

# QINGWEI FANG

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## EDUCATION

### Shanghai Jiao Tong University(SJTU)

Shanghai, China

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

Sept. 2015 – June 2019

- **Rank:** 2/53    **Overall GPA:** 3.84/4.30 (89.17/100)
- **Major courses:** Biomedical Image Processing I & II (91, 89)    Molecular Imaging and Early-stage Diagnosis of Diseases (95)    Cardiovascular Mechanobiology (95)    Digital & Analog Electronics (95, 92)    Signal and Linear Systems (94)    Digital Signal Processing (91)    Physics I & II (94, 91)    Anatomy and Physiology I & II (90, 88)    Cell Biology (98)    Cell Engineering (96)
- **Selected awards:** 2017-2018 National Scholarship (2%)

## PUBLICATIONS

- Yang Yang\*, **Qingwei Fang\***, Hongbin Shen. (2018). Predicting Gene Regulatory Interactions by Using Spatial Gene Expression Data and Deep Learning. (\*first co-author, under review: *Proceedings of the National Academy of Sciences of the United States of America*)

## RESEARCH EXPERIENCE

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

Mar. 2017 – Mar. 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 gene expression information from *Berkeley Drosophila Genome Project* (BDGP) public database.
- Ran traditional unsupervised GRN reconstruction algorithm, such as GINI (Gene Interaction Network Inference), TD-ARACNE (Time Delay Algorithm for the Reconstruction of Accurate Cellular Networks) and staNMF (stability-driven Nonnegative Matrix Factorization) as well as traditional feature extraction method, for example SIFT (scale-invariant feature transform).
- Proposed the idea of supervised method, GripDL, based on an existing large-scale GRN. Designed model with and conducted the experiments under the guidance of Prof. Yang Yang.
- Experiments showed both accuracy and F1 improved at least 14% compared with the state-of-art staNMF method. The work was summarized to paper, Predicting Gene Regulatory Interactions by Using Spatial Gene Expression Data and Deep Learning.

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

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

- Provided technical support on the manipulation of ultrasound machine, Fujifilm VisualSonics / VEVO LAZR-X.
- Designed ultrasound experiments. Successfully watched and collapsed the ultrasound signal from the genetically engineered *E.coli* in three conditions.
- Constructed team website including homepage and 24 children pages using HTML, CSS and JavaScript. Designed templates for elements of wiki documentation, such as paragraph, figure, table, video, extra-words storage box, etc.
- The experiments showed a promising future of our method in medical applications, promoting the popularization of non-invasive screening and early diagnosis of colorectal cancer.

### Electromyogram System 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 using C language and Code Composer Studio (CCS) platform.
- 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 using C++ language and Qt platform.
- Successful demonstration of signal collection, conversion, transmission, and MEP detection from human forearm muscle group.

## PROJECT EXPERIENCE

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### **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 smooth and refined segmentation of lung from original images compared with simple Otsu or region growing method.

### **Implementation of Filtered Back Projection (FBP) Algorithm for CT Image Reconstruction** Mar. 2018 – May 2018

- Innovative implementation of FBP using JavaScript, HTML, and CSS to make it applicable for online CT reconstruction.
- Independent implementation of radon and iradon transformation function.

### **Gmap: Automatic Visualization Analysis of Human Population Genetic Structure** Nov. 2017 – Dec 2017

- Implemented and Improved the original algorithm which is based on principal component analysis (PCA), minimum spanning tree (MST), and manual segmentation by proposing automatic segmentation of MST with k-means algorithm.

## TECHNICAL SKILLS

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- **Programming Languages:** C/C++, Python, MATLAB, Assembly, R, JavaScript, CSS, HTML
- **Tools:** Keras, LaTeX, Endnote, Qt, CMake, CytoScape
- **Language Skills:** TOEFL (R30 + L26 + S23 + W24, total 103), GRE (V160 + Q168 )