

GORDON G. QIAN

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EDUCATION

Xi'an Jiaotong University (XJTU)

Xi'an, China

B.Eng. in Mechanical Engineering (Honors Program)

Aug 2014 – Jul 2018

- GPA: 3.93/4.3 (91.26/100; ranking: 1st out of 34 students in Qian Xuesen Elite Class)
- Selected Awards and Scholarships: **Outstanding Undergraduate Model (top10 out of ~19,000 undergraduates, highest undergraduate honor)**; Outstanding Student Leader (top 3%); Outstanding Graduate (top 5%); National Scholarship (top 1%, **most prestigious national scholarship**)

Hong Kong University of Science and Technology (HKUST)

Hong Kong, China

Undergraduate Exchange Program

Feb 2017 – May 2017

- Selected courses: *Machine Learning, Numerical Methods in Engineering, Introduction to Robotics*

WORK EXPERIENCES

SenseTime Group Ltd., Sensor and Algorithm Group

Shenzhen, China

Computer vision researcher directed by Jimmy S. Ren

Jul 2018 – Present

Project: **Trinity of Pixel Enhancement: A Joint Solution for Demosaicking, Denoising and Super-Resolution**

- Goal: addressed drawbacks in current digital image processing that super-resolution (SR) would magnify demosaicking artifacts, and degradation model used in SR was not well suited for practical situation
- My job: proposed deep residual network to jointly denoise, super-resolve and demosaic; introduced burst pixel shift technique to obtain high-resolution noise-free RGB images; invented pixel shift Bayer image down-sampling algorithm to attain low-resolution noisy Bayer images; made public high-quality real-world datasets
- Result: PSNR improved by ~2dB on Urban100 images; visual performance showed significant improvement on real images; submitted paper to CVPR2019 as first author; made poster studied within SenseTime Research

RESEARCH AND PROJECT EXPERIENCES

HKUST, Visual Computing Lab

Hong Kong, China

Research Assistant to Professor Chi-Keung Tang

Mar 2017 – Jun 2017

Project: **Attribute-Guided Face Generation**

- Goal: worked on method that given LR face image and attribute vector extracted from another HR image, generated HR face image that satisfied given attributes for LR input
- My job: deep network worked but produced global artifacts; focused on eliminating artifacts; introduced Relative Total Variation (RTV), originally used to extract text structures to reduce defects
- Result: RTV loss item helped remove artifacts in a great deal

XJTU, Artificial Intelligence and Robotic Institute

Xi'an, China

Research Assistant to Professor Zejian Yuan

Jul 2017 – Dec 2017

Project: **Pixel-Wise Lane Detection**

- Goal: researched real-time lane detection algorithms to solve common failures in current methods (e.g. cases of similar local appearance, diverse lane line patterns, etc.) to improve technology crucial for autonomous driving
- My job: devised light-weight symmetrical residual encoder-decoder network to achieve real-time pixel-wise lane detection
- Result: model demonstrated great flexibility and speed in dealing with diverse lane line patterns

XJTU, CDIO Project, School of Mechanical Engineering

Xi'an, China

CDIO project advised by Senior Engineer and lecturer Dr. Yue Jin

May 2017 – Aug 2017

Project: **Calligraphy Robot**

- Goal: Designed, produced and controlled robot that could write Chinese characters with traditional brushes, unlike most writing robots which use hard pens because brushes are hard to control due to their propensity to deform
- My job: formed team of 2; designed algorithm that disassembled Chinese characters into different strokes so that robot only had to learn how to write certain strokes to compose all characters; controlled robots via microcomputer; co-designed and produced robot
- Result: robot could write Chinese and English characters fluently and beautifully

XJTU, Nano Surface Material Lab

Xi'an, China

Research Assistant to Professor Lei Yang

Sep 2016 – Apr 2018

Project: Tribological Behavior on Carbon Films

- Goal: constructed microscopic texture on material surface, which could act as oil reservoir and could decrease contact area between objects, thereby effectively reducing friction
- My job: developed new method for nano-texture fabrication on carbon films; fabricated micro-nano double-layer texture
- Result: achieved impressive anti-friction effect on carbon films; co-authored paper under review in ThinFilm2018

CONTEST EXPERIENCES

International Mathematical Modeling Contest

Jan 2016, International

Task: Water Resources Evaluation and Prediction

- Received intensive training on mathematical modeling, statistical analysis, MATLAB programming, etc.
- Goal: assessed quality and quantity of water resources
- My job: designed Analytic Hierarchy Process to evaluate; proposed Grey Prediction model (one kind of PDE); responsible for all programming and mathematical modelling
- Result: **Meritorious Winner** (top 5%); achieved high prediction accuracy using limited data

National Digital Mechanical Product Design Contest

May 2016, China

Task: **Cargo Robots Design**

- Received intensive training on mechanical design, 3D modelling, rendering, force analysis, etc.
- My goal: co-designed indoor and outdoor dual-purpose robot with detachable walking and grabbing system that could meet fast-growing modern warehousing and logistics needs; rendered robots; force analysis
- Result: **National First Prize** (top 5% out of ~700 participants); our robot outperformed hundreds of others in practicality, flexibility and appearance

National Electronic Design Contest

Jul 2017, China

Task: **Indoor Optical Location System and Optical Communication**

- Received intensive training on embedded system, FPGA, analog and digital electronics, etc.
- Goal: Built optical communication system that transferred information (music, etc.) and located optical receivers
- My job: realized frequency-labeled method to let different lighting sources shine at distinctive frequencies; used Fast Fourier Transform to decompose signals; proposed multi-layer perceptron network to locate optical receiver; programmed pair of microcomputers to achieve all relevant programming and control aspects
- Result: **National Second Prize** (top 5% out of ~40,000 participants); achieved robust optical signal transferring performance and high detection accuracy

PUBLICATION

- [1] **Guocheng Qian**, Jinjin Gu, Jimmy S. Ren, Furong Zhao, Juan Lin. Trinity of Pixel Enhancement: a Joint Solution for Demosaicking, Denoising and Super-Resolution. [submitted to CVPR2019].
- [2] Sicheng Chen, **Guocheng Qian**, Lei Yang. Precise control of surface texture on carbon film by ion etching through a filter: optimization of texture size for improving tribological behavior. [under review in ThinFilm2018].

EXTRACURRICULAR ACTIVITIES

Exchange student, Japan-Asia Youth Exchange Program in Science at Wakayama University Feb 2018 – Mar 2018

- 1 of 10 selected students on basis of academic abilities and communication skills; participated in short-courses and experimental projects

Summer Intern, YTO Group Corporation

Jun 2017 – Aug 2017

- Received training in equipment manufacturing at China's biggest agriculture and construction machinery manufacturer

Member, Robocon Team

Aug 2015 – Feb 2016

- Practiced designing, producing and controlling robots

Volunteer, XJTU Undergraduate Academic Counseling Center

Sep 2015 – Feb 2017

- Editor-in-chief of calculus learning materials; lectured on calculus and offered free Q&A to students

Summer Volunteer, Science and Technology Museum

Jun 2015 – Jul 2016

- Acted as tour guide and tutoring assistant

STANDARDIZED TESTS AND TECHNICAL SKILLS

- TOEFL iBT: 99 (24 Reading, 27 Listening, 22 Speaking, 26 Writing)
- GRE: 319 (151 Verbal, 168 Quantitative, 3 AW)
- Programming: MATLAB, Python, Pytorch, Caffe, Embedded System (C language), FPGA