

Liang-Bo Wang

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Computational biologist proficient in multi-omics/single-cell analysis and tool/pipeline development

EDUCATION

Washington University in St. Louis Ph.D. in Computational and Systems Biology	St. Louis, USA 2016–2021
National Taiwan University M.S. in Biomedical Electronics and Bioinformatics B.S. in Electrical Engineering and minor in Economics	Taipei, Taiwan 2014–2016 2009–2014

EXPERIENCE

Scientist, Oncology Bioinformatics Moderna	Cambridge, USA Apr 2023–Present
<ul style="list-style-type: none">• Led integration of diverse tools and algorithms for mutation calling, gene expression quantification, neoantigen prediction, tumor purity assessment, and HLA typing to advance personalized cancer vaccine development (Individualized Neoantigen Therapy; INT)• Collaborated closely with engineering team to develop and validate end-to-end Nextflow pipeline for personalized cancer vaccine design, meeting critical timelines for regulatory review• Led implementation of key NGS quality control metrics in cancer vaccine related bioinformatic pipelines to meet compliance with regulatory agencies and internal performance evaluation• Developed standardized data processing and benchmarking criteria to evaluate 4+ NGS sequencing workflows and vendors, enhancing INT program capabilities• Managed CRO team of 5 members, coordinating data analysis efforts and overseeing method evaluation and pipeline development to support INT initiatives	
Mandatory National Service Substitute Services Drafter	Taipei, Taiwan Mar 2022–Mar 2023
Washington University in St. Louis PhD Research, Li Ding Lab	St. Louis, USA Sep 2016–Dec 2021
<ul style="list-style-type: none">• Collaborated with leading cancer research communities including The Cancer Genome Atlas (TCGA), Clinical Proteogenomic Tumor Analysis Consortium (CPTAC), and Human Tumor Atlas Network (HTAN)• Led the data analysis team of CPTAC glioblastoma study, coordinating efforts across multiple institution, to identify different patient stratifications and druggable targets in signaling pathways using multi-omics analysis with multiplexed mass spectrometry and bulk genomics• Investigated tumor heterogeneity and microenvironment using single cell sequencing, spatial transcriptomics and multiplexed imaging (Hyperion, CODEX)• Developed tools, processing pipelines, and databases (PTMcosmos, CharGer) to analyze multi-modal datasets• Conducted quality control analysis on different versions of the mutation calling pipeline on the NCI Genomics Data Commons, a platform hosting and reprocessing data of multiple cancer genome programs	
Open Source Software Contributor	Online 2015–Present
<ul style="list-style-type: none">• Contributed to the development of open source tools and projects including conda-forge, bioconda, and cyvcf2• Demonstrated proficiency in the software development workflow, including testing, packaging, CI/CD, issue triaging, and documentation	
Pinkoi Internship on search improvement	Taipei, Taiwan Summer 2015
<ul style="list-style-type: none">• Enhanced the search functionality on Pinkoi, Asia's leading online marketplace for original design goods• Investigated various Mandarin/Chinese text segmentation methods in ElasticSearch	

- Developed a product recommendation system when user's search query failed to match any exact product by implementing a Word2Vec-based semantic search

Microsoft Research Asia

Beijing, China

Research Internship, Eric Chang Group

2014–2015

- Investigated the use of deep learning for histopathology image and pathway analysis in the brain and colon cancer
- Achieved highly accurate histopathology image classification and segmentation using convolutional neural network (CNN) based models
- Analyzed the CNN activation features and discovered that the model was able to accurately identify key morphological features and ignore irrelevant background noise as identified by pathologists

National Taiwan University

Taipei, Taiwan

Master's Research, Eric Y. Chuang Lab

2014–2016

- Developed a cloud platform to process and analyze sequencing data, including a web portal, a data processing job queue scheduler, and a database to track data and visualize results

SKILLS

Programming languages: Python (general purpose), R (data analysis, statistics, visualization), SQL

Analysis tools: (bio)conda, Nextflow, Snakemake, tidyverse, Bioconductor genomics-related tool stack

Databases: PostgreSQL, SQLite, DuckDB

Tool development: Python packaging (pytest, Sphinx), GitHub Actions/Workflow

Cloud/HPC computing: AWS, GCP, Azure, Docker

Web development: Django, Flask, basic frontend knowledge

LEADERSHIP EXPERIENCE

Tech communities

2013–Present

Speaker at PyCon APAC & Taiwan & China and Taiwan & China R conferences, Taipei Bioinformatics Omnibus and other R and Python local meetups

- Presented technical topics including Snakemake, genomic analysis, visualization, text search, statistics, convolutional neural network, HDF5, and parallel computing
- Past presentations available at blog.liang2.tw/talks

PyCon Taiwan

2016

Program Committee Chair

- Oversaw a team of 11 volunteers
- Coordinated the main theme and agenda planning of the 3-day conference with 50 talks and 700+ attendees
- Headed the talk proposal review process and keynote speaker invitations
- Introduced a new double blind multi-stage peer review system

PyCon APAC

2015

Public Relations Manager

Taiwan R User Group

2013–2016

Organizer and Host

SCHOLARSHIPS & AWARDS

- 1st place in Three-Minute Thesis competition at McDonnell Academy 2021
- McDonnell International Scholars Academy, WUSTL 2016–2021
- Taiwan Ministry of Education WUSTL Scholarship 2016–2021
- Outstanding Summer Research Award, Center of Genomic Medicine, NTU 2012

PUBLICATIONS

1. Liu, J. *et al.* Multi-scale signaling and tumor evolution in high-grade gliomas. *Cancer cell* 42, 1217–1238.e19. doi:10.1016/j.ccell.2024.06.004 (2024).
2. Geffen, Y. *et al.* Pan-cancer analysis of post-translational modifications reveals shared patterns of protein regulation. *Cell* 186, 3945–3967.e26. doi:10.1016/j.cell.2023.07.013 (2023).
3. Li, Y. *et al.* Proteogenomic data and resources for pan-cancer analysis. *Cancer cell* 41, 1397–1406. doi:10.1016/j.ccell.2023.06.009 (2023).
4. Cui Zhou, D. *et al.* Spatially restricted drivers and transitional cell populations cooperate with the microenvironment in untreated and chemo-resistant pancreatic cancer. *Nature genetics* 54, 1390–1405. doi:10.1038/s41588-022-01157-1 (2022).
5. Storrs, E. P. *et al.* Pollock: fishing for cell states. *Bioinformatics advances* 2, vbac028. doi:10.1093/bioadv/vbac028 (2022).
6. Huang, K.-l. *et al.* Spatially interacting phosphorylation sites and mutations in cancer. *Nature communications* 12, 2313. doi:10.1038/s41467-021-22481-w (2021).
7. **Wang, L.-B.** *et al.* Proteogenomic and metabolomic characterization of human glioblastoma. *Cancer cell* 39, 509–528.e20. doi:10.1016/j.ccell.2021.01.006 (2021).
8. Bailey, M. H. *et al.* Retrospective evaluation of whole exome and genome mutation calls in 746 cancer samples. *Nature communications* 11, 4748. doi:10.1038/s41467-020-18151-y (2020).
9. Dou, Y. *et al.* Proteogenomic characterization of endometrial carcinoma. *Cell* 180, 729–748.e26. doi:10.1016/j.cell.2020.01.026 (2020).
10. Gillette, M. A. *et al.* Proteogenomic characterization reveals therapeutic vulnerabilities in lung adenocarcinoma. *Cell* 182, 200–225.e35. doi:10.1016/j.cell.2020.06.013 (2020).
11. McDermott, J. E. *et al.* Proteogenomic characterization of ovarian HGSC implicates mitotic kinases, replication stress in observed chromosomal instability. *Cell reports medicine* 1, 100004. doi:10.1016/j.xcrm.2020.100004 (2020).
12. Petralia, F. *et al.* Integrated proteogenomic characterization across major histological types of pediatric brain cancer. *Cell* 183, 1962–1985.e31. doi:10.1016/j.cell.2020.10.044 (2020).
13. Rozenblatt-Rosen, O. *et al.* The Human Tumor Atlas Network: charting tumor transitions across space and time at single-cell resolution. *Cell* 181, 236–249. doi:10.1016/j.cell.2020.03.053 (2020).
14. Clark, D. J. *et al.* Integrated proteogenomic characterization of clear cell renal cell carcinoma. *Cell* 179, 964–983.e31. doi:10.1016/j.cell.2019.10.007 (2019).
15. Gao, G. F. *et al.* Before and after: comparison of legacy and harmonized TCGA genomic data commons' data. *Cell systems* 9, 24–34.e10. doi:10.1016/j.cels.2019.06.006 (2019). (*co-first author*).
16. Grüning, B., Dale, R., Sjödin, A., Chapman, B. A., Rowe, J., Tomkins-Tinch, C. H., Valieris, R., Köster, J. & **The Bioconda Team**. Bioconda: sustainable and comprehensive software distribution for the life sciences. *Nature methods* 15, 475–476. doi:10.1038/s41592-018-0046-7 (2018).
17. Huang, K.-l. *et al.* Pathogenic germline variants in 10,389 adult cancers. *Cell* 173, 355–370.e14. doi:10.1016/j.cell.2018.03.039 (2018).
18. Sun, S. Q., Mashl, R. J., Sengupta, S., Scott, A. D., Wang, W., Batra, P., **Wang, L.-B.**, Wyczalkowski, M. A. & Ding, L. Database of evidence for precision oncology portal. *Bioinformatics* 34, 4315–4317. doi:10.1093/bioinformatics/bty531 (2018).
19. Lai, Y.-P. ^{*}, **Wang, L.-B.** ^{*}, Wang, W.-A. ^{*}, Lai, L.-C., Tsai, M.-H., Lu, T.-P. & Chuang, E. Y. iGC—an integrated analysis package of gene expression and copy number alteration. *BMC bioinformatics* 18, 35. doi:10.1186/s12859-016-1438-2 (2017).
20. Xu, Y., Jia, Z., **Wang, L.-B.**, Ai, Y., Zhang, F., Lai, M. & Chang, E. I.-C. Large scale tissue histopathology image classification, segmentation, and visualization via deep convolutional activation features. *BMC bioinformatics* 18, 281. doi:10.1186/s12859-017-1685-x (2017).
21. **Wang, L.-B.**, Chuang, E. Y. & Lu, T.-P. Identification of predictive biomarkers for ZD-6474 in lung cancer. *Translational cancer research* 4, 324–331. doi:10.3978/j.issn.2218-676X.2015.08.10 (2015).
22. Lee, C.-Y. ^{*}, Chiu, Y.-C. ^{*}, **Wang, L.-B.** ^{*}, Kuo, Y.-L. ^{*}, Chuang, E. Y., Lai, L.-C. & Tsai, M.-H. Common applications of next-generation sequencing technologies in genomic research. *Translational cancer research* 2, 33–45. doi:10.3978/j.issn.2218-676X.2013.02.09 (2013).

23. Sun, C.-T., Lin, Y.-C., Hsieh, C.-J., Liou, J.-C., **Wang, L.-B.** & Tian, W.-C. *A linear-response CMOS-MEMS capacitive tactile sensor* in. 2012 IEEE SENSORS (2012), 1–4. doi:10.1109/ICSENS.2012.6411545.