Qingchu Jin

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Self-motivated fast learner with the ability to lead and conduct research independently as well as collaboratively in teams. Looking for a position to apply computational biology to large medical problems.

Education

Johns Hopkins University (JHU), School of Medicine, Baltimore, MD — Nov 2021 - Jan 2022
PhD in Biomedical Engineering (Computational biology track)

Shanghai Jiao Tong University (SJTU), School of Biomedical Engineering, China — Jun 2017
BS in Biomedical Engineering

Industry Research Experience

Quantitative Relationship between HIV PrEP Drug Adherence and Efficacy — May 2021 – Present
Quantitative Pharmacology and Pharmacometrics group, Merck & Co.

- Performed a pharmacokinetic analysis on a HIV pre-exposure prophylaxis (PrEP) drug using a physiological-based pharmacokinetic (PBPK) model in MATLAB.
- Designed a dosing regimen simulation protocol to mimic the clinical adherence.
- Performed the analysis of the relationship between efficacy and exposure/adherence for this PrEP drug.

Academic Research Experience

Estimating the Probability of Arrhythmias and its Applications (PhD thesis) — Sept 2017 – Present
Dr. Raimond Winslow's Lab, Institute for Computational Medicine, JHU, Baltimore, MD

- Established a novel spatial stochastic local control cardiac myocyte model (a quantitative system biology model) in C++ by ordinary differential equations and stochastic process and ran simulations in HPC clusters.
- Developed a simplified approach (logistic regression model) to estimate the probability of cellular arrhythmias efficiently and faithfully in MATLAB.
- Predicted the risk of Long QT syndrome mutations using my simplified approach.
- Discovered that prolonged action potential duration does not always cause greater early-afterdepolarization risk.

Prediction of the Cardiac Arrest Neurologic outcome with Machine Learning Methods — Sept 2018 – Mar 2020
Dr. Robert Stevens's Lab, Dept. of Biomedical Engineering, JHU, Baltimore, MD

- Explored and preprocessed more than 200,000 patient healthcare data to with various data mining algorithms including spectrum clustering, random forest, and other learning methods using Python, MATALB and R.
- Designed different types of deep learning models (convolution neural nets and recurrent neural network) to predict the post-cardiac arrest neurological outcome with features extracted from the healthcare database using Python (Pytorch).
- Performed transfer learning method on patient healthcare data to improve model performance.

Intracranial Aneurysm Segmentation using Convolutional Neural Networks — Mar 2020 – July 2021
Dr. Rui Li's Lab, Dept. of Biomedical Engineering, Tsinghua University, Beijing, China

- Modified a two-inputs 3D convolutional neural net to perform the 3D MRI image segmentation task by PyTorch.
- Extracted and analyzed the prediction of aneurysm diameters from the segmentations using Python.

Image-guided pulmonary navigation system Jun 2014 – Nov 2016

Dr. Lixu Gu's Lab, School of Biomedical Engineering, Shanghai Jiao Tong University, Shanghai, China

- Developed a pulmonary nodule biopsy navigation software system for safer and more accurate biopsy using Python and C++.
- Developed a deformation algorithm to compensate the respiratory movement during biopsy based on linear regression.
- Conducted animal studies and clinical trials to evaluate the accuracy and reliability of the system.

Teaching Experience

Teaching Assistant*, Introduction to Computational Medicine, JHU* Aug 2018 – Dec 2018
Aug 2019 – Dec 2019

- Facilitated outstanding support for two classes of ~100 students and administered student-centered mentoring along with in-depth feedback to improve performance and abilities in python and MATLAB

Honors

- Gakenheimer Fellowship, JHU 2019-2020
- Star Research Achievement Award in Society of Critical Care Medicine Meeting 2020
- Young Investigator Award in AHA Resuscitation Science Symposium 2019
- Graduation with honor of Shanghai, SJTU (highest graduation honor) 2017

Publications

- **Q Jin**, JL Greenstein and RL Winslow. Estimating Ectopic Beat Probability with Simplified Statistical Models that Account for Experimental Uncertainty. *PLoS Comp. Bio. (major revision).*
- **Q Jin**, JL Greenstein and RL Winslow. Estimating the Probability of Early Afterdepolarization and Predicting Arrhythmic Risk associated with Long QT Syndrome Type 1 Mutations. *J. Mol. Cell. Cardio. (submitted).*
- **Q Jin**, JL Greenstein and RL Winslow. Does prolonged action potential always indicate greater early afterdepolarization risk? *(In preparation)*.
- *HB Kim, *H Nguyen, ***Q Jin** et al. A Physiology-Driven Computational Model for Post-Cardiac Arrest Outcome Prediction. *The Lancet Digital Health (submitted)*. *: equal contribution.
- *M Zhang, ***Q Jin** et al. Intracranial aneurysm segmentation from TOF-MRA and black-blood MRI using a deep convolutional neural network *(In preparation)*. *: equal contribution.

Conferences

- **Q Jin**, JL Greenstein and RL Winslow. Simplified Models Predict Cellular Arrhythmia Probabilities and Reveal the Impact of Experimental Parameter Uncertainty on the Predicted Distribution of Arrhythmic Events. (poster) *Biophysical Society Meeting*. *2019*
- H Kim, H Nguyen, **Q Jin** et al. A machine learning-based prediction of cardiac arrest outcome using a large multi-center database. (oral) *AHA Resuscitation Science Symposium 2019* and *Society of Critical Care Medicine 2020*
- M Zhang, **Q Jin** et. al. Intracranial aneurysm segmentation using a deep convolutional neural network. (oral) *ISMRM 29th Annual Meeting & Exhibition 2021*.

Patents

- **Q Jin**, W Yu, S Hong et al. " Fast fusion method for dynamically simulating lung deformation in segmented model." P. R. China Patent No. 2015101287785. 15 July 2015
- W Yu, Q **Jin**, S Hong et al. "Dynamic registration method based on reference point in computer-aided

pulmonary surgery." P. R. China Patent No. 201510128779X. 24 June 2015

Skills

- **Programming languages and packages**: C++, MATLAB, Python, R, SQL, High performance computing (HPC) cluster, Pytorch, OpenMP, MPI, Git & Github, Linux system.
- **Modeling techniques:** quantitative system pharmacology (QSP) modeling, physiological-based pharmacokinetic (PBPK) modeling, parallel computing, Markov chain stochastic modeling, deep learning, data analysis, generalized linear regression.
- **Courses:** immunology, deep learning, system bioengineering, introduction to stochastic process, introduction to nonlinear system and chaos, statistics in public health, precision care medicine.