

# QINGWEI FANG

qingwei2010511951@gmail.com | 7205 Hart Lane, Austin, TX, USA | 512-921-8611

Homepage: <https://2010511951.github.io/Qingwei-Fang-homepage/>

## EDUCATION

### University of Texas at Austin (UT Austin)

Austin, TX, U.S.A.

Ph.D. in Biomedical Engineering, Department of Biomedical Engineering

Sept. 2019 – present

- Current cumulative GPA: **4.00/4.00**

### Shanghai Jiao Tong University (SJTU)

Shanghai, China

B.E. in Biomedical Engineering, School of Biomedical Engineering

Sept. 2015 – June 2019

- Major Rank: **2/53**      GPA: **3.84/4.30 (89.17/100)**
- Selected Awards:
  - 2016-2017 Academic Excellence Scholarship (second-class) by SJTU
  - 2016-2017 Biomedical Engineering Alumni Scholarship and Student Aid by SJTU
  - 2017-2018 National Scholarship by Ministry of Education of the People's Republic of China
  - 2018 International Genetically Engineered Machine Competition: Gold medal & Best Diagnostics Project Nominee
  - 2019 Second-class Award in National English Competition for College Students
  - 2019 Graduate with Distinction in Shanghai

## PUBLICATION/PRESENTATION

- Yang, Yang\*, **Qingwei Fang\***, and Hong-Bin Shen. "Predicting gene regulatory interactions based on spatial gene expression data and deep learning." *PLoS computational biology* 15, no. 9 (2019): e1007324. (\*co-first authors)
- Hsiao, Chiayi\*, **Qingwei Fang\***, Shuyu Zheng\*, Peixiang He\*, Kairan Zhang\*, Yirui Hong, Yuncong Ran et al. "Combinatorial cell surface display system in *Escherichia coli* for noninvasive colorectal cancer detection." *Journal of Bio-X Research* 2, no. 4 (2019): 185-196. (\*equal contribution)

## RESEARCH EXPERIENCE

### Reconstruction of Gene Regulatory Network (GRN) through Gene Expression Image Analysis

Dec. 2016 – June. 2018    Supervisor: Yang Yang (Associate Prof., Department of Computer Science and Engineering, SEIEE, SJTU)

- Constructed the local database of *Drosophila's in situ* hybridization (ISH) images containing > 120,000 images of over 8,000 genes from **Berkeley Drosophila Genome Project** (BDGP) public database.
- Proposed the idea of GripDL, gene regulatory interaction prediction via deep learning, based on an existing large-scale GRN. Designed deep model with and conducted the experiments under the guidance of Prof. Yang Yang.
- Improved both accuracy and F1 score over 14% compared with the state-of-art staNMF method.
- Identified important regulators in *Drosophila* eye development and the close relationship between eye development and nerve system development in *Drosophila*.

### Early and Noninvasive Diagnosis of Colorectal Cancer using Ultrasound Imaging and Genetically Engineered *E.coli*

Feb. 2018 – Nov. 2018    Supervisor: Lin He\* (Fellow of Chinese Academy of Sciences), Gang Ma\* (Associate Prof.), Yushu Wang\* (Assistant Prof.)      \* School of Life Sciences and Technology, SJTU

- Designed ultrasound experiments and performed ultrasound image analysis.
- Measured ultrasound signal of gas vesicles in the engineered *E.coli*, about 6 times higher than that in control group.
- Performed gas vesicle collapse by increasing acoustic pressure, showing a promising future of our method in medical applications to promote non-invasive screening and early diagnosis of colorectal cancer.
- Consolidating T2 relaxation difference between the engineered *E.coli* and normal *E.coli* in magnetic resonance imaging (MRI) with p-value < 0.005.
- Established team website (<http://2018.igem.org/Team:SJTU-BioX-Shanghai>).

### Electromyogram System for Detecting the Neuro-modulation Effect of Ultrasound Stimulation

Mar. 2018 – Sep. 2018    Supervisor: Junfeng Sun (Associate Prof., School of Biomedical Engineering, SJTU)

- Designed the software to drive MSP430 G2553 chip to collect myoelectric signal, perform A/D conversion and transmit data to upper PC end.
- Developed the software to control upper PC end to receive data, plot the real-time waveform of collected myoelectric signal and detect the motor evoked potential (MEP) through Teager-Kaiser energy (TKE) operator.
- Successful demonstration of signal collection, conversion, transmission, and MEP detection from human forearm muscle group.

## PROJECT EXPERIENCE

### Three-dimension Segmentation and Reconstruction of Lung CT Images

Dec. 2017 – Jan. 2018

- Combined Otsu optimum global thresholding method, erosion morphological processing on 2-D level and region growing method on 3-D level to perform segmentation of lung CT images.
- Achieved more smooth and refined segmentation of lung compared with simple Otsu or region growing method.

### Implementation of Filtered Back Projection (FBP) Algorithm for CT Image Reconstruction

Mar. 2018 – May 2018

- Implemented radon transformation function to simulate data acquisition of parallel beam CT.
- Designed a web page for interaction with users using JavaScript/HTML/CSS.
- Achieved online CT image reconstruction with FBP algorithm.

### Gmap: Automatic Visualization Tool for Human Population Genetic Structure Analysis

Nov. 2017 – Dec 2017

- Reduced HLA-A gene frequency matrix feature dimension from 10 to 3 with 0.99 cumulative explained variance ratio using principal component analysis.
- Constructed the minimum spanning tree (MST) of human population structure using Prim algorithm.
- Enabled automatic segmentation of MST with k-means algorithm.

## TECHNICAL SKILLS

---

- **Programming Languages:** C/C++, Python, MATLAB, Assembly, R, JavaScript, CSS, HTML
- **Language Skills:** TOEFL (R30 + L26 + S23 + W26, total 105)<sup>fi</sup>, GRE (V160 + Q170 + AW4.0)<sup>fi</sup>  
<sup>fi</sup> showing the best score on each section