

# Shaoshuai SHI

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## EDUCATION

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### The Chinese University of Hong Kong

*August 2017 - Exp. July 2021*

Ph.D. Student in Multimedia Lab (MMLab)

- **Supervisor:** Prof. Xiaogang Wang and Prof. Hongsheng Li
- **Research Interests:** Computer vision, deep learning and autonomous driving, especially the 3D scene understanding with point cloud representation and object detection.
- **Fellowship:** Hong Kong PhD Fellowship (HKPFS), Google PhD Fellowship.

### Harbin Institute of Technology

*August 2013 - July 2017*

Bachelor of Engineering, Computer Science and Technology (Honor Class)

- **GPA:** 92.97/100, top 3 out of more than 200 students. National Scholarship awardee for three time.

## PUBLICATIONS

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“\*” denotes equal contribution

1. ST3D: Self-training for Unsupervised Domain Adaptation on 3D Object Detection  
Jihan Yang\*, **Shaoshuai Shi\***, Zhe Wang, Hongsheng Li, Xiaojuan Qi  
*IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021
2. Back-tracing Representative Points for Voting-based 3D Object Detection in Point Clouds  
Bowen Cheng, Lu Sheng, **Shaoshuai Shi**, Ming Yang, Dong Xu  
*IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021
3. PV-RCNN++: Point-Voxel Feature Set Abstraction With Local Vector Representation for 3D Object Detection  
**Shaoshuai Shi**, Li Jiang, Jiajun Deng, Zhe Wang, Chaoxu Guo, Jianping Shi, Xiaogang Wang, Hongsheng Li  
*Technical report, arXiv:2102.00463 (under review)*.
4. Voxel R-CNN: Towards High Performance Voxel-based 3D Object Detection  
Jiajun Deng, **Shaoshuai Shi**, Peiwei Li, Wengang Zhou, Yanyong Zhang, Houqiang Li  
*AAAI Conference on Artificial Intelligence (AAAI)*, 2021
5. PV-RCNN: The Top-Performing LiDAR-only Solutions for 3D Detection / 3D Tracking / Domain Adaptation of Waymo Open Dataset Challenges  
**Shaoshuai Shi**, Chaoxu Guo, Jihan Yang, Hongsheng Li  
**Win 1<sup>st</sup> place among all LiDAR-only methods on 3D detection, 3D tracking and domain adaptation three tracks of the Waymo Open Challenges. (June 1, 2020)**  
*Technical Report of Solutions to Waymo Challenges over CVPR2020 Workshop (CVPRW)*, 2020
6. PV-RCNN: Point-Voxel Feature Set Abstraction for 3D Object Detection  
**Shaoshuai Shi**, Chaoxu Guo, Li Jiang, Zhe Wang, Jianping Shi, Xiaogang Wang, Hongsheng Li  
**Rank 1<sup>st</sup> place on KITTI 3D Object Detection benchmark for more than 8 months. (Nov. 15, 2019)**  
*IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020
7. PointGroup: Dual-Set Point Grouping for 3D Instance Segmentation  
Li Jiang, Hengshuang Zhao, **Shaoshuai Shi**, Shu Liu, Chi-Wing Fu, Jiaya Jia  
*IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020 (Oral)

8. From Points to Parts: 3D Object Detection from Point Cloud with Part-aware and Part-aggregation Network  
**Shaoshuai Shi**, Zhe Wang, Jianping Shi, Xiaogang Wang, Hongsheng Li  
*IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2020
9. PointRCNN: 3D Object Proposal Generation and Detection from Point Cloud  
**Shaoshuai Shi**, Xiaogang Wang, Hongsheng Li  
The top-11 cited papers among all CVPR-2019 papers with 200+ citations in one year (July, 2020).  
*IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019
10. SegVoxelNet: Exploring Semantic Context and Depth-aware Features for 3D Vehicle Detection from Point Cloud  
 Hongwei Yi, **Shaoshuai Shi**, Mingyu Ding, Jiankai Sun, Kui Xu, Hui Zhou, Zhe Wang, Sheng Li, Guoping Wang  
*IEEE International Conference on Robotics and Automation (ICRA)*, 2020
11. Feature Intertwiner for Object Detection  
 Hongyang Li, Bo Dai, **Shaoshuai Shi**, Wanli Ouyang, Xiaogang Wang  
*International Conference on Learning Representation (ICLR)*, 2019
12. GAL: Geometric Adversarial Loss for Single-View 3D-Object Reconstruction  
 Li Jiang, **Shaoshuai Shi**, Xiaojuan Qi, Jiaya Jia  
*European Conference on Computer Vision (ECCV)*, 2018 (**Oral**)
13. FP-DNN: An automated framework for mapping deep neural networks onto FPGAs with RTL-HLS hybrid templates  
 Yijin Guan, Hao Liang, Ningyi Xu, Wenqiang Wang, **Shaoshuai Shi**, Xi Chen, Guangyu Sun, Wei Zhang, Jason Cong  
*IEEE Field-Programmable Custom Computing Machines (FCCM)*, 2017

## WORK EXPERIENCE

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**Microsoft Research Asia (MSRA)**  
*Intern of System Group*

*July 2016 - June 2017*  
*Beijing, China*

- Research internship for one year in the System Group of MSRA. I worked on exploring the software computation graph (such as TensorFlow graph) and transferring it to the FPGA computation graph designed by ourselves.

## SELECTED PROJECTS

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- **OpenPCDet: General 3D Object Detection Toolbox with point cloud** *June 2020*  
 – Release the OpenPCDet toolbox for general 3D object detection with LiDAR point cloud, which includes multiple state-of-the-art 3D detection methods like PointRCNN, Part-A2 Net and PV-RCNN, and achieves state-of-the-art results on multiple datasets like KITTI and NuScenes.  
 – Code is released at <https://github.com/open-mmlab/OpenPCDet> with 1.5k+ stars.
- **PointRCNN: 3D Object Proposal Generation and Detection from Point Cloud (CVPR 2019)** *Nov. 2018*  
 – Propose the first two stage 3D object detection framework with a novel bottom-up proposal generation strategy for 3D object detection from pure point clouds.  
 – Code is released at <https://github.com/sshaoshuai/PointRCNN> (1.2k Stars), which is one of the earliest codebases for 3D object detection from point clouds.
- **Embedded Computer System Design and Tetris Application** *Aug. 2015 - Sep. 2015*  
 – Implement a basic computer system on FPGA board, including instructor set (based on MIPS),

center CPU, I/O, memory, etc.

– Develop the Tetris game running on the above FPGA based system with assembly language.

## HONORS & AWARDS

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- Google PhD Fellowship (10 selected world-wide in machine perception) 2020
- Hong Kong PhD Fellowship (The highest scholarship for PhD students in Hong Kong) 2017–2021
- National Scholarship (The highest scholarship for Bachelor students in China) 2014, 2015, 2016
- Silver Prize of China Collegiate Programming Contest (CCPC 2015) 2015
- Second Prize of China Undergraduate Mathematical Contest in Modeling (CUMCM 2015) 2015
- Gold Prize of China Collegiate Programming Contest (CCPC) of Northeast Area 2015
- First Prize of Mathematical Modeling Contest of Northeast Area 2015
- First Class Scholarship of HIT (six times at each semester) 2014–2016
- First Prize of Science and Technology Innovation Projects of HIT 2014