# Qimin Zhang

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Google Scholar link


## Education

- **The Pennsylvania State University** State College, USA
  *Ph.D in Computer Science and Engineering* *Aug. 2019 – May. 2024*
- **University of Chinese Academy of Sciences** Beijing, China
  *Master of Engineering in Computer Technology* *Sep. 2016 – June. 2019*
- **Beihang University** Beijing, China
  *Bachelor of Engineering in Aircraft Airworthiness* *Sep. 2012 – June. 2016*
  *Bachelor of Science in Applied Mathematics (minor)*

## Skills

- **Languages** C++, C, Python, Shell
- **Technical Skills and Tools** Machine Learning (scikit-learn, PyTorch), Bioinformatics, Cloud Computing (AWS), Linux, Git, Docker

## Work Experience

- **Laboratory Corporation of America Holdings (Labcorp)** Pittsburgh, PA
  ***Senior Bioinformatics Specialist*** *July 2023 - present*
  - Developed computational methods and pipelines for virus subtyping and strain-level identification from the metagenomics samples.
  - Developed and re-engineering the data structure and algorithms of tools and software to provides verbose log, improve accuracy, and reduce computational cost.
  - Developed pipelines for metabolomic pathway prediction from microbiome sequencing data using statistical and machine learning methods, focusing on the discovery of biomarkers related to women's health diseases.
- **Laboratory Corporation of America Holdings (Labcorp)** Pittsburgh, PA
  ***Data Science / Bioinformatics Summer Intern*** *May 2022 - Aug 2022*
  - Developed a set of highly accurate data pipelines using machine learning to predict gut metabolites and metagenome functions from gut microbiome data
  - Managed to work on a Colorectal Cancer dataset and achieved all metabolites well predicted

## Research Experience

Developed open-source software and tools, such as Scallop2 and Aletsch, have **over 15,000 downloads** in Bioconda, and the number is actively increasing.

- **Bioinformatics Algorithms** Sep 2019 - Present
  - **Transcriptome assembly & bulk/single-cell RNA-seq data analysis**

    **Scallop2**: a transcript assembler specifically optimized for paired-/multi-end RNA-seq data. Designed and implemented a dynamic programming algorithm and an enhanced consensus algorithm to improve 85.9% and 46.6% in precision comparing with two leading tools at the same level of sensitivity.
    **Aletsch**: assembler implemented efficient algorithms to assemble multiple RNA-seq samples (or multiple cells for single-cell RNA-seq data). Aletsch surpasses the leading assemblers TransMeta by 22.9%–62.1% and PsiCLASS by 23.0%–175.5% on human datasets.
- **Applied Machine Learning** Sep 2017 - present

- **High-throughput Computing**

  Evaluated machine learning techniques for predicting resource usage in high-throughput computing. Applied the density-based Clustering methodologies to minimize resource waste and reduce time, cores and memory consumption by 13.82%, 16.62%, 49.15%, respectively.

- **Healthcare**

  Explored machine learning techniques to biomedical problems. Extracted feature of sputum sound signals using wavelet transform algorithm. Implemented a BPNN model and improved the precision of detecting sputum to 84.53%.

- **Robotics: Dynamic Modeling and Control** Aug 2015 - Aug 2019
  - Performed modeling and designed control systems for bi-copter and bio-inspired robots. Designed a Bi-copter, studied the dynamics modeling, validated the effectiveness of designed PID attitude controller.

## Publications

1. Hayden Brochu, Kuncheng Song, **Qimin Zhang**, Qiandong Zeng, Adib Shafi et al. A program for real-time surveillance of SARS-CoV-2 genetics. *medRxiv*, 2024. (Preprint)
2. Kathryn N Porter Starr, Marshall G Miller, Jessica T Wallis, **Qimin Zhang**, Kuncheng Song et al. Effects of Blueberry Consumption and Exercise on Gut Microbiome Composition in a Randomized Controlled Trial of Sedentary Older Adults With Overweight or Obesity. *Current Developments in Nutrition*, 8(Supplement_2), 2024.
3. Qian Shi, **Qimin Zhang**, Mingfu Shao. Accurate assembly of multiple RNA-seq samples with Aletsch. *Bioinformatics*, 40(Supplement_1): i307–i317, 2024.
4. Kuncheng Song, Hayden Brochu N, **Qimin Zhang**, Jonathan Williams D, Lakshmanan Iyer K. An in silico analysis of PCR-based monkeypox virus detection assays: a case study for ongoing clinical surveillance. *Viruses*, 15(12), 2327, 2023.
5. **Qimin Zhang**, Mingfu Shao. Transcript Assembly and Annotations: Bias and Adjustment. *PLoS Computational Biology*, 19(12): e1011734, 2023.
6. **Qimin Zhang**, Qian Shi, Mingfu Shao. Accurate assembly of multi-end RNA-seq data with Scallop2. *Nature Computational Science*, 2, 148-152, 2022.
7. **Qimin Zhang**, Nathaniel Kremer-Herman, Benjamin Tovar, Douglas Thain. Reduction of Workflow Resource Consumption Using a Density-based Clustering Model. *2018 IEEE/ACM Workflows in Support of Large-Scale Science (WORKS)*, pages. 1-9, Nov. 2018.
8. **Qimin Zhang**, Pei An, Shuquan Wang, Xiaoli Bai, Wei Zhang. Image-based Space Object Reconstruction and Relative Motion Estimation using Incremental Structure from Motion. *2018 IEEE CSAA Guidance, Navigation and Control Conference (CGNCC)*, Aug. 2018.
9. Yan Shi, Guoliang Wang, Jinglong Niu, **Qimin Zhang**, Maolin Cai et al. Classification of sputum sounds using artificial neural network and wavelet transform. *International Journal of Biological Sciences*, 14(8): 938–945, 2018.
10. **Qimin Zhang**, Jieru Zhao, Shuquan Wang. Design of Motion Control System for Frog-Inspired Bionic Hopping Robot. *International Conference on Mechatronics and Intelligent Robotics*, Pages: 502-509, Nov, 2017.
11. Jieru Zhao, Yang Li, **Qimin Zhang**, Zhongcai Pei. Research on Gait and Control of Bionic Hexapod Robot *Proceedings of the 2017 International Conference on Artificial Intelligence, Automation and Control Technologies*, Pages: 1-5, April, 2017.
12. **Qimin Zhang**, Zihe Liu, Jieru Zhao, Shuguang Zhang. Modeling and attitude control of Bi-copter. *2016 IEEE International Conference on Aircraft Utility Systems (AUS)*, Pages:172 - 176, Oct, 2016.

## Academic Services

- **Conference Reviewer** : RECOMB 2021/2022/2023/2024, ISMB/ECCB 2020/2021/2022, WABI 2021, ACM-BCB 2020/2022, APBC 2020, GLBIO 2024.
- **Journal Reviewer** : Heliyon, Biochemical Genetics.