

# YINGCHENG LIU

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## EDUCATION

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**Peking University, Beijing, China**

2015.9 - present

B.Sc., Computer Science

GPA: **3.72** / 4, Rank: **13** / **207** (**Top 6%**)

Core Courses: Data Structure and Algorithms (94), Advanced Mathematics (92.5), Algebraic Structure and Combinatorial Mathematics (98), Introduction to Parallel and Distributed Computing (94), Empirical Methods in Natural Language Processing (94.5)

## PUBLICATIONS

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1. Recurrent Pose Estimation under Heavy Occlusion  
Mengxiao Lin, Siyuan Zhuang, Xiangyu Zhang, **Yingcheng Liu**, Yichen Wei and Jian Sun  
*IEEE Conference on Computer Vision and Pattern Recognition (CVPR2019)*, (under review)
2. Unified Perceptual Parsing for Scene Understanding  
\*Tete Xiao, \***Yingcheng Liu**, \*Bolei Zhou, Yuning Jiang and Jian Sun (\*: indicates equal contribution)  
*European Conference on Computer Vision (ECCV2018)*

## EXPERIENCE

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**Research Assistant, Dina Katabi's Lab, MIT CSAIL**

2018.7 - present

**Project I: Real-Time System for Through-Wall Human Pose Estimation**

- **Objective:** Design and implement a real-time system that tracks and estimates human skeletons using radio signals through obstacles
- **Achievement:**
  - Extended the standard 2D image based detection and pose estimation system to 4D radio frequency signal.
  - Replace 4D CNN with 3D CNN and 1D RNN to handle real-time video stream and achieve high speediness.
  - Built a tracking system that keeps histories of multiple human instances across time.
  - The system was demonstrated on SIGCOMM2018 conference.

**Project II: Through-Wall Human Dense Pose and Shape Estimation Using Radio Signal**

- **Objective:** Design and build a radio signal based system that estimates human dense pose / full mesh and shape through obstacles
- **Achievement:**
  - Updated the standard detection framework with trajectory proposal network and temporal-instance aware region convolutional network to address the specularity issue.
  - Integrated a generative model, SMPL, into detection and tracking system to disentangle shape and pose estimation.

**Research Intern in Computer Vision, Megvii (Face++) Inc.**

2017.11 - 2018.6

**Project I: Unified Perceptual Parsing for Scene Understanding**

- **Objective:** Design a unified framework that parses various visual concepts at multiple perceptual levels such as scene, objects, parts, textures, and materials all at once
- **Achievement:**
  - Designed a novel network called UPerNet with hierarchical structure to learn from heterogeneous data from multiple image datasets.

- A paper based on this study was accepted to ECCV2018.
- Released our code to MIT CSAIL Vision repository and our model was then used by GAN Dissection.

## Project II: Human Pose Estimation under Heavy Occlusion

- **Objective:** Design and implement a human pose estimation system that gives robust predictions even under heavy occlusion
- **Achievement:**
  - Proposed a simple and effective recurrent architecture, grid iterative network, that generates multiple poses from one region.
  - The model outperformed the previously state-of-the-art model on COCO human pose estimation benchmark.
  - A paper based on this study was submitted to CVPR2019.

## Research Intern, Machine Intelligence Lab, Peking University

2017.3 - 2017.10

### Project I: CheXNet for Classification and Localization of Thoracic Diseases

- **Objective:** Reimplement and improve CheXNet, a lung X-Ray image classification and disease localization system
- **Achievement:** Built a complete image classification and localization pipeline using two deep learning frameworks, PyTorch and TensorFlow.

## OPEN-SOURCED PROJECTS

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1. Unified Perceptual Parsing, proposed in Unified Perceptual Parsing for Scene Understanding (~150 stars). <https://github.com/CSAILVision/unifiedparsing>
2. CheXNet for Classification and Localization of Thoracic Diseases (~150 stars). <https://github.com/arnoweng/CheXNet>

## PATENTS

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1. **Yingcheng Liu** and Xiangyu Zhang  
*2D Grid Recurrent Neural Network for Multi-Person Pose Estimation*,  
China patent (In process), CN201811000563.5.

## HONORS & AWARDS

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1. Guanhua Scholarship, Peking University, 2018
2. Merit Student, Peking University, 2018
3. Lee Wai Wing Scholarship, Peking University, 2017
4. Merit Student, Peking University, 2017
5. Member of “Top Notch Class”, School of EECS, 2017
6. Silver Prize, Chinese Physics Olympiad, 2014

## TECHNICAL SKILLS

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1. **Programming Languages:** C/C++, Python, MATLAB, HTML
2. **Tools & Frameworks:** TensorFlow, PyTorch, Git, L<sup>A</sup>T<sub>E</sub>X

## LANGUAGE

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1. **Mandarin & Japanese:** Native language.
2. **English:** Advanced. TOEFL 110, GRE 326 + 3.5. 5 month working experience in MIT.