QINGWEI FANG

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EDUCATION

Shanghai Jiao Tong University (SJTU)   Shanghai, China
B.E. in Biomedical Engineering, School of Biomedical Engineering   Sept. 2015 – June 2019 (expected)

- Major Rank: **2/53**   GPA: **3.84/4.30 (89.17/100)**
- Selected Awards: 2017-2018 **National Scholarship** (2%)
  International Genetically Engineered Machine Competition 2018: **Gold medal & Best Diagnostics Project Nominee**

PUBLICATION

- Yang Yang*, **Qingwei Fang***, Hongbin Shen. (2018). Predicting Gene Regulatory Interactions by Using Spatial Gene Expression Data and Deep Learning. (*co-first author, under review)

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.

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) [fi], GRE (V160 + Q170 + AW4.0) [fi]

                    [fi] showing the best score on each section