Brandon X. **Han**

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"Work until your idols become rivals."

Education

Zhejiang University ("Double First-Class" Initiative, Project 985 & 211) — *Hangzhou, China*

Major in Information Engineering, College of Information Science and Electronic Engineering — *Sep. 2016 - PRESENT*

- Cumulative GPA: 3.92 / 4.00, Rank: 21 / 138

University of Notre Dame — *South Bend, U.S.A*

Member of iESR Exchange Program — *Aug. 2018 - Sep. 2018*

- iESR is an abbreviation for international Entrepreneurship and Social Responsibility.
- It is a short-term exchange program aiming at cultivating internationally influential leaders.

Research Experiences

AI and Robotics Laboratory, Westlake Institute for Advanced Study Research Assistant — *Hangzhou, China* — *Oct. 2019 - PRESENT*

- **Advisor** : Dr. Changbin Yu
- **Project** : Deep Learning-Based Features Prediction for Mass Spectrometry of Protein

Guo Research Group at EECS, the University of Michigan Project Leader — *Ann Arbor, U.S.A* — *Jul. 2019 - Oct. 2019*

- **Advisor** : Prof. L. Jay Guo
- **Projects** : Throat disease detection & Designing metasurface with deep neural network

Zhuo Research Group at ISEE, Zhejiang University Project Leader — *Hangzhou, China* — *Apr. 2019 - Jun. 2019*

- **Advisor** : Dr. Cheng Zhuo
- **Project** : Epilepsy detection based on video merely

Flexible Electronics Laboratory at ISEE, Zhejiang University Project Core Member — *Hangzhou, China* — *Apr. 2018 - Apr. 2019*

- **Advisor** : Prof. Shurong Dong
- **Project** : The reception and processing of electroencephalogram (EEG) signals, including algorithm design and application development

Publication

International Journal

Inverse Design of Metasurface Optical Filters using Deep Neural Network with High Degrees of Freedom — *InfoMat*

Xiao Han*, Ziyang Fan*, Zeyang Liu*, Chao Li, and L. Jay Guo — *Mar. 2020*

Honors & Awards

International

2018	**Honorable Mention Prize**, Mathematical Contest in Modeling and Interdisciplinary Contest In Modeling (MCM/ICM)	*The Consortium for Mathematics and Its Application, U.S.A*

Domestic

2019	**1st Prize**, Chunzhen International Exchange Scholarship	*Zhejiang University, China*
2019,2018,2017	**3rd Prize**, Academic & Outstanding Student Scholarship	*Zhejiang University, China*
2018	**1st Prize**, Yongping Scholarship	*BBK Group, China*
2018	**3rd Prize**, National Talent Training Base Scholarship	*Zhejiang University, China*
2017	**3rd Prize**, Physics Innovation Competition in Zhejiang Province	*Zhejiang Physical Society, China*

Extracurricular Activities

Network and Publicity Department, ZJUMPA Core Member — *Hangzhou, China* — *Oct. 2017 - Jul. 2018*

- ZJUMPA is an abbreviation for Zhejiang University Motion Picture Association, committing to promoting the development of the film industry.

Photography Department, QSC Core Member — *Hangzhou, China* — *Oct. 2016 - Jul. 2017*

- QSC team is the largest student organization of Zhejiang university, dedicating to new media communication and visual design.

Skills & Interests

Programming Languages Python(2/3), MATLAB, LaTeX, Verilog, C/C++, JAVA, HTML/CSS
Frameworks Pytorch, Tensorflow, Keras
Languages Chinese (mother tongue), English (IELTS: 6.5), Korean (primary)
Sports Badminton, Golf, Climbing, Extreme sports
Arts Photography, Movies
Misc. Traveling, Collecting

Projects

Research Topics

Inverse Design with Deep Neural Network for Metasurface Filter Leader *Repository Link* *Ann Arbor, U.S.A*
Interdisciplinarity *Regression* *Generation* *Image Processing* *Pytorch* *Aug. 2019 - Oct. 2019*

- To obtain a metasurface structure capable of filtering out the light of a specific wavelength in the visible band, traditional method usually traverses the space consisting of possible designs, searching for a potentially satisfying device by performing iterative calculations to solve Maxwell's equations. We proposed a neural network that could complete a high-freedom inverse design process to solve the mentioned problem. Compared with the traditional method, our method is faster while it is competent of generating better devices with the desired spectrum.

Throat Disease Detection Leader *Repository Link* *Ann Arbor, U.S.A*
Object Recognition *Image Processing* *Pytorch* *Jul. 2019 - Aug. 2019*

- In order to facilitate the patients' medical treatment, it is necessary to provide the doctor with information about the initial diagnosis. We combined the lightweight object recognition network PeleeNet with traditional image processing methods (including morphological processing, connected component extraction, contrast adjustment, etc.) to preliminarily achieve a throat disease diagnosis algorithm.

Epilepsy Detection Based on Video Merely Personal Work *Repository Link* *Hangzhou, China*
Object Recognition *Human Pose Estimation* *Video Processing* *Data Mining* *Tensorflow* *Apr. 2019 - Jun. 2019*

- The traditional method of epilepsy detection is to diagnose epilepsy by brain wave, which is expensive and not easy for patients to make rough judgment. I extracted the key points of human body through the estimation algorithm of human behavior, and then combined with the filtering algorithm to analyze the patient video frame by frame.Due to the variety of epilepsy and the small number of data samples, my algorithm could not be fully tested.

The Reception and Processing of Electroencephalogram (EEG) signals Core Member *Repository Link* *Hangzhou, China*
Digital Signal Processing *JAVA* *Android Development* *Apr. 2018 - Apr. 2019*

- This is a project of the student research training program (SRTP). We used the ultra-low-power bluetooth protocol (BLE) to receive information from the wireless EEG transmitter in the laboratory from the mobile terminal, and analyzed the received data (including PCA dimensionality reduction, specific component extraction and signal feature recognition, etc.).

Course Projects

Embeded Car System with Traffic Sign and Pedestrian Detection Leader *Repository Link* *Hangzhou, China*
Object Recognition *Raspberry Pi* *Image Processing* *Socket* *Keras* *Apr. 2019 - Jun. 2019*

- This is a customized project of integrated experiment of photoelectric information processing. Based on ellipse detection algorithm, LeNet convolutional neural network and SSD pedestrian detection model, a high-speed real-time micro-autopilot system is proposed. Hardware of the car includes PI 3B+ experimental board, 51duino motor driver board and 5MP raspberry pi camera.

Panoramic Image Mosaic with SIFT Leader *Repository Link* *Hangzhou, China*
SIFT *Image Processing* *MATLAB* *May. 2019 - Jun. 2019*

- This is a customized project of digital image processing. The main task is to realize the automatic image mosaic through the traditional method. Taking the official MATLAB routine as the benchmark, we focused on optimizing and improving the image stitching ability, computing efficiency, data set adaptability and output aesthetics of the algorithm.

Multi-function Simple Chat Room Leader *Repository Link* *Hangzhou, China*
Socket *GUI Programming* *Mar. 2019 - Jun. 2019*

- This is a customized project of computer network. We used the Python interface of Socket API to realize IPv4/IPv6 based multi-person text/voice/video chat and file/picture transmission, and called AI robot to participate in the chat, all parts embedded in PyQt5 GUI.

Simple Crack for Microsoft Office Word Encryption Personal Work *Repository Link* *Hangzhou, China*
Cryptology *C Programming* *Oct. 2018 - Nov. 2018*

- This is a compulsory project of computer composition and design. As the innovative products of Office, Office2010 uses Open XML language to describe as well as ZIP to pack with the SHA1-AES encryption mechanism. I started from the document structure, extracted the encryption information flow, and then cracked the password by brute-force method.