

# Wen-Wei Liang, Ph.D.

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Molecular geneticist and computational biologist aiming to unravel the epigenetic mechanisms governing tumor progression through integrated experimental and computational approaches.

## EDUCATION

Washington University in St. Louis	Ph.D. in Molecular Genetics and Genomics	2014–2020
National Yang-Ming University, Taiwan	M.S. in Microbiology and Immunology	2009–2011
National Tsing-Hua University, Taiwan	B.S. in Life Science	2005–2009

## EXPERIENCE

New York Genome Center & New York University	New York, NY
Postdoctoral research associate, Laboratory of Neville Sanjana	2021–Present
Washington University in St. Louis	St. Louis, MO
Postdoctoral research associate, Laboratory of Li Ding	2020–2021

## PUBLICATIONS

### First authorship (\* Equal contribution)

1. **Liang, W.-W.** \*, Müller, S. \*, Hart, S. K., Wessels, H.-H., Méndez-Mancilla, A., Sookdeo, A., Choi, O., Caragine, C. M., Corman, A., Lu, L., Kolumba, O., Williams, B. & Sanjana, N. E. Transcriptome-scale RNA-targeting CRISPR screens reveal essential lncRNAs in human cells. *Cell* 0 (2024).
2. **Liang, W.-W.**, Wendl, M. C., Wyczalkowski, M. A., Chen, F. & Ding, L. Emerging roles of epigenetic drivers in regulating cancer transitions. *Invited at Nature Reviews Genetics* (2024).
3. **Liang, W.-W.**, Lu, R. J.-H., Jayasinghe, R. G., Foltz, S. M., Porta-Pardo, E., Geffen, Y., Wendl, M. C., Lazcano, R., Kolodziejczak, I., Song, Y., Govindan, A., Demicco, E. G., Li, X., Li, Y., Sethuraman, S., Payne, S. H., Fenyö, D., Rodriguez, H., Wiznerowicz, M., Shen, H., Mani, D. R., Rodland, K. D., Lazar, A. J., Robles, A. I., Ding, L. & Clinical Proteomic Tumor Analysis Consortium. Integrative multi-omic cancer profiling reveals DNA methylation patterns associated with therapeutic vulnerability and cell-of-origin. *Cancer Cell* 41, 1567–1585.e7 (2023). (*Featured in The Scientist magazine*).
4. Terekhanova, N. V. \*, Karpova, A. \*, **Liang, W.-W.** \*, Strzalkowski, A., Chen, S., Li, Y., Southard-Smith, A. N., Iglesia, M. D., Wendl, M. C., Jayasinghe, R. G., Liu, J., Song, Y., Cao, S., Houston, A., Liu, X., Wyczalkowski, M. A., Lu, R. J.-H., Caravan, W., Shinkle, A., Naser Al Deen, N., Herndon, J. M., Mudd, J., Ma, C., Sarkar, H., Sato, K., Ibrahim, O. M., Mo, C.-K., Chasnoff, S. E., Porta-Pardo, E., Held, J. M., Pachynski, R., Schwarz, J. K., Gillanders, W. E., Kim, A. H., Vij, R., *et al.* Epigenetic regulation during cancer transitions across 11 tumour types. *Nature* 623, 432–441 (2023). (*Spotlighted in Nature Genetics and Trends in Genetics*).
5. Gao, Q. \*, **Liang, W.-W.** \*, Foltz, S. M. \*, Mutharasu, G., Jayasinghe, R. G., Cao, S., Liao, W.-W., Reynolds, S. M., Wyczalkowski, M. A., Yao, L., Yu, L., Sun, S. Q., Fusion Analysis Working Group, Cancer Genome Atlas Research Network, Chen, K., Lazar, A. J., Fields, R. C., Wendl, M. C., Van Tine, B. A., Vij, R., Chen, F., Nykter, M., Shmulevich, I. & Ding, L. Driver fusions and their implications in the development and treatment of human cancers. *Cell Rep.* 23, 227–238.e3 (2018). (*Best of Cell Reports 2018*).
6. **Liang, W.-W.** & Cheng, S.-C. A novel mechanism for Prp5 function in prespliceosome formation and proofreading the branch site sequence. *Genes Dev.* 29, 81–93 (2015).

## Co-authorship (\*, + Equal contribution)

7. Li, Y. \*, Dou, Y. \*, Da Veiga Leprevost, F. \*, Geffen, Y. \*, Calinawan, A. P. \*, Aguet, F., Akiyama, Y., Anand, S., Birger, C., Cao, S., Chaudhary, R., Chilappagari, P., Cieslik, M., Colaprico, A., Zhou, D. C., Day, C., Domagalski, M. J., Esai Selvan, M., Fenyő, D., Foltz, S. M., Francis, A., Gonzalez-Robles, T., Gümüş, Z. H., Heiman, D., Holck, M., Hong, R., Hu, Y., Jaehnig, E. J., Ji, J., Jiang, W., Katsnelson, L., Ketchum, K. A., Klein, R. J., Lei, J. T., **Liang, W.-W.**, *et al.* Proteogenomic data and resources for pan-cancer analysis. *Cancer Cell* 41, 1397–1406 (2023).
8. Li, Y. \*, Porta-Pardo, E. \*, Tokheim, C. \*, Bailey, M. H. \*, Yaron, T. M. \*, Stathias, V. +, Geffen, Y. +, Imbach, K. J. +, Cao, S. +, Anand, S., Akiyama, Y., Liu, W., Wyczalkowski, M. A., Song, Y., Storrs, E. P., Wendl, M. C., Zhang, W., Sibai, M., Ruiz-Serra, V., **Liang, W.-W.**, Terekhanova, N. V., Rodrigues, F. M., Clauser, K. R., Heiman, D. I., Zhang, Q., Aguet, F., Calinawan, A. P., Dhanasekaran, S. M., Birger, C., Satpathy, S., Zhou, D. C., Wang, L.-B., Baral, J., Johnson, J. L., Huntsman, E. M., *et al.* Pan-cancer proteogenomics connects oncogenic drivers to functional states. *Cell* 186, 3921–3944.e25 (2023).
9. Carrot-Zhang, J. \*, Yao, X. \*, Devarakonda, S. \*, Deshpande, A., Damrauer, J. S., Silva, T. C., Wong, C. K., Choi, H. Y., Felau, I., Robertson, A. G., Castro, M. A. A., Bao, L., Rheinbay, E., Liu, E. M., Trieu, T., Haan, D., Yau, C., Hinoue, T., Liu, Y., Shapira, O., Kumar, K., Mungall, K. L., Zhang, H., Lee, J. J.-K., Berger, A., Gao, G. F., Zhitomirsky, B., **Liang, W.-W.**, Zhou, M., Moorthi, S., Berger, A. H., Collisson, E. A., Zody, M. C., Ding, L., Cherniack, A. D., *et al.* Whole-genome characterization of lung adenocarcinomas lacking the RTK/RAS/RAF pathway. *Cell Rep.* 34, 108707 (2021).
10. Huang, C. \*, Chen, L. \*, Savage, S. R. \*, Egue, R. V., Dou, Y., Li, Y., da Veiga Leprevost, F., Jaehnig, E. J., Lei, J. T., Wen, B., Schnaubelt, M., Krug, K., Song, X., Ciešlik, M., Chang, H.-Y., Wyczalkowski, M. A., Li, K., Colaprico, A., Li, Q. K., Clark, D. J., Hu, Y., Cao, L., Pan, J., Wang, Y., Cho, K.-C., Shi, Z., Liao, Y., Jiang, W., Anurag, M., Ji, J., Yoo, S., Zhou, D. C., **Liang, W.-W.**, Wendl, M., Vats, P., *et al.* Proteogenomic insights into the biology and treatment of HPV-negative head and neck squamous cell carcinoma. *Cancer Cell* 39, 361–379.e16 (2021).
11. Wang, L.-B. \*, Karpova, A. \*, Gritsenko, M. A. \*, Kyle, J. E. \*, Cao, S. \*, Li, Y. \*, Rykunov, D. +, Colaprico, A. +, Rothstein, J. H. +, Hong, R. +, Stathias, V. +, Cornwell, M. +, Petralia, F. +, Wu, Y., Reva, B., Krug, K., Pugliese, P., Kawaler, E., Olsen, L. K., **Liang, W.-W.**, Song, X., Dou, Y., Wendl, M. C., Caravan, W., Liu, W., Cui Zhou, D., Ji, J., Tsai, C.-F., Petyuk, V. A., Moon, J., Ma, W., Chu, R. K., Weitz, K. K., Moore, R. J., Monroe, M. E., *et al.* Proteogenomic and metabolomic characterization of human glioblastoma. *Cancer Cell* (2021).
12. Bailey, M. H., Meyerson, W. U., Dursi, L. J., Wang, L.-B., Dong, G., **Liang, W.-W.**, Weerasinghe, A., Li, S., Kelso, S., MC3 Working Group, PCAWG novel somatic mutation calling methods working group, Saksena, G., Ellrott, K., Wendl, M. C., Wheeler, D. A., Getz, G., Simpson, J. T., Gerstein, M. B., Ding, L. & PCAWG Consortium. Retrospective evaluation of whole exome and genome mutation calls in 746 cancer samples. *Nat. Commun.* 11, 4748 (2020).
13. Gillette, M. A. \*, Satpathy, S. \*, Cao, S. +, Dhanasekaran, S. M. +, Vasaikar, S. V. +, Krug, K. +, Petralia, F. +, Li, Y., **Liang, W.-W.**, Reva, B., Krek, A., Ji, J., Song, X., Liu, W., Hong, R., Yao, L., Blumenberg, L., Savage, S. R., Wendl, M. C., Wen, B., Li, K., Tang, L. C., MacMullan, M. A., Avanesian, S. C., Kane, M. H., Newton, C. J., Cornwell, M., Kothadia, R. B., Ma, W., Yoo, S., Mannan, R., Vats, P., Kumar-Sinha, C., Kawaler, E. A., Omelchenko, T., *et al.* Proteogenomic characterization reveals therapeutic vulnerabilities in lung adenocarcinoma. *Cell* 182, 200–225.e35 (2020).
14. Cao, S., Wylie, K. M., Wyczalkowski, M. A., Karpova, A., Ley, J., Sun, S., Mashl, R. J., **Liang, W.-W.**, Wang, X., Johnson, K., DiPersio, J. F., Gay, H., Ratner, L., Chen, F., Adkins, D. R. & Ding, L. Dynamic host immune response in virus-associated cancers. *Commun Biol* 2, 109 (2019).

15. Bailey, M. H. \*, Tokheim, C. \*, Porta-Pardo, E. \*, Sengupta, S., Bertrand, D., Weerasinghe, A., Colaprico, A., Wendl, M. C., Kim, J., Reardon, B., Ng, P. K.-S., Jeong, K. J., Cao, S., Wang, Z., Gao, J., Gao, Q., Wang, F., Liu, E. M., Mularoni, L., Rubio-Perez, C., Nagarajan, N., Cortés-Ciriano, I., Zhou, D. C., **Liang, W.-W.**, Hess, J. M., Yellapantula, V. D., Tamborero, D., Gonzalez-Perez, A., Suphavitai, C., Ko, J. Y., Khurana, E., Park, P. J., Van Allen, E. M., Liang, H., MC3 Working Group, *et al.* Comprehensive characterization of cancer driver genes and mutations. *Cell* 173, 371–385.e18 (2018).
16. Jayasinghe, R. G. \*, Cao, S. \*, Gao, Q., Wendl, M. C., Vo, N. S., Reynolds, S. M., Zhao, Y., Climente-González, H., Chai, S., Wang, F., Varghese, R., Huang, M., **Liang, W.-W.**, Wyczalkowski, M. A., Sengupta, S., Li, Z., Payne, S. H., Fenyő, D., Miner, J. H., Walter, M. J., Cancer Genome Atlas Research Network, Vincent, B., Eyraes, E., Chen, K., Shmulevich, I., Chen, F. & Ding, L. Systematic analysis of splice-site-creating mutations in cancer. *Cell Rep.* 23, 270–281.e3 (2018).
17. Sanchez-Vega, F. \*, Mina, M. \*, Armenia, J. \*, Chatila, W. K., Luna, A., La, K. C., Dimitriadou, S., Liu, D. L., Kantheti, H. S., Saghafeina, S., Chakravarty, D., Daian, F., Gao, Q., Bailey, M. H., **Liang, W.-W.**, Foltz, S. M., Shmulevich, I., Ding, L., Heins, Z., Ochoa, A., Gross, B., Gao, J., Zhang, H., Kundra, R., Kandath, C., Bahceci, I., Dervishi, L., Dogrusoz, U., Zhou, W., Shen, H., Laird, P. W., Way, G. P., Greene, C. S., Liang, H., Xiao, Y., *et al.* Oncogenic signaling pathways in the cancer genome atlas. *Cell* 173, 321–337.e10 (2018).
18. Foltz, S. M., **Liang, W.-W.**, Xie, M. & Ding, L. MIRMMR: binary classification of microsatellite instability using methylation and mutations. *Bioinformatics* 33, 3799–3801 (2017).
19. Niu, B., Scott, A. D. \*, Sengupta, S. \*, Bailey, M. H., Batra, P., Ning, J., Wyczalkowski, M. A., **Liang, W.-W.**, Zhang, Q., McLellan, M. D., Sun, S. Q., Tripathi, P., Lou, C., Ye, K., Mashl, R. J., Wallis, J., Wendl, M. C., Chen, F. & Ding, L. Protein-structure-guided discovery of functional mutations across 19 cancer types. *Nat. Genet.* 48, 827–837 (2016).

## RESEARCH PROJECTS

### New York Genome Center & New York University

New York, NY

Postdoctoral research associate, Laboratory of Neville Sanjana

2021–Present

- **Transcriptome-scale RNA-targeting CRISPR screens reveal essential lncRNAs in human cells:** Conducted Cas13 pooled screens and perturbation assays, coupled with single-cell RNA sequencing, to identify and characterize hundreds of lncRNAs crucial for cell proliferation and their mechanistic roles.
- **Targeting onco-lncRNAs as a strategy against cancer:** Conducted integrative bioinformatic analyses alongside *in vitro* and *in vivo* pooled screens to identify lncRNAs driving tumor progression in BRCA xenograft and organoid models.

### Washington University in St. Louis

St. Louis, MO

Ph.D. student and postdoctoral research associate, Laboratory of Li Ding

2015–2021

- **Epigenetic regulation during cancer transitions across 11 tumour types:** Utilized snATAC sequencing, single-cell RNA sequencing, and bulk whole-exome sequencing data of 206 samples across 11 cancer types from the Human Tumor Atlas Network (HTAN) to profile over a million cells or nuclei. Identified cancer-specific accessible region dynamics correlating with gene expression, uncovering novel regulatory regions and their target genes.
- **Integrative multi-omic cancer profiling reveals DNA methylation patterns associated with therapeutic vulnerability and cell-of-origin:** Leveraged DNA methylation, RNA sequencing, and proteomic data of 687 samples across 7 cancer types from the Clinical Proteogenomic Tumor Analysis Consortium (CPTAC) to elucidate how epigenetic changes in cancer cells influence gene expression, protein levels, tumor characteristics, and therapeutic responses.
- **Driver fusions and their implications in the development and treatment of human cancers:** Conducted comprehensive analysis of gene fusions in over 9,000 tumors across 33 cancer types from The Cancer Genome Atlas (TCGA), uncovering how these fusions drive the expression of oncogenes, tumor suppressor genes, and kinases. Identified druggable fusions in 6.0% of cases, highlighting their potential as targets for precision therapies.

## Academia Sinica

Master's student and research assistant, Laboratory of Soo-Chen Cheng

Taipei, Taiwan

2009–2014

- **A novel mechanism for Prp5 function in prespliceosome formation and proofreading the branch site sequence:**  
Identified the role of Prp5 in spliceosome assembly and branch site proofreading, showing how Prp5's interactions with U2 snRNA and subsequent release facilitate accurate spliceosome assembly.

## National Tsing-Hua University

Undergraduate student, Laboratory of Chung-Yu Lan

Hsinchu, Taiwan

2008–2009

- Investigated the reactions of the iron-responsive element under virulence gene expression in *Candida albicans*.

## Linköping University

Visiting student, Laboratory of Jordi Altimiras

Linköping, Sweden

2007–2008

- Analyzed G-protein coupled receptor-dependent contractility in chicken heart tissue.

## SELECTED TALKS

Transcriptome-scale RNA-targeting CRISPR screens reveal essential lncRNAs in human cells

**CSHL Meeting: The Biology of Genomes**

Cold Spring Harbor Laboratory, NY, 2024

**NYC RNA Symposium**

Rockefeller University, NY, 2024

**The MacMillan Center for the Study of the Non-Coding Cancer Genome**

New York Genome Center, NY, 2024

Multimic profiling reveals tumorigenic DNA methylation associated with therapeutic vulnerability and cell-of-origin

**The CPTAC Annual Scientific Symposium**

Virtual, 2021

**The CPTAC Site Visit – NYU-WU-BYU PGDAC**

New York University, NY, 2019

A novel mechanism for Prp5 function in prespliceosome formation and proofreading the branch site sequence

**CSHL Meeting: Eukaryotic mRNA Processing**

Cold Spring Harbor Laboratory, NY, 2013

**Taiwan Yeast Meeting**

Taiwan, 2013

## FELLOWSHIPS

Taiwan Ministry of Education - Washington University in St. Louis Fellow (\$732,000)

2014–2018

Washington University in St. Louis Precision Medicine Pathway Fellow (\$5,000)

2015–2016

Taiwan Ministry of Education Fellowship to Study Abroad (\$10,000)

2007–2008

## HONORS & AWARDS

- Best of *Cell Reports* 2018
- Outstanding Merit Research Award National Yang-Ming University 2011
- Dean's List, Department of Life Science, National Tsing-Hua University 2007
- Outstanding student from Low-income, Lu Feng-Zhang Memorial Scholarship 2006

## TEACHING & MENTORING

**Simons foundation-NYU biology summer undergraduate research program, New York, NY**

Mentored underrepresented student on a project focused on identifying long noncoding RNAs essential for macrophage differentiation and polarization using *in vitro* CRISPR pooled screening.

- **Sebastián H. Díaz-Rodríguez**, Undergraduate at University of Puerto Rico-Río Piedras Summer 2024  
Current - Undergraduate, NIH-funded Research Initiative for Scientific Enhancement (RISE) scholar

**Laboratory of Neville Sanjana, New York University, New York, NY**

- **Breanna Williams**, Master's student, Recipient of the Wasserman Center Internship Grant 2022–2023  
Current - Research technician at Memorial Sloan Kettering Cancer Center
- **Olivia Choi**, Undergraduate, Recipient of the NYU Dean's Undergraduate Research Fund 2022–2024  
Current - Ph.D. student at Johns Hopkins University

## Laboratory of Li Ding, Washington University in St. Louis, St. Louis, MO

- **Carolyn Lou**, Undergraduate 2015–2017  
Current - Associate Director at Pfizer Biostatistics
- **Terrence Tsou**, Undergraduate 2017–2019  
Current - Medical student at John Hopkins University
- **Rita Jui-Hsien Lu**, Research technician 2019–2020  
Current - Senior bioinformatician at Mount Sinai medical school

## Department of Biology, Washington University in St. Louis, St. Louis, MO

Spring 2016

Delivered lectures, provided assistance in molecular biology experiments, and assessed student performance as a teaching assistant in the Microbiology Laboratory course (Biol 3491) for over 30 undergraduate students.

## SERVICE & OUTREACH

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### Postdoc Seminar Series, New York Genome Center, New York, NY

2021–Present

Organized monthly seminars featuring presentations by postdoctoral researchers.

### Café Philo at NY, New York, NY

2024

Delivered a talk introducing the human genome and genome editing to a general audience of over 30 participants.

### Biology Club, Rutgers University-Camden, Camden, NJ

2022

Participated as a panelist to discuss career development opportunities in science and technology with over 20 students.

### Midwest Taiwanese Biotechnology Association, Chicago, IL

2017–2021

Co-founded the association, served in various leadership roles including Finance (2018), Promotion (2019), and President (2021), and organized events to foster dialogue among more than 300 young scientists across Midwest cities.

### Institute of Molecular Biology, Academia Sinica, Taiwan

2014–2018

Served as a panelist to discuss the process of applying for PhD programs in the United States with over 20 undergraduates.

## REFERENCES

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### Dr. Li Ding (Ph.D. mentor)

Distinguished Professor  
Department of Medicine and Genetics  
Washington University in St. Louis  
lding@wustl.edu

### Dr. Neville Sanjana (Postdoctoral mentor)

Associate Professor  
Department of Biology  
New York Genome Center and New York University  
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### Dr. Ben Raphael (Collaborator)

Professor  
Department of Computer Science  
Princeton University  
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