# Siyuan Stella Wang, Ph.D. - Resume


**Contact**

**Email:** siyuanswang@gmail.com
**LinkedIn:** linkedin.com/in/siyuanstellawang
**Nationality:** United States
**ORCID:** 0000-0001-8249-6553
**GitHub:** github.com/SiyuanSWang
**Website:** stellawang.bio



**Summary**

Molecular systems engineer with 10+ years of experience designing and scaling programmable DNA architectures for molecular characterization, nanomaterial development, and computing applications. Built end-to-end fabrication and analysis pipelines spanning nucleic acid design, high-throughput sequencing, quantitative modeling, and automation.


**Education**

Ph.D. Molecular Biology, University of Texas at Austin — Aug 2016 - May 2022
B.S. Biomolecular Engineering, California Institute of Technology — Oct 2012 - Jun 2016

**Research Experience**

**Postdoctoral Fellow, Wyss Institute**
Advisor: Dr. William Shih — Jun 2022 - Current

**Current projects**

- Designed and produced modular DNA-based force spectroscopy constructs using molecular biology techniques and DNA origami self-assembly, enabling high-throughput single-molecule detection of post-translational protein modifications
- Led development of a solid-phase synthesis workflow for improved yield and scalable production of micron-scale, nanometer-addressable crisscross DNA origami structures
- Contributed to the development and validation of a computational framework for the computer-aided design of crisscross DNA origami structures, enabling scalable design and fabrication of complex, multi-layered assemblies

**Cross-institutional technology collaborations**

Designed and fabricated spatially addressable crisscross DNA origami architectures supporting applications in nanoelectronics, photonic, biosensing, and computing.

- Crisscross DNA origami-templated carbon nanotube arrays for nanoelectronics devices (University of Fribourg)
- Crisscross DNA origami scaffolds for arranging optical metamaterials in 3D neuromorphic computing systems (Columbia University)
- Crisscross DNA origami-guided integration of nanoscale conductive elements on microchips for single-molecule electrical biosensing (Aarhus University & Technical University of Denmark)
- Scalable fabrication of crisscross DNA origami architectures enabling nanoscale patterning for experimental studies of molecular quantum behavior (Korea University)

**Operations and funding contributions**

- Contributed to federal, non-profit, and international grant proposals to support cutting-edge DNA nanotechnology research
- Trained and onboarded new postdoctoral, graduate, and undergraduate researchers to the project team
- Served as Lab Safety Officer, overseeing compliance and ensuring safe lab operations

**Graduate Research Assistant, University of Texas at Austin**
Advisor: Andrew D. Ellington Aug 2016 - May 2022
Thesis: Scaling up DNA computation with NGS and modified nucleic acids (link)

- Developed a quantitative model predicting sequence- and backbone-dependent hybridization stability of phosphorothioate-modified DNA using high-resolution melting and matrix decomposition
- Engineered a next-generation sequencing pipeline for retrieval and decoding of data stored in synthetic DNA, encompassing sample QC, library preparation, bioinformatic processing of raw reads, and data visualization
- Engineered and validated a fluorescence-based, high-throughput screening assay by repurposing Illumina MiSeq flow cells to profile DNA hybridization and T7 promoter-polymerase interactions
- Built a programmable nucleic acid-responsive transcription switch enabling conditional activation of T7-driven RNA synthesis in cell-free systems

## Technical Leadership and Teaching

- Mentored and trained 4 undergraduate students and 1 graduate student in nucleic acid engineering
- Led technical training for new team members and established standardized workflows
- Served as a teaching assistant at both undergraduate and graduate levels, leading laboratory instruction and mentoring students in quantitative analysis

## Skills

**Molecular biology**: PCR, qPCR, cloning, nucleic acid purification, bacterial protein expression and purification, size-exclusion chromatography
**Next-generation sequencing**: library prep, RNA-Seq, Illumina MiSeq and iSeq
**Instruments**: FPLC, TEM, TIRF, liquid handling automation
**Computation**: Python, Linux, R, GitHub
**Software**: Geneious, NUPACK, caDNAno, Adobe Illustrator
**Languages**: English (native), Chinese (proficient), German (Goethe-Zertifikat A1)

## Selected Publications and Patent

- **Wang, S.S.** & Ellington, A.D. (2019). Pattern generation with nucleic acid chemical reaction networks. *Chemical Reviews*, 119(10), 6370-6383.
- **Wang, S.S.***, Xiong, E.*, Bhadra, B., & Ellington, A.D. (2022). Developing predictive hybridization models for phosphorothiolated oligonucleotides using high-resolution melting. *PLOS One*, 17(5), e0268575.
  *Contributed equally (co-first authors)
- Wang, B.*, **Wang, S.S.***, Chalk, C., Ellington, A.D., & Soloveichik, D. (2023) Parallel molecular computation on digital data stored in DNA. *PNAS*, 120 (37), e2217330120.
  *Contributed equally (co-first authors)
- Aquilina, M.*, Katzmeier, F.*, Nijenhuis, M.A.D.**, **Wang, S.S.****, Becker, C., Zhao, Y., Seok, S.H., Finkel, J., Cui, H., Lee, J., Lee, S., & Shih, W.M. (2026) A computational framework for designing micron-scale crisscross DNA megastructures. (In review)
  *Contributed equally (co-first authors); **Contributed equally (co-second authors)
- Edward M. Marcotte, Eric Anslyn, Alexander Boulgakov, Angela M. Bardo, **Siyuan S. Wang** and Jagannath Swaminathan. Single-molecule sequencing of peptides bound to the Major Histocompatibility Complex. US Patent: PCT/US2019/046507. Filed Aug 14, 2019.

## Fellowships, Honors, and Awards

Foresight Institute Fellow 2024
National Science Foundation Graduate Research Fellow Awarded 2018, Tenure Sep 2018 - Aug 2021
Selected departmental and conference travel awards 2019, 2024, 2025, & 2026
Caltech Summer Undergraduate Research Fellowships Summer 2013, 2014, & 2015