

# Michelle L. Wu (吴佳盈)

[CMU Email] | [LinkedIn] | [Github] | [Google Site] | [Company Email]

## EDUCATION

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<b>University of Southern California, Viterbi School of Engineering</b> <i>Merit-based from '25 PhD pool. Masters of Science in Biomedical Engineering.</i>	Los Angeles, CA Aug. 2025 – May 2026
<b>Carnegie Mellon University, Tepper School of Business</b> <i>Merit scholarship recipient. Masters of Science in Business Analytics.</i>	Pittsburgh, PA Aug. 2024 – May 2026
<b>University of California, Riverside</b> <i>Dean's Honor List. Bachelor of Science in Mathematics (Applied Mathematics and Chemistry)</i>	Riverside, CA Oct. 2020 – June 2024

## PUBLICATIONS

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<b>Pre-Prints</b> <i>arXiv</i>	July 2025 – Present Irvine, CA
• [A Grover-Based Quantum Algorithm for Solving Perfect Mazes via Fitness-Guided Search]	

## EXPERIENCE

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<b>NEXQ Inc.</b> <i>Founding Engineer &amp; Chief Executive Officer (Founding)</i>	September 2024 – Present Irvine, CA
<ul style="list-style-type: none"><li>• <b>Chief Executive Officer (Sept 2024 – Present):</b> Promoted from Founding Engineer based on demonstrated technical leadership and execution. Own overall system strategy for a quantum deep-tech startup building secure, scalable platforms for biomedical imaging and quantum-safe analytics.</li><li>• Accountable for business-critical engineering decisions spanning system architecture, security posture, deployment strategy, and research-to-production translation.</li><li>• Led fundraising, partnerships, and go-to-market execution while maintaining direct ownership of core technical systems and delivery timelines.</li><li>• Designed executive dashboards and reporting pipelines to support internal decision-making and external stakeholder communication.</li><li>• More at [nexq.us]; additional materials available upon request.</li><li>• <b>Founding Engineer (Sept 2024 – Present):</b> Designed and implemented the startup's core technical architecture across quantum ML, high-performance computing pipelines, cloud infrastructure, and secure APIs.</li><li>• Led development of QNN-based tumor segmentation and financial simulation systems, integrating post-quantum cryptographic primitives and multi-cloud deployment pipelines.</li><li>• Built and launched encrypted MVPs used to validate oncology and analytics workflows, with direct responsibility for correctness, performance, and failure modes.</li></ul>	
<b>LuxLeaf AI</b> <i>Founding Protocol Engineer / DeFi</i>	August 2016 – January 2026 Remote
<ul style="list-style-type: none"><li>• <b>Founding Protocol Engineer (August 2025 – January 2026):</b> Designed and engineered AURIX-AI, an open-source, cloud-native decision optimization platform integrating telemetry ingestion, uplift modeling, and profit-aware policy selection.</li><li>• Owned protocol architecture and optimization logic supporting large-scale experimentation, backtesting, and deployment of data-driven decision systems.</li><li>• <b>Senior Full Stack AI/ML Engineer (April 2025 – January 2026):</b> Designed and implemented distributed vector search infrastructure (FAISS, Weaviate) operating over 20+ TB of unstructured data with sub-second query latency.</li><li>• Built end-to-end ML pipelines supporting semantic search, experimentation, and rapid iteration for research and production users.</li><li>• Led development and deployment of healthcare-focused and ethical-AI LLM systems, leveraging RAG, LoRA/PEFT fine-tuning, and MLOps best practices to ensure reliability, auditability, and regulatory compliance (HIPAA/GDPR).</li><li>• <b>Independent Consultant (Aug 2016 – 2024) — Founder (2024 – January 2026):</b> Transitioned from independent engineering engagements to formal company operations, delivering production-grade systems for global clients.</li></ul>	

- Architected and operated secure, high-performance backend services and APIs, with direct responsibility for system reliability, scalability, and maintainability.
- Designed and deployed full-stack systems using React, Angular, Python, and SQL, integrating backend services with data-driven frontends and analytics workflows.
- Owned cloud infrastructure and CI/CD pipelines using AWS, Docker, Kubernetes, GitHub Actions, Jenkins, and Terraform to support repeatable, scalable deployments.
- Delivered multiple long-running client engagements under NDA, demonstrating sustained technical ownership, autonomy, and client trust.

## Massachusetts Institute of Technology

May 2024 – January 2026

*Quantum Software & Development Instructor & Lead Instructor (Promotion)*

Cambridge, MA

- **Lead Instructor (May 2025 – January 2026):** Promoted from Instructor based on demonstrated technical leadership and curriculum execution. Designed and delivered federally funded quantum software systems curriculum, focusing on translating theoretical models into executable, production-quality code. Mentored instructors and TAs; established technical standards and project frameworks.
- **Instructor (May 2024 – May 2025):** Taught Qiskit fundamentals, developed student projects, and delivered live instruction for MIT Beaver Works Summer Institute
- Funded by MIT Lincoln Laboratory & MITRE. Curriculum and source code available on [GitHub]

## City of Hope - Beckman Cancer Research Institute

April 2024 – April 2025

*Computational and Quantitative Medicine Research Assistant*

Duarte, CA

- Publication in drafting. Developed a novel technique for CAR-T cell treatment of glioblastomas with Dr. Ryan Woodall and Dr. Russell Rockne, applicable to classical and high-performance computing

## Interdisciplinary Center for Quantitative Modeling in Biology

Jan 2023 – October 2024

*Applied Mathematics & Biology Research Assistant*

Riverside, CA

- Received direct advising under Dr. Heyrim Cho & Dr. Yat Tin Chow
- Applied machine learning (ML) skills towards computational oncological analysis
- Integrated stochastic models to reduce parameter variance and improve prediction accuracy

## Allen P. Mills Positron Laboratory

Nov 2022 – June 2024

*NSF Quantum R&D Team Lead & Laboratory Inventory Manager*

Riverside, CA

- Developed a non-uniform thin-film Bose-Einstein Condensate (BEC) substrate
- Led polymer synthesis and substrate fabrication team; increased productivity by 200%
- Aided in writing NSF grant updates, which was well received by Dr. Allen P. Mills
- Applied machine shop experience towards substrate fabrication
- Designed and currently managing the lab's [Google Site]

## Grad Mentor for NSF Materials and Connections REU Fellowship

June 2023 - August 2023

*University of California, Riverside*

Riverside, CA

- Mentored an undergraduate student, David Nwineh from Riverside Community College on the synthesis of polymers and applications of quantitative & analytical chemistry
- Guided the student through the obstacles of research which allowed him to develop his skills and thought process
- Aided in the development of the symposium presentation and the research poster presentation
- Ensured his successful completion of the program with the proper growth of professional skills

## Condensed Matter Physics R&D Team Lead

June 2023 – October 2023

*NSF UCR Positron Summer Institute Internship*

Riverside, CA

- Applied ATC Load-Locked RF Sputtering techniques towards quantum (anti-particle) research and development for Tetraethyl Orthosilicate based Bose-Einstein Condensate targets
- Worked on mathematical models based on angular momentum, dispersion rates, and viscosity to develop a proper polymer recipe + expanded on positron diffusion models with random walk simulations in MATLAB
- Used computer-aided design to engineer a trench for a metal alloy conductor that is etched by electron-beam lithography after alignment with scanning electron microscopy

## **Analytical Chemistry & Biosensing Research Assistant**

Feb 2022 – Sep 2022

*University of California, Riverside*

*Riverside, CA*

- Conducted research with UCR Postdoctoral Fellow, Dr. Alexander Scott Malinick under Dr. Quan Jason Cheng with a focus on the application of Surface Plasmon Resonance for disease detection and the characterization of complex biophysical interactions
- Contributed to various scientific research projects, such as the development of curved membrane biomimicry and the effects of nanoplastics and lanthanides on lipid membranes
- Received hands-on training and experiences with lipid extraction, e-beam deposition, NanoSPR & NanoSPRi
- Developed skills in machine learning (ML) in R, Python, & MATLAB to aid in computational analysis while learning how to train and develop Neural Networks
- Quantitative data analysis consisted of but was not limited to, SPR & MALDI-TOF-MS graphical and quantitative reports, computationally docked molecules, and computational chemistry applications for gangliosides, proteins, and enzymes

## **NSF Materials and Connections REU Summer Fellowship**

Jun 2022 – Jul 2022

*University of California, Riverside*

*Riverside, CA*

- Applied fundamental techniques such as SPR, electron beam evaporation, and ML on biophysical studies related to the effects of nanoplastics on lipid membranes alongside Dr. Alexander S. Malinick and Suzette Aguayo
- Aided in the data analysis of curved membrane biomimicry and presented a new [project], which was well received by the Principal Investigator, Dr. Quan Cheng
- NSF provided a \$3500 grant in order to fund research and an additional \$1500 in order to fund the respective clean room machine training

## **Small Business Owner**

Dec 2019 – Dec 2021

*Hybrid*

*Diamond Bar, CA*

- Invested in iconic shoes, streetwear, accessories, and technology
- Turned a 45% net profit margin which funded giveaways in order to give back to the community, incentivize positive engagement, and exponentially increase sales
- Opened two other branches after 6 months: special + limited edition pre-orders and personalized priority shipping labels
- Sold to a Private Investor in order to focus on my passion to learn

## **Project Manager**

Aug 2020 – Aug 2021

*Synn Nation*

*Los Angeles, CA*

- Constructed multiple championship-winning teams
- Led team developing exercises which contributed to the 250% boost in engagement
- Increased the annual revenue by 130% which was well received by the CEO

## **Full Stack Developer**

Aug 2016 – Dec 2018

*Freelancer & UpWork*

*Hybrid*

- Received direct mentorship from Dr. Jack Sheau-Min Wu
- Coordinated with multiple international teams in order to broaden the toolset of troubleshooting
- Executed and revised numerous projects in C/C++, CSS, HTML, Java, Python, and PHP
- Signed an NDA for an 8-month-long project in C

## **PRESENTATIONS**

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### **Southern California Applied Math Symposium 2025**

26 April 2025

*Optimizing Delivery Locations of CAR-T Cells In High-Grade Glioblastomas Using IFF*

*Riverside, CA*

- City of Hope - pre-print in progress

### **Southern California Applied Math Symposium 2025**

26 April 2025

*Quantum-Financial Optimization - See Title Below*

*Riverside, CA*

- A Provably Convergent Framework for Portfolio Allocation & Gas-Efficient Routing in Decentralized Markets

### **Southern California Applied Math Symposium 2025**

26 April 2025

*Optimizing Quantum Convolutional Neural Networks for High-Precision Glioma Segmentation*

*Riverside, CA*

<b>Mathematical Excellence &amp; Diversity Conference 2025</b>	11 March 2025
<i>Optimizing Quantum Convolutional Neural Networks for High-Precision Glioma Segmentation</i>	Riverside, CA
<ul style="list-style-type: none"> <li>• First Place Graduate Student Essay &amp; Honorable Mention Graduate Student Poster</li> <li>• Well received by Dr. Vyjayanthi Chari, Dr. Patricio Gallardo, Dr. Sara Lapan, Dr. José González, Dr. Po-Ning Chen, &amp; the entire UCR Department of Mathematics</li> </ul>	
<b>Data Visualization &amp; Exploration Symposium</b>	01 March 2025
<i>The Subscription Economy vs. The Ownership Economy</i>	Pittsburgh, PA
<ul style="list-style-type: none"> <li>• Well received by Dr. Ben Collier</li> </ul>	
<b>Empowering Women in STEM Fair</b>	27 February 2025
<i>Invited &amp; Featured Panelist</i>	Riverside, CA
<ul style="list-style-type: none"> <li>• Event sponsored by AT&amp;T, Raising Canes, &amp; Starbucks</li> </ul>	
<b>Mathematics Undergraduate Research Symposium</b>	13 June 2024
<i>Segmentation &amp; Characterization of Gliomas by Quantum Convolutional Neural Networks</i>	Riverside, CA
<ul style="list-style-type: none"> <li>• Well received by Dr. Jia Gou, Dr. Kevin Costello, Dr. Jose Gonzalez, Dr. Jim Keliher, Dr. Po-Ning Chen, Dr. Weitao Chen, Savanna Gee &amp; the entire UCR Department of Mathematics.</li> </ul>	
<b>Mathematics Undergraduate Symposium of Real Analysis</b>	4 June 2024
<i>The Fundamental Theorem of Path Integrals &amp; Functional Applications</i>	Riverside, CA
<ul style="list-style-type: none"> <li>• Well received by Dr. Estela Gavosto.</li> </ul>	
<b>Mathematical Excellence &amp; Diversity Conference</b>	24 May 2024
<i>LV Model Interaction Calibration with Prostate Cancer</i>	Riverside, CA
<ul style="list-style-type: none"> <li>• First place award for best-written essay and third place award for outstanding poster</li> <li>• Well received by Dr. Patricio Gallardo, Dr. José González, Dr. Agnieszka Zelerowicz, Dr. Cynthia Flores, Dr. Lara Kassab, Dr. Luca Schaffler, &amp; Jordy Lopez Garcia.</li> </ul>	
<b>Mathematics Undergraduate Symposium of Mathematical Modeling</b>	14 March 2024
<i>Calibration of Lotka-Volterra Model with In-Vivo Prostate Cancer &amp; Radiotherapy Treatment</i>	Riverside, CA
<ul style="list-style-type: none"> <li>• Presentation was well received by Dr. Mykhailo Potomkin and Khoi Vo</li> </ul>	
<b>Mathematics Undergraduate Symposium of Real Analysis</b>	16 March 2024
<i>Generalized Analysis of Composition of Uniformly Continuous Functions in Metric Spaces</i>	Riverside, CA
<ul style="list-style-type: none"> <li>• Demonstrated full capabilities of using LaTeX by creating eye-catching handouts and worksheets for students to follow</li> <li>• Presentation was well received by Distinguished Professor of Mathematics, Dr. Michel L. Lapidus</li> </ul>	
<b>Understanding the Vibrational-Rotational Spectroscopy of HCl/DCI</b>	Winter 2023
<i>Applications of Classical and Quantum Mechanical Interpretations for Vibrational Spectroscopy</i>	Riverside, CA
<ul style="list-style-type: none"> <li>• Constructed an energy level diagram along with a thorough scheme of Fourier Transform Infrared Spectroscopy</li> <li>• Analyzed data and portrayed sample results for a comprehensive overview of the relationship between Morse and Harmonic Oscillator potentials, optimal bond lengths, &amp; IR activity</li> <li>• Demonstrated full capabilities of using Google Slides by creating an eye-catching presentation with the application of timed animations</li> </ul>	
<b>Undergraduate Analytical Chemistry and Instrumental Methods Symposium</b>	Fall 2022
<i>Quantitative Analysis of Caffeine by High-Performance Liquid Chromatography</i>	Riverside, CA
<ul style="list-style-type: none"> <li>• Designed and presented a detailed instrumentation scheme with the analyzed data for a comprehensive overview of HPLC</li> <li>• The poster and presentation were well received by many, especially the Principal Investigator Dr. Joseph Genereux</li> </ul>	
<b>The Materials and Connections REU Symposium</b>	Summer 2022
<i>Understanding the Ecotoxicity of Nanoplastics</i>	Riverside, CA
<ul style="list-style-type: none"> <li>• Presented a new project proposal on the effects of nanoplastics in C.elegans with an emphasis on lipidomics</li> <li>• Presented a review of the project for the biomimicry of curved membranes and the introduction to future project directions</li> </ul>	

## TECHNICAL SKILLS

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**Programming Languages:** Python, C/C++, MATLAB, R, SQL (PostgreSQL, MySQL, NoSQL), Java, JavaScript, HTML/CSS, Rust, Ruby, LaTeX, Solidity, Qiskit, Q#, OpenQASM, Pulser (Pasqal)

**Quantum Computing & Quantum Software:** Quantum algorithm design, Variational quantum algorithms (VQAs), Quantum machine learning (QML), Quantum neural networks (QNNs), Hybrid quantum-classical systems, Neutral-atom quantum computing (Pasqal), Gate-based quantum computing (IBM Quantum), Annealing & adiabatic optimization, Quantum simulation, Noise modeling, Error mitigation, Quantum intermediate representations (QIR)

**Quantum Frameworks & SDKs:** Qiskit, Cirq, PennyLane, Amazon Braket, TensorFlow Quantum, Pasqal Pulser, Classical-quantum simulators

**Blockchain, DeFi & Crypto Systems:** Stablecoin mechanisms, Depeg risk modeling, Collateralized debt systems, Liquidation engines, Oracle design & failure modes, Automated Market Makers (CFMMs), MEV-aware routing, Slippage & liquidity modeling, Gas optimization, Cross-chain settlement, On-chain/off-chain integration

**Optimization & Quantitative Methods:** Convex optimization, Stochastic processes, Agent-based simulation, Game theory, Control systems, Graph optimization, Portfolio optimization, Backtesting & stress testing

**Machine Learning, AI & Data Science:** Classical & quantum ML, Large language models (LLMs), Retrieval-augmented generation (RAG), LoRA/PEFT fine-tuning, Vector search & embeddings, Secure and compliant AI pipelines

**Frameworks, Libraries & Data Systems:** PyTorch, TensorFlow, NumPy, Pandas, Matplotlib, Keras, FAISS, Weaviate, React, Node.js, FastAPI, Flask, Bootstrap, Material-UI, Hadoop

**Business Analytics & Marketing Analytics:** Statistical analysis, Predictive modeling, Customer segmentation, Cohort analysis, Churn & retention modeling, A/B testing, Uplift modeling, Attribution modeling, Funnel analysis, KPI design, Executive dashboards, Data storytelling

**Cloud, Infrastructure & DevOps:** AWS, Google Cloud Platform, Docker, Kubernetes, CI/CD (GitHub Actions, Jenkins), Infrastructure as Code (Terraform), Secure APIs, Distributed systems, Multi-cloud architectures

**Executive, Founder & CEO Systems:** Technical strategy, Product architecture, Go-to-market analytics, Fundraising & investor reporting, Financial modeling, Pricing strategy, Risk analysis, Regulatory-aware system design, Cross-functional leadership, Scalable organizational systems

**Developer Tools & Platforms:** Git, Jupyter, VS Code, Visual Studio, PyCharm, IntelliJ, Eclipse, iTerm, IBM Quantum, Tableau, .NET

## LABORATORY & INSTRUMENTAL TECHNIQUES

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**Analytical, Computational, & Quantitative:** Gaussian, Linear Regression, Non-linear Regression, Polynomial Regression, Lipid Extraction, Molecule Visualization, Virtual Molecule Docking

**Nanofabrication Clean Room:** ATC Load-Locked Sputtering, Chemical Vapor Deposition, Electron Beam Deposition, Electron Beam Lithography, Scanning Electron Microscopy

**Synthesis:** Serial Dilutions, Acid-Base Titration, Organic Synthesis, Polymer Synthesis, Wet Chemical Etching

**Instrumental:** Gas Chromatography-Flame Ionization Detector, Gas Chromatography-Mass Spectroscopy, High-Performance Liquid Chromatography, Inductively Coupled Plasma Atomic Emission Spectroscopy, Matrix Assisted Laser Desorption/Ionization-Time Of Flight, Spectrofluorimetry, Surface Plasmon Resonance, Tandem Mass Spectrometry, Quadrupole-Time Of Flight Mass Spectrometry

## LANGUAGE PROFICIENCY

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**English:** Native Proficiency

**Mandarin Chinese:** Native Proficiency

**Spanish:** Native Proficiency

**French:** Limited Working Proficiency

**Korean:** Limited Working Proficiency

**Russian:** Limited Working Proficiency

## SUMMARY

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Engineer and quantitative systems builder with experience designing and scaling computationally intensive platforms that sit directly on core business and research workflows, while compressing time between an idea and a reliable result. Background spans quantitative research, optimization, distributed systems, and cloud-native infrastructure, with a strong record of translating theoretical models into production-grade tools. Founder and technical leader with 0 → 1 product experience, comfortable owning ambiguous, high-impact problems end-to-end while mentoring engineers and partnering closely with research users. Seeking to apply this skill set in a fast-paced quantitative environment where robust engineering and research velocity are equally critical.