Juexiao Zhou

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Research Interests

My research interests lie in machine learning, deep learning, intelligent healthcare, privacy, security, bioinformatics, artificial general intelligence, and large language model. In a nutshell, I am committed to achieving privacy-preserving artificial general intelligence for healthcare and bioinformatics.

Academic Experiences

King Abdullah University of Science and Technology — Saudi Arabia

PhD Student in Computer Science, Supervised by Prof. Xin Gao; ***GPA: 4.00/4.00*** — *Dec 2021 – Present*

Master of Science, M.S. in Computer Science, Supervised by Prof. Xin Gao; ***GPA: 3.95/4.00*** — *Aug 2020 – Dec 2021*

Southern University of Science and Technology — Shenzhen, China

Bachelor of Science, B.S. (Honored) in Bioinformatics; ***GPA: 3.92/4.00*** — *Sep 2016 – Jun 2020*

Publications

Journal (#equal contribution, *corresponding author)

1. Haoyang Li#, **Juexiao Zhou#**, Zhongxiao Li, Siyuan Chen, Xingyu Liao, Bin Zhang, Ruochi Zhang, Yu Wang, Shiwei Sun, Xin Gao*. A comprehensive benchmarking with practical guidelines for cellular deconvolution of spatial transcriptomic. ***Nature Communications (IF: 14.919).*** DOI: 10.1038/s41467-023-37168-7

2. Yongkang Long#, Bin Zhang#, Shuye Tian, Jiajia Chan, **Juexiao Zhou**, Zhongxiao Li, Yisheng Li, Zheng An, Xingyu Liao, Yu Wang, Shiwei Sun, Ying Xu, Yvonne Tay, Wei Chen*, Xin Gao*. Accurate transcriptome-wide identification and quantification of alternative polyadenylation from RNA-seq data with APAIQ. ***Genome Research (IF: 9.438).*** In press.

3. Xiaopeng Xu, Tiantian Xu, **Juexiao Zhou**, Xingyu Liao, Ruochi Zhang, Yu Wang, Lu Zhang, Xin Gao*. AB-Gen: Antibody Library Design with Generative Pre-trained Transformer and Deep Reinforcement Learning. ***Genomics, Proteomics & Bioinformatics (IF: 6.615).*** In press.

4. Wenkai Han#, NingNing Chen#, Xinzhou Xu, Adil Salhi, **Juexiao Zhou**, Zhongxiao Li, Huawen Zhong, Elva Gao, Ruochi Zhang, Yu Wang, Shiwei Sun, Peter Cheung, Xin Gao*. Predicting the antigenic evolution of SARS-COV-2 with deep learning. ***Nature Communications (IF: 14.919).*** In press.

5. Zhongxiao Li#, Elva Gao#, **Juexiao Zhou**, Wenkai Han, Xiaopeng Xu, and Xin Gao*. Applications of Deep Learning in Understanding Gene Regulation. ***Cell Reports Methods.*** DOI: 10.1016/j.crmeth.2022.100384

6. **Juexiao Zhou#**, Bin Zhang#, Haoyang Li, Longxi Zhou, Zhongxiao Li, Yongkang Long, Wenkai Han, Mengran Wang, Huanhuan Cui, Wei Chen, Xin Gao*. Annotating TSSs in Multiple Cell Types Based on DNA Sequences and RNA-seq Data via DeeReCT-TSS. ***Genomics, Proteomics & Bioinformatics (IF: 6.615).*** DOI: 10.1016/j.gpb.2022.11.010

7. Haoyang Li, Hanmin Li, **Juexiao Zhou** and Xin Gao*. SD2: Spatially resolved transcriptomics deconvolution through integration of spatial and dropout information. ***Bioinformatics (IF: 6.931).*** DOI: 10.1093/bioinformatics/btac605

8. Longxi Zhou#, Xianglin Meng#, Yuxin Huang#, Kai Kang#, **Juexiao Zhou**, Yuetan Chu, Haoyang Li, Dexuan Xie, Jiannan Zhang, Weizhen Yang, Na Bai, Yi Zhao, Mingyan Zhao, Guohua Wang, Lawrence Carin, Xigang Xiao, Kaijiang Yu, Zhaowen Qiu, Xin Gao*. An Interpretable Deep Learning Workflow for Discovering Sub-Visual Abnormalities in CT Scans of COVID-19 Inpatients and Survivors. ***Nature machine intelligence (IF: 25.9).*** DOI: 10.1038/s42256-022-00483-7

9. Haoyang Li, **Juexiao Zhou**, Yi Zhou, Jieyu Chen, Feng Gao, Ying Xu, Xin Gao*. An interpretable computer-aided diagnosis method for periodontitis from panoramic radiographs. ***Frontiers in Physiology, section Computational Physiology and Medicine (IF: 4.755).*** DOI: 10.3389/fphys.2021.655556.

10. Zhongxiao Li, Yisheng Li, Bin Zhang, Yu Li, Yongkang Long, **Juexiao Zhou**, Xudong Zou, Min Zhang, Yuhui Hu, Wei Chen, Xin Gao*. DeeReCT-APA: Prediction of Alternative Polyadenylation Site Usage through Deep Learning. ***Genomics Proteomics and Bioinformatics (IF: 6.615).*** DOI: 10.1016/j.gpb.2020.05.004.

11. Haoyang Li, **Juexiao Zhou**, Huiyan Sun, Zhaowen Qiu, Xin Gao* and Ying Xu*. CaMeRe: A novel tool for inference of cancer metabolic reprogramming. ***Front. Oncol. (IF: 6.244).*** DOI: 10.3389/fonc.2020.00207.

12. Yisheng Li[#], Bernhard Schaefke[#], Xudong Zou, Min Zhang, Florian Heyd, Wei Sun, Bin Zhang, Guipeng Li, Weizheng Liang, Yuhao He, **Juexiao Zhou**, Yunfei Li, Liang Fang, Yuhui Hu*. Pan-tissue analysis of allelic alternative polyadenylation suggests widespread functional regulation. ***Molecular Systems Biology (IF: 12.744).*** DOI: 10.15252/msb.20199367.

13. Liongxi Zhou, Zhongxiao Li, **Juexiao Zhou**, Haoyang Li, Yupeng Chen, Yuxin Huang, Dexuan Xie, Lintao Zhao, Ming Fan, Shahrukh Hashmi, Faisal AbdelKareem, Riham Eiada, Xigang Xiao, Lihua Li, Zhaowen Qiu, and Xin Gao*. A Rapid, Accurate and Machine-agnostic Segmentation and Quantification Method for CT-based COVID-19 Diagnosis. ***IEEE Transactions on Medical Imaging (IF: 11.037).*** DOI: 10.1109/TMI.2020.3001810.

Conference (#equal contribution, *corresponding author)

14. Haoyang Li, **Juexiao Zhou**, Yi Zhou, Jieyu Chen, Feng Gao, Ying Xu, Xin Gao*. Automatic and interpretable model for periodontitis diagnosis in panoramic radiographs. ***Medical Image Computing and Computer Assisted Interventions 2020.*** DOI: 10.1007/978-3-030-59713-9_44.

Posters & Technical Reports (#equal contribution, *corresponding author)

15. **Juexiao Zhou**, Xin Gao*. Privacy in Bioinformatics and Intelligent Healthcare. Poster. ***Smart-Health Student Research Symposium***, KAUST, Saudi Arabia, November 10, 2022.

16. Haoyang Li, **Juexiao Zhou**, Xin Gao*. Deetal-Perio: DEEp denTAL Advisor for Periodontitis Diagnosis based on Two-step Segmentation of Teeth and Gingiva with Lower-dimensional Features. Poster. ***DigitalHealth***, KAUST, 2020.

17. Haoyang Li, **Juexiao Zhou**, Huiyan Sun, Zhaowen Qiu, Xin Gao* and Ying Xu*. CaMeRe: A novel tool for inference of cancer metabolic reprogramming. Poster. ***Advance In Artificial Intelligence***, KAUST, 2019.

18. Yongkang Long, **Juexiao Zhou**, Zhongxiao Li, Wei Chen, Xin Gao*. DeeRect-PAS—A Deep-Learning based method for Transcriptome-wide PAS Identification. Poster. ***Advance In Artificial Intelligence***, KAUST, 2019.

19. Min Zhang, Yisheng Li, **Juexiao Zhou**, Yuhao He, Guipeng Li, Liang Fang, Wei Chen*. Systematical discovery of cis-elements regulating alternative polyadenylation in mammalian cells. Poster. ***RNA Biology***, CSH Asia, 2019.

20. Min Zhang, Yisheng Li, **Juexiao Zhou**, Yuhao He, Guipeng Li, Liang Fang, Wei Chen*. Systematical discovery of cis-elements regulating alternative polyadenylation in mammalian cells. Poster. ***Regulatory RNAs, Cell Symposia***, Berlin, Germany, May 12-14, 2019.

Pre-Prints (#equal contribution, *corresponding author)

21. Xingyu Liao, Wufei Zhu, **Juexiao Zhou**, Haoyang Li, Xiaopeng Xu, Bin Zhang, Xin Gao*. Repetitive DNA sequence detection and its role in the human genome. under review.

22. **Juexiao Zhou**#, Haoyang Li#, Xingyu Liao, Bin Zhang, Wenjia He, Zhongxiao Li, Longxi Zhou, Xin Gao*. Audit to Forget: A Unified Method to Revoke Patients' Private Data in Intelligent Healthcare. under review.

23. Xiaopeng Xu, **Juexiao Zhou**, Chen Zhu, Qing Zhan, Zhongxiao Li, Ruochi Zhang, Xingyu Liao, Xin Gao*. GPT generates more diverse scaffolds than GRU in exploring the chemical space. under review.

24. Yuetan Chu#, Longxi Zhou#, **Juexiao Zhou**, Yuxin Huang, Tianyi Xing, Dexuan Xie, Xigang Xiao, Zhaowen Qiu, Xin Gao*. An end-to-end workflow for robust pulmonary artery-vein segmentation on thick-slice chest CT. under review.

25. **Juexiao Zhou**#, Longxi Zhou#, Di Wang, Xiaopeng Xu, Haoyang Li, Yuetan Chu, Wenkai Han, Xin Gao*. Personalized and privacy-preserving federated heterogeneous medical image analysis with PPPML-HMI. under review.

26. **Juexiao Zhou**#, Siyuan Chen#, Yulian Wu#, Haoyang Li, Bin Zhang, Longxi Zhou, Yan Hu, Zihang Xiang, Zhongxiao Li, Ningning Chen, Wenkai Han, Di Wang and Xin Gao*. PPML-Omics: a Privacy-Preserving federated Machine Learning system protects patients' privacy from omic data. under review.

27. Longxi Zhou, Yitong Ding, Jiayang Guo, Ming Fan, **Juexiao Zhou**, Haoyang Li, Yujiao Li, Yuxin Huang, Yi Zhao, Yuetan Chu, Kun Wang, Qiming Fang, Xin Gao, Hongxia Zhang, Lihua Li. A Workflow for Automatic, Accurate and Robust Breast Tumor Segmentation on Multi-Database DCE-MRI. under review.

Patents and Patent Applications

28. **Juexiao Zhou**, Xin Gao. Personalized and privacy-preserving federated heterogeneous medical image analysis with PPPML-HMI. KAUST reference: 2023-012.

29. Xingyu Liao, **Juexiao Zhou**, Xin Gao. A high-precision identification method of tandem repeat expansion based on refined alignment and deep learning. KAUST reference: 2023-054.

30. **Juexiao Zhou**, Xin Gao. Audit to forget: a unified suite to revoke patients' private data in intelligent healthcare. KAUST reference: 2023-056.

31. **Juexiao Zhou**, Xin Gao. A camera-based privacy-preserving early warning system for critical diseases. KAUST reference: 2023-074.

Work Experience

King Abdullah University of Science and Technology — Saudi Arabia
Student Ambassador, CEMSE — *Dec 2021 – Present*

Teaching

CS220, Data Analytics — KAUST
Teaching Assistant — *Fall 2022/2023*
- Cooperated with Prof. Xin Gao

BioE 201/230 Foundations of Bioengineering — Building 9 Room 4225, KAUST
Teaching Labs — *Fall 2022/2023*
- Cooperated with Prof. Xin Gao
- Lab 1. Genome data analysis, 2022.08.30, Content: Python basics, D/RNA sequence analysis, Biopython, BLAST, Reference genome
- Lab 2. Protein sequence analysis, 2022.09.06, Content: Protein sequence analysis, MSA, PDB, PyMOL, Secondary structure prediction
- Lab 3. Protein structure and function, 2022.09.13, Content: Ab initio with PyRosetta, AlphaFold2, NucleicNet, Docking with Smina, Pfam annotation with deep learning

CS398 Graduate Seminar — KAUST
Teaching Assistant — *Spring 2022*
- Cooperated with Prof. Dominik Michels

Honors & Awards

King Abdullah University of Science and Technology, KAUST, 2021-Present, PhD, Computer Science

- KAUST AII's NeurIPS travel grant, 2022
- CEMSE Dean's List Award, 2022
- Excellent Research Award, CEMSE, 2021

King Abdullah University of Science and Technology, KAUST, 2020-2021, Master of Science, Computer Science

- Student ambassador, CEMSE, 2021
- Yearly best student award, CEMSE, 2021
- Full scholarship for MS/PhD study, 2020

Southern University of Science and Technology, SUSTech, 2016-2020, Bachelor of Science, Bioinformatics, Biology

- Outstanding graduate of SUSTech, 2020.
- Cum Laude Graduate of the Department of Biology (Top 1/10), 2020.
- The Guinness world record for "the most vows received by a single civilized act activity", 2019
- Candidate for 2019 National Scholarship, 2019
- Summer social practice excellent experience Award, 2018
- Excellent Student, The First Prize Scholarship, 2018
- Outstanding volunteer for the 12th CBIS Biennial Meeting, Shenzhen, China, 2018
- Candidate for 2018 National Scholarship, 2018
- Outstanding Volunteer of the 3rd Shenzhen International Life Science & Health Industry Summit (2016) Excellent Student, The First Prize Scholarship, 2017
- Dean scholarship, The First Prize Scholarship, 2017
- Excellent Student Cadre, 2017
- Outstanding Volunteer of 2017 Shenzhen International Precision Medicine Summit, 2017
- Alma mater practice excellent team, 2017
- National Literary Creation Award, 2016
- Excellent Student, The Second Prize Scholarship, 2016

Memberships

- Chinese Association for Artificial Intelligence (CAAI) Member
- The international Asia-Pacific Bioinformatics Network (APBioNET) Member

Talks

- Audit to Forget: A Unified Method to Revoke Patients' Private Data in Intelligent Healthcare. *Poster.* CBRC session, KAUST Research Open Week, Saudi Arabia, March 2, 2023
- Audit to Forget: A Unified Method to Revoke Patients' Private Data in Intelligent Healthcare. *Oral & Poster.* Spotlight, Rising Stars in AI Symposium 2023 at KAUST, Saudi Arabia, Feb 2, 2023
- Privacy in Bioinformatics and Intelligent Healthcare. *Poster.* Smart-Health Student Research Symposium, KAUST, Saudi Arabia, November 10, 2022.
- PPML-Omics: a Privacy-Preserving federated Machine Learning system protects patients' privacy from omic data. *Oral.* CBRC Dual Seminar, King Abdullah University of Science and Technology, Saudi Arabia, March 29, 2022
- PPML-Omics: a Privacy-Preserving federated Machine Learning system protects patients' privacy from omic data. *Oral.* BDAI, Beijing, ChinaMarch 9, 2022

Academic Services

Reviewer

(Journal/Conference Name, number of reviews)

- Genome Biology, #1
- Genome Research, #2
- Heliyon, #1
- IJCAI-ECAI 2022, #1
- ICONIP2020, #1
- ICMLA2021, #1
- Journal of Bioinformatics and Computational Biology, #1
- MICCAI2020, #1
- Multimedia Systems, #1
- SIGKDD2022, #2

Conference Administrator

- The 21st International Conference on Bioinformatics (InCoB2022), Administrator