# ZIYI WU

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## EDUCATION

**Tsinghua University**, Beijing, P.R.China

**Bachelor** of Engineering in Automation *Aug, 2017 – Jul, 2021 (expected)*

- **GPA: 3.9/4.0, Ranking: $2^{nd}$/173**
- **Chairman** of Spark Program, Tsinghua University

**Core Courses**

- **Mathematics**: Calculus A (4.0/4.0), Linear Algebra (4.0/4.0), Introduction to Complex Analysis (4.0/4.0), Probability and Statistics (4.0/4.0), Operations Research (4.0/4.0)
- **CS**: Computer Languages and Programming (4.0/4.0), C++ Program Design and Training (4.0/4.0), Data Structure and Algorithms (4.0/4.0), Computer Network and Applications (4.0/4.0), Fundamental Artificial Intelligence (4.0/4.0), Pattern Recognition and Machine Learning (4.0/4.0)

## SCHOLARSHIPS & AWARDS

- **2021 SenseTime Scholarship** (Awarded to only 21 undergraduate AI researchers in P.R.China)
- **2020 Xiaomi Scholarship** (Highest scholarship in Tsinghua sponsored by Xiaomi Corp., **0.1%**)
- **2020, 2019 Tsinghua Innovation Award of Science and Technology** (**0.2%**)
- **2019 Fang Chongzhi Scholarship** (Highest honor in the Dept. of Automation, **0.1%**)
- **2019 Tsinghua Spark Program Membership** (Top student program in academic research, **1%**)
- **2018 National Scholarship** (Highest scholarship awarded by the Chinese government, $<$ **0.1%**)
- **2018 Champion** in the $20^{th}$ **Electronic Design Competition**, Tsinghua University (**1/120**)
- **2018 $5^{th}$ place** in the $1^{st}$ **Artificial Intelligence Challenge**, Tsinghua University (**5/150**)

## PUBLICATIONS & MANUSCRIPTS

1 **Ziyi Wu***, Yueqi Duan*, He Wang, Qingnan Fan, Leonidas J. Guibas. IF-Defense: 3D Adversarial Point Cloud Defense via Implicit Function based Restoration. Submitted to *2021 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. Under review. [arXiv]

2 Ziwei Wang, Jiwen Lu, **Ziyi Wu**, Jie Zhou. Learning Efficient Binarized Object Detectors with Information Compression. Accepted by *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*.

3 Ziwei Wang, **Ziyi Wu**, Jiwen Lu, Jie Zhou. BiDet: An Efficient Binarized Object Detector. Accepted by *2020 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. [arXiv]

4 Zimeng Tan, Yongjie Duan, **Ziyi Wu**, Jianjiang Feng, Jie Zhou. A Cascade Regression Model for Anatomical Landmark Detection. Accepted by *2019 Medical Image Computing and Computer Assisted Intervention (MICCAI) Workshop*. [Springer]

5 Zhanwei Xu, **Ziyi Wu**, Jianjiang Feng. CFUN: Combining Faster R-CNN and U-net Network for Efficient Whole Heart Segmentation. [arXiv]

## RESEARCH INTEREST

**Fields** 3D Vision, Video Analysis, Efficient Inference, Unsupervised Learning

**Methods** Deep Learning, Reinforcement Learning, Neural Networks, Information Theory

## RESEARCH EXPERIENCE

**Stanford University**, CA, U.S.
*Geometric Computing Group, Department of Computer Science* *May, 2020 – Nov, 2020*
Research Assistant, Advisor: Prof. Leonidas Guibas
**Project: IF-Defense: 3D Adversarial Point Cloud Defense via Implicit Function based Restoration**

- Summarized the effects of 3D adversarial attacks on point cloud into two aspects from a geometric perspective through comprehensive review of existing attack methods
- Proposed a novel defense algorithm for 3D point cloud which can simultaneously address the two attack effects via accurate surface recovery and optimization based point restoration
- Achieved state-of-the-art robustness against all existing attacks on five typical point cloud networks

**Tsinghua University**, Beijing, P.R.China
*Intelligent Vision Group, Department of Automation* *Apr, 2019 – Apr, 2020*
Research Assistant, Advisors: Profs. Jiwen Lu & Jie Zhou
**Project: BiDet: An Efficient Binarized Object Detector**

- Applied binary neural networks (BNNs) in the object detection task to reduce storage and computational cost, which was the first attempt to the best of our knowledge
- Employed the Information Bottleneck (IB) method for redundancy removal to fully utilize the capacity of BNNs and learned sparse object priors to eliminate the false positives in prediction outputs
- Boosted the performance significantly for both one-stage and two-stage detectors while reducing the model size and inference time by more than 10×

**Project: Learning Efficient Binarized Object Detectors with Information Compression**

- Proposed AutoBiDet, an extension of BiDet that automatically adjusts the IB trade-off and utilizes class-aware sparse object priors to alleviate the false positives more effectively
- Outperformed BiDet by a sizeable margin on both PASCAL VOC and MS COCO datasets when combined with more backbones and detection frameworks
- Generalized the techniques used in AutoBiDet to improve other model compression methods including low-bit quantization and channel pruning to show the universality of our approach

## PROGRAMMING SKILLS

**Proficient** Python, PyTorch, C#, Markdown, LaTeX, Git

**Familiar** Linux, C/C++, TensorFlow, Keras, MATLAB, HTML, etc.

## LANGUAGE SKILLS

**TOEFL iBT** 109/120 (Reading 30, Listening 26, Speaking 23, Writing 30)

**GRE** 333/340+4.5/6.0 (Verbal 163, Quantitative 170, Analytical Writing 4.5)