# Zangwei Zheng

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## EDUCATION

**Nanjing University** Sept. 2017 – June 2021 (expected)
*B.S. in Computer Science and Technology, National Elite Program of Computer Science* *Jiangsu, China*

- **GPA:** 4.61/5.00 (92.2/100) **Rank:** 4th/204 **TOEFL:** 105 **GRE:** V160+Q170+3.5
- **Highlight Courses:** *Problem Solving (94, 4-semester course covering Discrete Mathematics, Data Structures, Algorithm Design and Analysis etc.), Intro to Computer Systems (96), Operating Systems (98), Compiler (96), Intro to Machine Learning (94), Advanced Algorithms (92), Combinatorics (94), Quantum Computation (95)*
- **Teaching Assistant:** Course of *Algorithm Analysis and Design, Fall 2020*

## PUBLICATIONS

1. **Prototypical Cross-domain Self-supervised Learning for Few-shot Unsupervised Domain Adaptation** **Zangwei Zheng***, Xiangyu Yue*, Shanghang Zhang, Yang Gao, Trevor Darrell, Kurt Keutzer, Alberto Sangiovanni-Vincentelli **CVPR 2021** (under review)

## RESEARCH EXPERIENCE

**University of California, Berkeley (iCyPhy, DOP Center)** Apr. 2020 – Present
*Research Intern, supervised by Prof. Alberto Sangiovanni-Vincentelli & Dr. Xiangyu Yue* *CA, US*

- **Few-shot Domain Adaptation via Self-supervised Learning with Clustering**
  - Revealed performance deterioration of existing methods due to lack of labels in few-shot domain adaptation.
  - Incorporated clustering property of datasets to construct self-supervised loss – more specifically, contrastive loss between instances and centroids of clustering both in the same and different domains.
  - Proposed to better align different domains with high-confident instances and mutual entropy maximization.
- **Diverse Autonomous Driving Scene Generation**
  - Proposed training on different styles of images to mitigate simulation-to-real world domain shift.
  - Incorporated Implicit Maximum Likelihood Estimation (IMLE) to generate diverse simulation driving scenes across different domains.
- **Covid-19 C3.ai Project: Detection and Containment of Emerging Diseases Using AI Techniques**
  - Extended multi-modality learning methods for X-ray, CT and MRI data in real world scenario.
  - Proposed self-supervised methods to mitigate the problem of lack of labels in medical domain.

**Nanjing University (LAMDA)** June 2019 – Jan. 2020
*Research Intern, supervised by Prof. Ming Li* *Jiangsu, China*

- **Deep Forest for Matching Problem**
  - Extended Deep Forest (deep learning model other than neural network) to information retrieval problem.
  - Incorporated co-clustering results in query words and texts for the supervised training of Deep Forest.
- **Correlation among Base Learners in Meta-Learning** Nov. 2019 – Dec. 2019
  - Demonstrated that there exists close relationship among base learners in many meta-learning approaches.
  - Proposed dictionary learning to assist the meta-learning training process.

## PROJECT & TRAINING

**Android Mobile AI Game-Pad** Mar. 2019 – June 2019
*Independent Designer, Developer* *Jiangsu, China*

- Developed an Android application that can turn user's mobile phone into an interactive, real-time game-pad – once connected, users can make diverse movement to get feedback and interact with computer games.
- Deployed a light-weight neural network onto the mobile to identify user's gestures from sensors.

**MBTI Personality Type Analyzer** Jan. 2018
*Google 1st Machine Learning Winter Camp (China)* *Shanghai, China*

- Construct a MBTI type prediction system that can analyze people's personality according to their writings.
- Deployed an application to predict and visualize each word's contribution to the prediction in real-time.

**Estimator for Time Taken in Convergence of SGD** Jan. 2019
*Team member of 3, Designer, Developer* *Hong Kong, China*
- Designed an ensemble model with augmented features to predict the time taken for stochastic gradient descent, which ranked first in competition.

**Five-stage Pipeline MIPS System on FPGA** Dec. 2018 – Jan. 2019
*Team leader of 2, Designer, Developer* *Jiangsu, China*
- Developed a five-stage pipeline MIPS32 system with all instructions implemented.
- Designed and developed a mini-OS, which can support keyboard, monitor and digital piano connection, memory management and simple C program compiling and running.

**Image Painting, Processing and Rendering System** Feb. 2020 – June 2020
- Implemented a robust painting system with basic tools, including Bézier and B-spline curve.
- Developed image processing plugins such as edge detection, operators both in space and frequency domain.
- Extended the system with 3D plotting as well as scene rendering by ray-tracing algorithm.

**NJU Emulator** Sept. 2018 – Dec. 2018
- Implemented an emulator for x86 instructions, a machine-independent abstraction layer and a virtual machine on top of this layer, where some software and games can be directly launched.

**Toy Operating System** Feb. 2019 – June 2019
- Implemented an OS supporting memory management, multi-threads, file systems and interactive shell.

**C-- Compiler** Feb. 2020 – June 2020
- Developed a compiler support essential parts of C language, including optimization via data-flow analysis.

**C++ Cloning Code Detector** Mar. 2018 – Jun. 2018
- Designed a vector representation for C/C++ code that can reflect key characteristics of programs.
- Incorporated the random forest algorithm to determine whether two pieces of code have the same function.

## SELECTED HONORS

**First Prize, People Scholarship**, NJU 2020
**First Prize, National Elite Program Scholarship** (top 1%) 2018, 2019
**Zheng Gang Overseas Study Scholarship**, NJU 2019
**1st Place**, Hong Kong HKUST-NJU Competition 2019
**Silver Award**, ACM-ICPC Xuzhou National Invitational Contest 2018

## EXTRACURRICULAR ACTIVITIES

**Class Leader (Class of 2017, National Elite Program of Computer Science)** 2017 – Present
- Organized lectures, travels and various activities for class members, and managed daily routines.
- Awarded **Outstanding Student Leader of Nanjing University**, our class awarded **Model Class of NJU**.

**Outstanding Volunteer of Nanjing University** 2020
- Participated in **124** hours volunteer work, including repairing ancient books and looking after the elderly.

**Visitor to Universities in Hong Kong (HKU, CUHK, HKUST, HKPU)** 2019
- Took lectures in machine learning, computer vision, robotics and visited robot labs and computing center.

**Outstanding Peer Tutor for the 2019 Freshman**, NJU 2019
**Best Debater in Department Cup (on behalf of Computer Science Dept.)** 2018

## SKILLS

**Languages** C, C++, Python, MATLAB, Java, Shell script, JavaScript, Assembly, Verilog
**Frameworks** PyTorch, TensorFlow, OpenCV, Scikit-learn, NumPy, Qt
**Tools** Git, SQL, Slurm, LaTeX, reST
**Development** Android App, Desktop App (MacOS, Windows), Webs Building