Qiao Liu – Curriculum Vitae

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Research Statement

My research interests cover problems on statistical learning and computational biology problems. In particular, I am interested in developing machine learning algorithms, especially deep learning algorithms with applications in both general statistics and specific problems in computational biology, pharmacopathology, and health care. Related related works have been published in top journals (**PNAS**, **Nature Machine Intelligence**, **Bioinformatics**) and conferences (**ISMB** 19', **ECCB** 20', **NeurIPS** 20', **MICCAI** 20').

Employment

2021.06-Present Postdoctoral Scholar - Stanford University, Stanford, USA
Department of Statistics, advised by Prof. **Wing Hung Wong** (NAS member)
Developing ML algorithms for solving problems in general statistics and computational biology.

Education

2019.09-2021.06 Joint Ph.D. student - Stanford University, Stanford, USA
Department of Statistics, advised by Prof. **Wing Hung Wong** (NAS member)
Developing machine learning algorithms with applications in both general statistics and biomedical data

2016.09-2021.06 Ph.D. candidate in **Control Science and Engineering** - Tsinghua University, Beijing, China
Department of Automation, advised by tenured Assoc. Prof. **Rui Jiang**
Tsinghua National Laboratory for Informatics and Technology (TNLIST)

2015.08-2016.01 Exchange Student - Lund University, Lund, Sweden
Department of Computer Science
GPA:**5.0**/5.0

2012.09-2016.06 Bachelor in **Engineering** - Beihang University, Beijing, China
ShenYuan Honors College (Special Pilot Class, formerly a.k.a. School of Advanced Engineering)
GPA:**91.5**/100, Rank:**2**/50

Internships

2019.06-2019.09 Research Intern - SenseTime Inc, Beijing, China
AI+Healthcare, mentored by Dr. **Mu Zhou**
Developing ML algorithms for drug sensitivity prediction and novel drug discovery

2015.09-2015.12 Undergraduate Intern - LUGG Lab, Lund, Sweden
Lund University Graphics Group, advised by Assoc. Prof. **Michael Doggett**
Developing and maintaining RenderChimp graphics applications platform

Publications

1. Feng Wang, Guoyizhe Wei, **Qiao Liu**, Jinxiang Ou, Xian Wei, Hairong Lv. Boost Neural Networks by Checkpoints [C]. Conference on Neural Information Processing Systems (***NeurIPS***), 2021, 33. (Top machine learning conf, acceptance rate:26%)

2. **Qiao Liu**, Jiaze Xu, Rui Jiang, Wing Hung Wong. Density estimation with deep generatative neural networks [J]. Proceedings of the National Academy of Sciences of the United States of America(***PNAS***), 2021, 118(15), e2101344118.

3. **Qiao Liu**, Shengquan Chen, Rui Jiang, Wing Hung Wong. Simultaneous deep generative modeling and clustering of single cell genomic data[J]. ***Nature Machine Intelligence***, 2021, 3(6): 536-544.

4. **Qiao Liu**, Kui Hua, Xuegong Zhang, Wing Hung Wong, Rui Jiang. Incorporating gene expression in genome-wide prediction of chromatin accessibility via deep learning[J]. ***Genomics, Proteomics & Bioinformatics***, 2021. (In press)

5. Chencheng Xu, **Qiao Liu**, Minlie Huang, Tao Jiang. Reinforced molecular optimization with neighborhood-controlled grammars[C]. Conference on Neural Information Processing Systems (***NeurIPS***), 2020, 33. (Top machine learning conf, acceptance rate:20.1%)

6. Kexin Ding, **Qiao Liu**, Edward Lee, Mu Zhou, Aidong Lu, Shaoting Zhang. Feature-enhanced graph networks for genetic mutational prediction using histopathological images in colon cancer[C]. International Conference on Medical Image Computing and Computer Assisted Intervention (***MICCAI***), 2020, (pp. 294-304). (Top medical image conf)

7. **Qiao Liu**, Zhiqiang Hu, Rui Jiang, Mu Zhou. Cancer drug response prediction via a hybrid graph convolutional network[J]. ***Bioinformatics***, 2020. 36(Supplement_2): i911-i918. Also in *Proceedings of the 19th European Conference on Computational Biology* (***ECCB***), 2020.(Top bioinformatics conf, conference acceptance rate:20.2%)

8. Chencheng Xu, **Qiao Liu**, Jianyu Zhou, Minzhu Xie, Jianxing Feng, Tao Jiang. Quantifying functional impacts of regulatory variants with multi-task Bayesian neural network[J]. ***Bioinformatics***, 2020, 36(5): 1397-1404. (Top bioinformatics journal, JCR Q1)

9. Qingzhu Yang, **Qiao Liu**, Hairong Lv. A Decentralized System for Medical Data Management via Blockchain [J]. ***Journal of Internet Technology***, 2020, 21(5): 1335-1345.

10. Junfeng Liu, **Qiao Liu**, Qingzhu Yang. Mstree: a multispecies coalescent approach for estimating ancestral population size and divergence time during speciation with gene flow [J]. ***Genome biology and evolution***, 2020, 12(5): 715-719. (JCR Q2)

11. **Qiao Liu**, Hairong Lv, Rui Jiang. hicGAN infers super resolution Hi-C data with generative adversarial networks. ***Bioinformatics***, 2019, 35(14): i99-i107. Also in *Proceedings of the 27th Intelligent Systems for Molecular Biology the 18th European Conference on Computational Biology* (***ISMB/ECCB***), 2019. (Top bioinformatics conf, conference acceptance rate:18.9%)

12. Pengyu Chen*, **Qiao Liu***, Lan Wei, Beier Zhao, Yin Jia, Hairong Lv, Xiaolu Fei. Automatically structuring on Chinese ultrasound report of cerebrovascular diseases via natural language processing[J]. ***IEEE Access***, 2019, 7: 89043-89050. (Co-first author, JCR Q1)

13. Shaoming Song, Hongfei Cui, Shengquan Chen, **Qiao Liu**, Rui Jiang. EpiFIT: Functional interpretation of transcription factors based on combination of sequence and epigenetic information[J]. ***Quantitative Biology***, 2019, 1-11.

14. Qijin Yin, Mengmeng Wu, **Qiao Liu**, Rui Jiang. DeepHistone: a deep learning approach to predicting histone modifications[J]. ***BMC Genomics***, 2019,20(2):193. (JCR Q2)

15. **Qiao Liu**, Fei Xia, Qijin Yin, Rui Jiang. Chromatin accessibility prediction via a hybrid deep convolutional neural network[J]. ***Bioinformatics***, 2017, 34(5): 732-738. (Top bioinformatics journal, JCR Q1)

16. **Qiao Liu**, Mingxin Gan, Rui Jiang. A sequence-based method to predict the impact of regulatory variants using random forest[J]. ***BMC Systems Biology***, 2017, 11(2): 7. (JCR Q2) Also in *Proceedings of the 15th Asia Pacific Bioinformatics Conference* (***APBC***), 2017.

17. Bai Li, Mu Lin, **Qiao Liu**, Ya Li, Changjun Zhou. Protein folding optimization based on 3D off-lattice model via an improved artificial bee colony algorithm[J]. ***Journal of Molecular Modeling***, 2015, 21(10): 261. (JCR Q2)

(* denotes equal contribution)

Invited Talks

2021.12 **NeurIPS 2021**(Thirty-fifth Conference on Neural Information Processing Systems), Virtual talk.
2020.09 **ECCB 2020**(The 19th European Conference on Computational Biology), Virtual talk.
2020.03 **CEGS GGR**(Centers of Excellence in Genomic Science Seminar), Stanford University, USA.
2019.11 **BIBM 2019**(2019 IEEE International Conference on Bioinformatics & Biomedicine), San Diego, USA
2019.07 **ISMB 2019**(The 27th Conference on Intellegent Systems for Molecular Biology), Basel, Switzerland
2019.03 **BUAFAI 2019**(The First Beijing Universities Academic Forum of Artificial Intelligence), Beijing, China
2017.01 **APBC 2017**(The Fifteenth Asia Pacific Bioinformatics Conference), Shenzhen, China

Honers and Awards

2021.06 **Excellent Ph.D. Thesis**, Tsinghua University (**6**% of all Ph.D. theses)
2021.06 **Excellent Graduates of Tsinghua University**, Tsinghua University (**5**% of all graduate students)
2021.06 **Excellent Graduates of Beijing**, Beijing Municipal Commission of Education (**5**% of all graduate students)
2020.10 **Friends of Tsinghua - Mingwei Zhang Scholarship**, Tsinghua University
2020.08 **ECCB Fellowship**, International Society for Computational Biology
2019.10 **The First Class Scholarship**, Tsinghua University
2019.07 **CSC Scholarship**, China Scholarship Council
2019.04 **ISMB Travel Fellowship**, International Society for Computational Biology
2018.10 **National Scholarship**, Ministry of Education of China (**7** out of all Ph.D. students in Department of Automation, Tsinghua University)
2017.10 **The First Class Scholarship**, Tsinghua University
2016.06 **Excellent Graduates of Beijing**, Beijing Municipal Commission of Education
2016.06 **Excellent Graduates of Beihang University**, Beihang University ()
2016.05 **Rui An First Prize Scholarship**, Rui An Inc
2015.10 **National Encouragement Scholarship**, Ministry of Education of China
2015.06 **Microsoft Young Fellowship**, Microsoft Research Asia (**40** undergraduates among top universities in China)
2014.10 **National Encouragement Scholarship**, Ministry of Education of China
2013.10 **National Encouragement Scholarship**, Ministry of Education of China
2012.09 **Excellent Freshman Prize**, Beihang University

Competitions

2021.12 **NeurIPS 2021 Competition, Multimodal Data Integration**, rank 1^{st} in Joint Embedding tasks NeurIPS conference
2021.05 **RNA Unpaired Probability Prediction Competition**, rank **3**/1012, Baidu AI Studio, Baidu Inc
2019.03 **Liver Cancer Image Diagnose Competition**, rank:**2**/1397, Digital China Innovation Contest, DCIC 2019
2015.01 **Honorable Mention in COMAP's Mathematical Contest in Modeling**, The American Mathematical Society
2014.10 1^{st} **Prize in NCSMC**(The 6^{th} National College Students Mathematical Competition), Chinese Mathematical Society
2014.09 **National** 1^{st} **Prize in CUMCM**(Contemporary Undergraduate Mathematical Contest in Modeling), China Society for Industrial and Applied Mathematics
2014.09 1^{st} **Prize in Mathematical Competition**, Beihang University
2013.12 1^{st} **Prize in Physical Competition**, Beihang University
2013.10 1^{st} **Prize in NCSMC**(The 5^{th} National College Students Mathematical Competition), Chinese Mathematical Society

Technical Strengths

- **Programming Languages**
  Python,C,Shell,R,Matlab
- **Deep learning software stacks**
  TensorFlow,Keras,PyTorch,PyTorch Lightning,Theano
- **Miscellaneous**
  Git,OpenMP,Slurm,Flask,Apache Web Servers

Teaching Experiences

2019.02-2019.06 **Teaching Assistant**, Fundamental Industry Training Center, Tsinghua University
Smart Things and Intelligent Systems, Undergraduate Course

2018.09-2019.01 **Teaching Assistant**, Department of Automation, Tsinghua University
Introduction to Artificial Intelligence, Undergraduate Course

2017.09-2018.01 **Teaching Assistant**, Department of Automation, Tsinghua University
Introduction to Artificial Intelligence, Undergraduate Course

2016.08-2016.09 **Teaching Assistant**, Department of Automation, Tsinghua University
Project of Electronic Circuits, Undergraduate Summer Course

Professional Activities

Member of International Society of Computational Biology (ISCB).
Student member of Institute of Electrical and Electronics Engineers (IEEE).
Independent Reviewer for Journals: *Nature Machine Intelligence, Bioinformatics, BMC Genomics,BMC Bioinformatics, Complex & Intelligent Systems, Journal of Information Technology, Computational Biology and Bioinformatics*
Independent Reviewer for Conferences: *GIW*2018, *ISB*2018, *IDASB*2018, *BECB*2021