Honglei Zhou

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EDUCATION

- **The University of Chicago** — Chicago, IL
  Master of Science, Computer Science — *June 2018*
- **Thomas Jefferson University** — Philadelphia, PA
  Doctor of Philosophy, Biochemistry and Molecular Biology — *July 2016*
- **Wuhan University** — Wuhan, China
  Bachelor of Science, Biology — *June 2010*

SKILLS

- Programming Languages: JavaScript, Python, Java, R, C/C++, PHP, HTML/CSS, CWL
- Databases: PostgresSQL, MySQL, MongoDB, MarkLogic DB
- DevOps/Cloud: AWS, OpenStack, Git, SVN, SaltStack, Docker, SLURM, cAdvisor/CollectD/STATSD/Graphite
- Distributed Computing and Storage: Hadoop, HBase, Redis

PROFESSIONAL EXPERIENCE

- **Jiangsu Province Hospital** — Nanjing, China
  Senior Software Engineer / Research Assistant Professor — *March 2021 – Present*

- **Web-based RNA sequencing data analysis service:** Implemented the backend analysis pipeline and seamlessly integrating it with the frontend UI.
  Tech stack used: R, Python, Flask, JavaScript, Vue.js
  - Implemented a standard analysis procedure for bulk RNA sequencing data, leveraging packages such as limma and Deseq2, and generating plots using ggplot2.
  - Integrated a standard procedure for single-cell sequencing data analysis, incorporating R packages Seurat and Monocle, along with the Python package Scanpy.
  - Designed and developed the frontend using JavaScript and the Vue.js framework.
  - Implemented a REST API to support backend microservices.
- **Automation of Bioinformatic Job Stack:** Implemented a resource monitoring system to assist in automatic resource and job allocations.
  Tech stack used: OpenStack, Docker, Python, cAdvisor, Graphite, etc.
  - Built a detailed monitoring stack that gathers runtime metrics at the container level using cAdvisor.
  - Centralized real-time metrics in PostgreSQL for both offline analysis and live detection, leveraging Graphite.
  - Designed predictive algorithms to estimate job runtime, facilitating automatic resource reallocation as needed.

- **Data analysis and research article writing:** Collaborated with researchers to uncover critical disease-related factors.
  - Conducted RNA-seq analysis to identify genes associated with Alzheimer's disease.
  - Analyzed scRNA-seq data to explore interactions between tumors and the microenvironment in PDAC.
  - Additional contributions and involvement.

- **MarkLogic Corporation** San Carlos, CA

Senior Software Engineer *May 2020 – January 2021*

- **AWS-based SaaS Service:** Developed an AWS Spot Fleet-based MarkLogic DB SaaS service.

Tech stack used: Python, AWS SDK, Atlassian

  - Optimized AWS CloudFormation Template to accommodate various use cases.
  - Developed internal tools named Watchdog to oversee dynamic network, computing resource, and data storage usage for Spot Fleet Clusters.
  - Collaborated with the team to tailor MarkLogic AWS-based SaaS for Electronic Arts Inc.

- **Bliss Motors, LLC** Chicago, IL

Full Stack Developer, Co-founder *September 2018 – April 2020*

- **Bliss Motors Web Frontend:** Developed the website frontend for both mobile devices and desktops with tailored functionalities using Vue.js.

Tech stack used: JavaScript, Vue.js, HTML/CSS

  - Integrated chatbot functionality into the mobile end, enabling users to directly engage with the AI bot.
  - Partially incorporated SuiteCRM into the website, facilitating the creation of leads and contacts in the CRM system when customers submit queries.
  - Integrated Stripe payment system into the web, allowing users to make online payments through mobile.
  - Incorporated customized email notifications into the web, streamlining the process for sales to receive and track individual queries submitted through the website.
  - Implemented customized registration and registration confirmation within the website, enabling users to register as customers or dealerships.
  - Integrated a customized career page, allowing job candidates to submit their applications directly.

- **Distributed Web Crawler:** Developed a distributed web crawler using the scrapy framework and scrapy-redis module.

Tech stack used: Python, scrapy, scrapy-redis, PostgreSQL, MongoDB, Redis, AWS

  - Deployed Redis in the master node for slave nodes to store and fetch requests, as well as items.
  - Utilized MongoDB to store crawled non-structured data.
  - Implemented an item process cluster to process items in Redis and persist them into the PostgreSQL database.
  - Automatically deployed clusters with Docker containers in the cloud.

- **Bliss Motors Backend Stack:** Developed the backend stack to support the website and internal messaging system.

Tech stack used: Python, Django, Django Rest-Framework, OAuth, Twilio, Ejabbered, PostgreSQL

  - Created a messaging system using Python.
  - Utilized the Twilio platform to build an SMS application.
  - Employed Django to construct a webhook for receiving SMS from customers and forwarding them to the Ejabbered server.
  - Used Ejabbered as a backend message server to deliver SMS to the internal app, with incoming messages automatically assigned to available sales/customer care team members based on a Round-robin algorithm.
  - Utilized PostgreSQL to store messages and customer information.

- **CD Genomics** Shirley, NY

Project Manager *January 2017 – July 2017*

- Organizing and facilitating telephone conferences with customers to discuss project techniques and solutions.
- Monitoring project progress, providing updates to customers, and addressing customer feedback.
- Coordinating efforts among scientists and engineers within the team, collaborating to estimate project costs, turnaround time, and risks.
- Collaborating with vendors to resolve technical problems.

PART-TIME AND INTERN EXPERIENCE

- **Paigo, Inc** San Francisco, CA

Senior Software engineer, part-time *December 2022 – July 2024*

- **Paigo Full Stack:** Dashboard feature implementation.

Tech stack used: Typescript, Next.js, AWS

- Implementing frontend dashboard features.
- Customizing and integrating AWS usage monitoring system for customers' SaaS.
- Testing and debugging the backend API implementation.

- **Paigo Backend API:** Designed and developed the Paigo backend customer service API.

Tech stack used: Typescript, Next.js

- Designed the Paigo REST API for the customer service backend.
- Developed and tested the backend API.

- **The University of Chicago, Department of Computer Science** Chicago, IL

Research Intern, Advisor: Prof. Haryadi Gunawi *June 2018 - July 2018*

- **JVM Garbage Collector Optimization:** Implemented MITTOS to enhance JVM garbage collector performance in tails.

Tech stack used: C++, Java

- Analyzed runtime performances of various JVM garbage collectors in distributed systems.
- Developed a new JVM garbage collector with the integration of MITTOS, targeting resource management and addressing EBUSY prediction.

- **The University of Chicago, Center for Translational Data Science** Chicago, IL

Practicum, Advisor: Prof. Robert Grossman *January 2018 – June 2018*

- **Bioinformatics Stack Monitoring System**

Tech stack used: Python, PostgresSQL, cAdvisor, STATSD, Graphite

- Extracted previous bioinformatics pipeline running metrics from PostgreSQL, cleaned up, analyzed, and plotted the data using Python and scientific packages such as NumPy, Pandas, and Matplotlib.
- Identified stragglers at each level in the system by analyzing the workflow and components of each step.
- Implemented a fine-grained monitoring stack that collects container-level runtime metrics with cAdvisor.
- Aggregated real-time metrics and stored them in PostgreSQL for offline analysis, as well as online detection with the help of STATSD/Graphite components.

PUBLICATION

*Indicates corresponding author

1. Ji W#, **Zhou H#**, Liang W#, Zhang W, Gong B, Yin T, Chu J, Zhuang J, Zhang J, Luo Y, Liu Y, Gao J, Yin Y. SSK1-Loaded Neurotransmitter-Derived Nanoparticles for Alzheimer's Disease Therapy via Clearance of Senescent Cells. Small. 2024 Mar
2. Lei Li, Yinjiao Fei, Tianfu Dong, Yuxin Song, Xiu Chen, Heda Zhang, **Honglei Zhou***, Mingxing Liang*, Jinhai Tang*,IFI30 as a key regulator of PDL1 immunotherapy prognosis in breast cancer, International Immunopharmacology, 2024 May
3. Shao X, Yang D, Shan L, Yan X, Xu D, Li L, Sun Y, Yu Q, **Zhou H***, Ding Y*, Tang J*. TH-4000, a hypoxia-activated pan-HER inhibitor, shows excellent preclinical efficacy for the treatment of $HER2^{+}$ breast cancer. Arch Toxicol. 2024 Jan
4. Gong B, Zhang W, Cong W, Gu Y, Ji W, Yin T, **Zhou H**, Hu H, Zhuang J, Luo Y, Liu Y, Gao J, Yin Y. Systemic Administration of Neurotransmitter-Derived Lipidoids-PROTACs-DNA Nanocomplex Promotes Tau Clearance and Cognitive Recovery for Alzheimer's Disease Therapy. Adv Healthc Mater. 2024 Jul
5. Wang DD, Jiang LH, Zhang J, Chen X, **Zhou HL**, Zhong SL, Zhang HD. Androgen receptor expression and clinical characteristics in breast cancer. World J Surg Oncol. 2024 Sep
6. Wenquan Chen, Hao Li, Dandan Wang, Sujin Yang, Junchen Hou, **Honglei Zhou**, Jinhai Tang, Jian Zhang,HJURP indicates poor prognosis of female breast cancer by promoting cell proliferation and migration,Genes & Diseases,2023 Oct
7. Shurui Xuan, Yuan Ma, **Honglei Zhou**, Shengwei Gu, Xin Yao, Xiaoning Zeng, The implication of dendritic cells in lung diseases: Immunological role of Toll-like receptor 4, Genes & Diseases,2023 Apr
8. Liang M, Fei Y, Wang Y, Chen W, Liu Z, Xu D, Shen H, **Zhou H***, Tang J*. Integrative analysis of the role of *BOLA2B* in human pan-cancer. Front Genet. 2023 Feb
9. Yang K, Wang YL, Zhu Z, Cao XH, Liang MX, Xu D, Fei YJ, Yang SY, **Zhou HL**, Tang JH. CBX3 promotes breast cancer progression and high level of CBX3 predicts poor prognosis in patients. Neoplasma. 2023 Feb
10. Fang Z, Shen HY, Xu Q, **Zhou HL**, Li L, Yang SY, Zhu Z, Tang JH. PUS1 is a novel biomarker for predicting poor outcomes and triple-negative status in breast cancer. Front Oncol. 2022 Nov
11. Mogilyansky E, Clark P, Quann K, **Zhou H**, Londin E, Jing Y, Rigoutsos I. Post-transcriptional Regulation of BRCA2 through Interactions with miR-19a and miR-19b. Front Genet. 2016 Aug
12. **Zhou H**, Telonis AG, Jing Y, Xia NL, Biederman L, Jimbo M, Blanco F, Londin E, Brody JR, Rigoutsos I. GPRC5A is a potential oncogene in pancreatic ductal adenocarcinoma cells that is upregulated by gemcitabine with help from HuR. Cell Death Dis. 2016 Jul
13. **Zhou H**, Rigoutsos I. MiR-103a-3p targets the 5' UTR of GPRC5A in pancreatic cells. RNA. 2014 Sep.