柳 媛 **Yuan Liu, Ph.D.**
Bioinformatician
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Education

Sichuan University (SCU); University of California, San Diego (UCSD); Sanford-Burnham-Prebys (SBP)

Ph.D. | 2018-2019
UCSD SBP Medical Discovery Institute, San Diego, CA-Jointly trained PhD student
Program: Bioengineering-Bioinformatics-Genetic data analysis, Supervisors: Prof. Crystal Zhao)

Ph.D. | 2015-2020
College of chemistry, SCU,
SCU "Project 3+2+3" High-Level Talent Training Scheme,
Field: Analytical Chemistry-Bioinformatics / Chemometrics
Supervisor: Prof. Menglong Li

Bachelor of Arts | 2013-2015
College of foreign languages, SCU, English literature

Bachelor of Science | 2011-2015
College of chemistry, SCU, Chemistry Excellence Class (National Base Class)

Skills

Computational/ AI: End-to-end pipeline engineering experience (QC - analysis - visualization) across multi-omics (NGS / single-cell / immune profiling) and spectroscopy-based biomedical data. Strong Python/R /Shell; experienced with Linux/Mac/Windows HPC environments, version control, cloud, containers, and workflow automation. Extensive experience on classical machine learning (ML) framework applying deep learning architectures- DNN, RNN, CNN, GANs, LSTM - and AI learning paradigms including Transfer Learning, Active Learning, and lifelong learning. Skilled with large language model (LLM) applications and evaluation.

Wet lab / technology platforms: molecular biology workflows, high-throughput library construction, Illumina sequencing, and robotic automation (Eppendorf liquid handlers).

Career Objective

I am a bioinformatician integrating bioinformatics, chemometrics, and machine learning to solve high-value problems in human disease. My focus is to develop scalable algorithms and sequencing-based platforms to translate multi-omics signals (genomics/proteomics/spectral signatures) into clinically actionable biomarkers for cancer, neurodegeneration and immunotherapy. With 10+ years spanning academia, U.S. Food and Drug Administration (FDA)-led toxicology efforts, National Institutes of Health (NIH)-supported drug development and UCSD translational research, my goal is to lead an independent research program that bridges dry-lab computation with wet-lab validation-turning biological signal into precision diagnostics and therapeutic decision support.

Employment

2021.8- UCSD, Center of precision genomics/ Bioengineering
USA-NIH F32 Postdoc Fellow/Bioinformatician

Protein-protein interaction (PPI) mapping: A novel *in vivo* experimental platform that converts PPIs into DNA sequence readouts, enabling high-throughput identification of millions of interactions by sequencing-based library analysis.

Alzheimer's diseases research (ADRC): Led an AD project with >1,500 plasma /serum/CSF samples; robot-automated library construction, optimized low-input sequencing protocols, and developed the analysis pipeline with 7 machine learning (ML) models to identify hub regions and assess low-input quantification feasibility.

2023.12- San Diego, GENEMO Inc. **Principal Scientist/Consultant**

Diagnostics system: Leading translational biomarker development using patented ultra-low-input exRNA (SILVER-seq) toward CLIA-compatible liquid biopsy diagnostics for early AD-including scientific design and NIH SBIR application.

2025.1- San Diego, Neurospan LLC. **Consultant**

Drug development: AI-driven small-molecule prioritization for early symptom alleviation in AD; current program (NCT503) is under IND application.

2021.1-2021.8 HUIYU SEACROSS Pharm. *Inc.* #:688553 (SHA)
Senior Scientist (Co-Manager of Bioinformatics division)

Small Molecular and Antibody Study: Drove antibody & small-molecule therapeutic informatics, enabling two candidates to enter clinical translation -including HYP-2090PTSA (world's first dual KRAS-G12C/PI3K inhibitor) and a PD-1 + TIGIT + IL-15/IL-15Rα macromolecule antibody with Investigational New Drug (IND) approval.

2020.11-2021.1 **Senior Researcher, Bioinformatics division**

Pipeline development: establishing sequencing pipelines (Ig-seq / BCR-TCR / LIBRA-seq / Rep-seq / single-cell) and immunogenicity / neoepitope prediction workflows for mRNA vaccine construct design.

2020.7-2020.11 **Senior Portfolio Evaluation Specialist**

Project evaluation: Led cross-functional project evaluation-integrating technical data, market potential, and manufacturing capacity into final decision reports for biosimilars, biologics, and small-molecule candidates.

Scientific activities

Authored 46 scientific outputs, including 25 SCI-indexed papers (cumulative IF >200; citations >400), 5 patents, and 3 book chapters. Full list available upon request.
https://scholar.google.com/citations?authuser=1&user=ZEcAZvAAAAAJ

2025.9- Ruth L. Kirschstein National Research Service Award (NRSA), NIH — Awardee
2025.6, 2025.11- Invited Ad hoc Scientific Review Group, NIH — Grant Reviewer
2023.9- Sigma Xi, The International Scientific Research Honor Society — Member
2023.7- International Journal of Molecular Sciences — Reviewer Board
2022.6- Center for Precision Genomics, UCSD — Member
2022.1- The Human BioMolecular Atlas Program (HubMAP), NIH — Member
2021.10- Center of liquid biopsy, UCSD — Member
2021.8- The Common Fund's 4D Nucleome (4DN), NIH — Organization-hub & Member
2016.11-2018.1 Student Journal of SCU — Editorial Committee
2017.6 -2020.6 Medical Big Data Center, SCU — Consultant
2014.11- Massive Analysis and Quality Control (MAQC) Society, FDA — Member

Major Awards

INTERNATIONAL:

2023 The International Scientific Research Honor Society, Member (Awarded by peers), Sigma Xi

2014 leadership development program identification, United Nations Development Programme (UNDP)

NATIONAL:

2025 Ruth L. Kirschstein National Research Service Award (NRSA), NIH

2021 Top Downloaded Article in 2021, Chin. J. Chem.

2018-2019 National-sponsored Joint PhD Training Program for High-Level University students, CSC

2017, 2015 "Best Poster" of the 13/14th National Conference on Computational (Computer) Chemistry, CCS

2015 Outstanding Participant, Modern Biological Mathematics Summer School, NSFC

2015, 2014, 2013 Outstanding Volunteer, SK-SUNNY, China Guanghua Foundation

2013- National Class-I Volleyball Referee, the General Administration of Sport of China (GASC)

2012- National Class-II Beach Volleyball Athlete, GASC

PROVINCIAL AND MUNICIPAL:

2023 Mentor for Outstanding Undergraduate Research Award recipient, Bioengineering, UCSD

2020, 2021 Professional & Technical Talent in Urgent Need of Chengdu (Municipal Government Talent Program)

2015-2020 Graduate Student First-Class Full Scholarship, SCU (awarded annually)

2019 Outstanding Graduate Leader, SCU

2017, 2016 Outstanding Graduate student, SCU

2015 Excellent Undergraduate Thesis Award, SCU

2015 Outstanding Student leader, SCU

2014, 2013 Outstanding undergraduate student, SCU

2013 Comprehensive Quality "A-Level" Certificate, Sichuan Province

OTHER:

2024 Selected Journal Cover Artwork, *Cell Genomics*, Volume 4, Issue 1, Jan. 10.

2021 Annual outstanding employee, HUIYU SEACROSS Pharm. Inc

2018 Champion-San Diego Social Beach Volleyball League (Sum-Season)

2017 EVONIK Corporate Scholarship

2014 Champion-Sichuan Provincial University Volleyball League

2013 2nd prize of SHIMADZU Science & technology innovation speech competition

Representative Highlights

- **EB-1A (Extraordinary Ability) petition approved by USCIS (USA), 2024**
- **NIH Ruth L. Kirschstein National Research Service Awardee (F32), 2025**
- AI-driven small-molecule NCT503 for early AD symptom alleviation-in ***IND application*** stage, Neurospan LLC, 2024
- Dual-target KRAS-G12C/PI3K inhibitor advanced to IND filing, PD-1+TIGIT+IL-15/IL-15Rα antibody entered ***Clinical-Trial*** phase, HUIYU SEACROSS Inc., 2021
- SILVER-seq ultra-low-input extracellular RNA ***CLIA platform*** applied in AD/cancer/ IVF translational studies, GENEMO Inc., 2019
- **High impact Papers: A.** Junchen Chen[#], Yuan Liu[#], *et al*. Proteome-scale Mapping of Protein-Protein Associations in Physiologically Relevant Conditions, ***Cell****, 2025.* (Under review) *#Co-first author, equal contribution*. **B.** Job Dekker, … Yuan Liu*, et al*. An integrated view of the structure and function of the human 4D nucleome. ***Nature****, 2025*.
- **Book chapters led by US. FDA: A.** Yuan Liu *et al.* Centralized data sources and QSAR methods for the prediction of idiosyncratic adverse drug reaction, *QSAR in Safety Evaluation and Risk Assessment, **Elsevier**, 2024*. **B.** Yuan Liu *et al.* Multivariate Curve Resolution for Analysis of Heterogeneous System in Toxicogenomic, *Machine Learning and Deep Learning in Computational Toxicology, **Nature Springer**, 2023.*
- **Patents:** CN111444233A, 112613233A, 113314219A, 203285029U, 204314250U

Teaching & Academic Service

2022-2025 (monthly) NIH Common Fund 4D Nucleome Consortium (4DN) Neuro Interest Group **Co-Host**

2022-2025 (bi-weekly) NIH 4DN Predictive Modeling Working Group **Co-Host**

2025.8 Micro MBA Program (selected cohort; Executive Education), Rady School of Management, UCSD **Participant**

2024.12 NIH Common Fund 4DN Annual Meeting, San Diego **Organizer**

2023.12 NIH Common Fund 4DN Annual Meeting, Boston **Participant**

2022.12 NIH Common Fund 4DN Annual Meeting, San Diego **Participant**

2022.10 HubMAP 2022 All Hands Meeting, San Diego **Participant**

2020.12 "Study on Applying Matrix Factorization to The Heterogeneity of Gene Expression Data ", Sichuan University, Chengdu **Invited Talk**

2019.12 "Physiological and Disease Insights from exRNA in a Single Drop of Serum" Fudan University, Leming Shi Lab, Shanghai **Invited Talk**

2019.12-2020.6 College of Chemistry, SCU **Academic Advisor (Student Affairs)**

• Responsible for student affairs for Class of 2020 (Undergraduate), 235 students.

• Taught the required course "Current Affairs and Policy".

2019.07-2019.12 Bioinformatics (undergraduate) **Teaching Assistant**

2018.11 Participant, American Society of Human Genetics (ASHG) Meeting, San Diego

2017.07-2018.07 Cheminformatics (undergraduate) **Teaching Assistant**

• Office hours, grading, coding the demos for demonstrating practice

2015.9-2017.6 Instrumental Analysis Laboratory (Analytical Chemistry) **Lecturer**

• lecturing and demonstrating instrument analysis experiment (undergraduate).

2015- Peer Review Service **Peer Reviewer**

• Reviewer for 17+ international journals with 30+ reviews (avg IF≈10)

• Selected journals: Molecular Cancer, IEEE J. B&H Informatics, BMC Bioinformatics, Scientific Reports, Pharmaceutics, Journal of Clinical Medicine, International Journal of Molecular Sciences, Frontiers in Cellular & Infection Microbiology

2014-2016 Information Technology & Chemistry Club, SCU **Founder & Leader**

• Daily operations, club administration, and funding/grant applications.

2014.11. FDA Microarray Quality Control MAQC-III (SEQC-I) Project Results Workshop, Shanghai **Participant**

2013-2015 "SK SUNNY" International Youth Volunteers (SCU Station) **Leader**

• Member of Leadership Group. Responsible for team introduction, event planning, special funding materials, and partner negotiations

• Completed three volunteer programs: -Cultural heritage conservation; -Childhood leukemia support programs; -Stray animal protection

2012-2014 College of Chemistry, SCU **President of the Student Union**

• Organized 45+ student events, prepared reports / proposals / annual summaries (>140,000 words)