, Summer 2019
- CS 4803/7643 : Deep Learning, **Georgia Tech**, Fall/Spring 2018/2019

Teaching Assistant | **Teaching Assistant**
- CSCI2420 : Probablistic Graphical Models, **Brown University**, Fall 2016
- CSCI1450 : Introduction to Probability & Computing, **Brown University**, Spring 2015

Media Coverages

Transient Attributes for High-Level Understanding and Editing of Outdoor Scenes, SIGGAPH '14

IEEE Spectrum	Transform Your Photos with a Magic Word
NBC News	Don't Like the Weather in Your Photos? Now You Can Change It
PBS	Scientists launch technology that can change the weather...in your photos
MIC	These Vivid Photo Filters of the Future Make Instagram Look Like Child's Play
Gizmodo	This Algorithm Can Change the Season and Weather In Your Photos
Brown News	Photo editing algorithm changes weather, seasons automatically

Semantic MapNet : Building Allocentric Semantic Maps and Representations from Egocentric Views, AAAI '21

Venturebeat	Facebook releases tools to help AI navigate complex environments
ZDNet	Facebook is building home robots to help you find your ringing phone
MIT-TR	Facebook is training robot assistants to hear as well as see
Digital Trends	Facebook's new 'embodied A.I' project aims to build a new breed of robots