Siyuan Stella Wang, Ph.D. - Curriculum Vitae

Contact

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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

Experience

Postdoctoral Fellow, Wyss Institute

Advisor: Dr. William Shih

Jun 2022 - Current

- Developed a solid-phase synthesis method for the accelerated production of spatially addressable, multi-micron DNA crisscross origami structures (presented at DNA31, DFCI Retreat 2025, ArtBio, and FNANO24)
- Developed a bead-based purification method for application-compatible DNA crisscross origami
- Worked with various domestic and international collaborators across disciplines to design and apply DNA crisscross origami towards semiconductor manufacturing, alternative computation systems, and single-molecule biomarker detection
- Designed and synthesized DNA-based caliper constructs for single-molecule, high-throughput profiling of protein properties (e.g. sequence, post-translational modification, binding kinetics)
- Assisted with grants and helped secure funding from DOE and international sources
- Trained junior postdoc members and mentored graduate and undergraduate students
- Served as a Lab Safety Officer at the Wyss from 2023 to current

Graduate Student Researcher, University of Texas at Austin

Advisor: Dr. Andrew D. Ellington

Aug 2016 - May 2022

- Thesis: Scaling up DNA computation with next-generation sequencing and modified nucleic acids (link)
- Committee members: Dr. David Soloveichik, Dr. Ilya Finkelstein, Dr. Edward Marcotte, Dr. Eric Anslyn
- Developed a predictive model for sequence-dependent hybridization stability of phosphorothioate DNA (published in *PLOS One* and presented at FNANO19)
- Developed a DNA data storage scheme with in-memory computation (published in PNAS)
- Developed a hybridization-activated in vitro T7 transcription element
- Demonstrated high-throughput profiling of promoter-polymerase interactions and DNA:DNA hybridization on a repurposed next-generation sequencing chip assay platform (presented at FNANO19)

Graduate Teaching Assistant, University of Texas at Austin

Professor: Dr. Vishy Iyer Fall 2021

• Held office hours and graded homework assignments and final projects in Python and R for an introductory programming course for biologists (MOL290C)

Teaching Assistant, California Institute of Technology

Professor: Dr. Justin Bois Winter 2015

• Assisted with lab set up, guided experiments, held office hours, and graded assignments for an experiment-driven lab course (Bi 1x)

Undergraduate Research Fellow, California Institute of Technology

Advisor: Dr. Lulu Qian

Summer 2015 - Spring 2016

• Designed, implemented, and analyzed a DNA strand-displacement system to with winner-take-all behavior through competition for a shared fuel species

Advisor: Dr. Frances Arnold

Summer 2014

• Improved the fluorescence of a channelrhodopsin Arch3 variant using directed evolution

Advisor: Dr. Ravinder Abrol

Summer 2013

• Computational analysis of anti-apoptotic protein Mcl-1 using molecular dynamics

Publications

- 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. https://doi.org/10.1073/pnas.2217330120
- Wang, S.S., Xiong, E., Bhadra, B., & Ellington, A.D. (2022). Developing predictive hybridization models for phosphorothicated oligonucleotides using high-resolution melting. *PLOS One*, 17(5), e0268575. https://doi.org/10.1371/journal.pone.0268575
- Shroff, R., Ellefson, J.W., Wang, S.S., Boulgakov, A.A., Hughes, R.A., & Ellington, A.D. (2022). Recovery of Information Stored in Modified DNA with an Evolved Polymerase. *ACS Synthetic Biology*, 11(2), 554-561. https://doi.org/10.1021/acssynbio.1c00575
- Wang, S.S. & Ellington, A.D. (2019). Pattern generation with nucleic acid chemical reaction networks. *Chemical Reviews*, 119(10), 6370-6383. https://doi.org/10.1021/acs.chemrev.8b00625

Presentations

- Wang, S.S., Aquilina, M., Katzmeier, F., Chen, H., Lee, J., & Shih, W. (Aug 2025). Solid-phase assembly of micrometer-scale crisscross DNA origami structures. *Poster presentation at the 31st International Conference on DNA Computing and Molecular Programming (DNA31), Lyon, France. Runner-up for the Excellent Student/Postdoc Poster Award.*
- Wang, S.S. (Feb 2025). Fully-addressable cell-sized DNA origami devices. *Presentation at the Dana-Farber Cancer Institute Retreat, Cambridge, MA*.
- Wang, S.S., Aquilina, M., Chen, H., Katzmeier, F., Lee, J., & Shih, W. (Aug 2024). Solid-phase assembly of micrometer hierarchical DNA origami structures. *Poster presentation at the 2nd Artificial Biology Conference (ArtBio2024), Aarhus, Denmark.*
- Wang, S.S., Lee, J., Shih, W. (April 2024). Solid-phase, user-friendly assembly of micrometer hierarchical DNA origami structures. *Poster presentation at Foundations of Nanoscience (FNANO24), Snowbird, UT.*
- Wang, S.S. & Ellington, A.D. (Sept 2021). High-throughput readout of in vitro transcriptional networks using RNA-Seq. Poster presentation at the 27th International Conference on DNA Computing and Molecular Programming (DNA27), virtual event.

- Wang, S.S., Ellington, A.D., Finkelstein, I.J. (Apr 2019). High-throughput thermodynamic profiling of mismatched nucleic acid hybridization on Next-Generation sequencing chips. *Poster presentation at Foundations of Nanoscience (FNANO19), Snowbird, UT.*
- Wang, S.S., Xiong, E., Ellington, A.D. (Apr 2019). Modeling thermodynamic stability of phosphorothioate-modified DNA. Poster presentation at Foundations of Nanoscience (FNANO19), Snowbird, UT.
- Jung, C., Hawkins, J.A., Jones, S.K., Jr., Xiao, Y., Rybarski, J.R., Dillard, K.E., Hussmann, J., Saifuddin, F.A., Wang, S.S., Savran, C.A., Ellington, A.D., Ke, A., Press, W.H., Finkelstein, I.J. (Sept 2017). Adaptation of the Next Generation Sequencing Platform for Molecular Applications. Poster presentation and talk at the 23rd International Conference on DNA Computing and Molecular Programming (DNA23), Austin, TX.

Fellowships, Honors, and Awards

DNA31 NSF Travel Award

Foresight Institute Fellow

Dana Farber Cancer Institute Travel Award

NSF GRFP

Awarded 2018, Tenure Sep 2018 - Aug 2021

UT Austin ICMB Travel Award

Spring 2019

Patent

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.

Skills

Wet lab: bacterial cloning, PCR, qPCR, gel electrophoresis, next-generation sequencing, PAGE purification, protein purification, FPLC, TEM, TIRF microscopy, liquid handling automation (Echo and EpMotion)

Computation: Python, Linux, NUPACK, Adobe Illustrator, caDNAno, GitHub, LATEX Languages: English (native), Chinese (proficient), German (Goethe-Zertifikat A1)