Huat Thart Chiang

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Education

University of Washington, Seattle, WA, USA
PhD in Chemical Engineering (Data Science) — *2020 – 2025*

University of Washington, Seattle, WA, USA
Master of Science in Chemical Engineering (Data Science) — *2020 – 2022*

University of South Florida, Tampa, FL, USA
Bachelor of Science in Chemical Engineering — *2016 – 2020*

Skills

Machine Learning
- Bayesian Optimization
- Gaussian Processes
- Active Learning
- Deep Learning
- Functional Data

Physical Sciences
- Biological and Soft Matter
- Nanotechnology
- HT-Experimentation
- Small Angle Scattering
- Electron Microscopy

Software Skills
- Scikit-learn, Scipy, Pandas
- PyTorch, BoTorch, CUDA
- MATLAB, Simulink
- HOOMD-Blue, GROMACS
- Fusion 360 (CAD)

Research Experience

Postdoctoral Fellow — *September 2025 – present*
Johns Hopkins University – Material Science and Engineering — *Baltimore, MD, USA*

- Perform molecular dynamics simulations to understand how the behavior of water molecules under nanoconfinement in carbon nanotubes.
- Characterize material dynamics using broadband dielectric spectroscopy and quasi-elastic neutron scattering.

Pozzo Research Group — *2020 – 2025*
University of Washington – Chemical Engineering — *Seattle, WA, USA*

- Combined machine learning techniques with high throughput experimentation to analyze and predict the structure and functionality of various soft matter systems, including proteins, peptoids, DNA, lipids, inorganic nanoparticles, and emulsions.
- Developed data-driven methods for executing timed interventions in dynamic soft matter experiments.
- Used numerical methods for simulating small-angle scattering curves of large biomolecular assemblies and designed model-fitting algorithms.
- Performed SAXS, SANS, DLS, UV-Vis spectroscopy, SEM and TEM characertzation on various colloidal systems.
- Led lab safety initiatives, including training, waste management, and compliance inspections for the Pozzo Research Group, achieving a 100% safety rating.

Experiments at Large Scale Facilities

Structural Analysis of mRNA Delivery Vectors as a Function of pH — *September 2023*
High Flux Isotope Reactor — *Oak Ridge, TN, USA*

- Used Bio-SANS to investigate the effect of pH on the structure of lipid nanoparticles for the delivery of mRNA.

Structural Investigation of the Thaumatin I Protein *March 2023*
PETRA III Max von Laue Experimental Hall *Hamburg, Germany*

- Used Bio-SAXS and protein crystallography to investigate the structure of the Thaumatin I protein.

Hercules European School 2023 *March 2023*
European Photon and Neutron Science Campus *Grenoble, France*

- Selected as a participant for a 5-week course for performing science at large-scale facilities that include using neutrons, x-ray synchrotron radiation, and free electron lasers for condensed matter studies.
- Performed experiments and data analyses at various X-ray, neutron, and XFEL beamlines.

High Throughput USAXS and Active Learning to Optimize Nanostructures *February, June 2022*
Advanced Photon Source *Lemont, IL, USA*

- Obtained scattering data (USAXS/SAXS) for 550 gold nanoparticle samples in roughly 40 hours.
- Processed and analyzed the scattering data to determine the nanoparticle's morphology and size.
- Investigated the structural changes of the growth of a gold nanorod and a nanosphere using time-resolved USAXS.

Software

Small Angle Scattering Simulations *January 2023 - Present*
Github Link

- An inexpensive numerical method (O1 complexity) to efficiently model large biomolecular assemblies and simulate their small angle scattering curves
- Includes a model-fitting algorithm to fit experimental scattering data

Data Driven Exploration *January 2023 – August 2023*
Github Link

- Python code that involves using a Gaussian Processes classifier to actively suggest new experiments
- Code for the visualization of large high-dimensional datasets

OTTO - OT2 Time and Order *December 2021 – March 2023*
Github Link

- Code that allows a liquid handling robot to vary the volume, time delay, and order of the mixing of stock solutions
- Developed a method to optimize the scheduling of the pipetting steps (similar to the optimization of a Gantt chart), which reduced the pipetting time by up to 80%

Mentorship, Teaching, and Outreach

Reviewer of Research Proposals *Seattle WA, USA*
Online *2024-2025*

- Reviewed applications for the UW Distinguished Young Scholar Seminar
- Reviewed applications for the US DOE Office of Science Graduate Student Research (SCGSR) program

Research Experience for Undergraduates - Mentor *June 2022 – Present*
University of Washington *Seattle, WA, USA*

- Mentored 3 undergraduate students

Nanomaterials Engineering via High-throughput Robotic Experimentation *December 2021 – April 2022*
University of Washington – Material Science and Engineering *Seattle, WA, USA*

- Designed a lab module for the introduction to material science class.

- Developed a code in a Jupyter notebook for students to run gold nanoparticle synthesis protocols using an Opentrons OT2 liquid handling robot.
- Developed an interactive Jupyter notebook for the students to visualize the data that they collected.

Chemical Engineering Teaching Assistant *December 2021 – December 2024*
University of Washington – Chemical Engineering *Seattle, WA, USA*

- Assisted in the instruction and facilitation of undergraduate lab sessions focused on colloid science and its applications in chemical engineering.
- Developed and implemented supplemental instructional materials, including lab manuals and visual aids, enhancing student understanding of complex concepts.

Publications and Preprints

Huat Thart Chiang, Naomi Kern, Zachery Wylie, Abdul Moeez, Haoqing Zhang, Daniel McKeen, Nicholas Herringer, Oleg Gang, Andrew Ferguson, Zachary Sherman, Lilo Pozzo, "Assembly of Small Silica Nanoparticles using Lipid-Tethered DNA 'Bonds'" *Chemrxiv*. (2025)

Shunzhi Wang, Andrew Favor, Ryan Daniel Kibler, Joshua Morris Lubner, Andrew J Borst, Nicolas Coudray, Rachel Redler, **Huat Thart Chiang**, William Sheffler, Yang Hsia, Zhe Li, Damian Charles Ekiert, Gira Bhabha, Lilo Pozzo, David Baker, "Bond-centric modular design of protein assemblies". *Nature Materials*. (2025)

Huat Thart Chiang, Zhiyin Zhang, Kiran Vaddi, F. Akif Tezcan and Lilo. D Pozzo, "Efficient Analysis of Small-Angle Scattering Curves for Large Biomolecular Assemblies Using Monte Carlo Methods". *Journal of Applied Crystallography*. (2025)

Kiran Vaddi, **Huat Thart Chiang**, and Lilo. D Pozzo, "Autonomous Phase Mapping of Gold Nanoparticles Synthesis with Differentiable Models of Spectral Shape". *Chemrxiv*. (2025)

Zhiyin Zhang, **Huat Thart Chiang**, Ying Xia, Nicole Avakyan, Ravi Sonani, Fengbin Wang, Edward H. Egelman, James J. De Yoreo, Lilo D. Pozzo, and F. Akif Tezcan, "Design of Light- and Chemically-Responsive Protein Assemblies through Host-Guest Interactions". *Chem*. (2025)

Christopher Lowe, Helen Larson, Yifeng Cai, **Huat Thart Chiang**, Lilo Pozzo, Francois Baneyx, Brandi Cossairt "Induced Chirality in QDs Using Thermoresponsive Elastin-Like Polypeptides". *Langmuir*. (2024)

Huat Thart Chiang, Kiran Vaddi, Lilo D. Pozzo "Data-Driven Exploration of Silver Nanoplate Formation in Multidimensional Chemical Design Spaces". *Digital Discovery*. (2024)

Kacper J. Lachowski, **Huat Thart Chiang**, Kaylyn Torkelson, Wenhao Zhou, Shuai Zhang, Jim Pfaendtner, Lilo D. Pozzo. "Anisotropic Gold Nanomaterial Synthesis Using Peptide Facet Specificity and Timed Intervention". *Langmuir*. (2023)

Sakshi Yadav Schmid, Kacper Lachowski, **Huat Thart Chiang**, Lilo Pozzo, Jim De Yoreo, Shuai Zhang. "Mechanisms of Biomolecular Self-Assembly Investigated Through *In Situ* Observations of Structures and Dynamics". *Angewandte Chemie*. (2023)

Kiran Vaddi, **Huat Thart Chiang**, Lilo D. Pozzo. "Autonomous retrosynthesis of gold nanoparticles via spectral shape matching". *Digital Discovery*. (2022)

Conference Proceedings

MRS Spring Meeting 2025, Seattle, WA, USA *April 2025*
Contributed Talk: Efficient Analysis of Small-Angle Scattering Curves for Large Biomolecular Assemblies Using Monte Carlo Methods

APS Global Physics Summit, Anaheim, CA, USA *March 2025*
Contributed Talk: High-Throughput Exploration of Nanoparticle Assemblies using Physically-Tethered DNA Bonds

98th ACS Colloids and Surface Science Symposium, Seattle, WA, USA *June 2024*
Contributed Talk: Data-Driven Exploration of Nanoparticle Assemblies using Physically-Tethered DNA Bonds

MRS Spring Meeting 2024, Seattle, WA, USA *April 2024*
Contributed Talk: Data-Driven Exploration of Silver Nanoplate Formation in Chemical Spaces

97th ACS Colloids and Surface Science Symposium, Raleigh, NC, USA *June 2023*
Contributed Talk: Data-Driven Exploration of Silver Nanoplate Formation in Chemical Spaces

Hercules European School, Grenoble, France *March 2023*
Poster: High-Throughput Scattering Characterization Combined with AI/ML to Accelerate Material Discovery

International Conference on Energy Conversion and Storage, Friday Harbor, WA, USA *September 2022*
Poster: Performance Evaluation of Distance Metrics in Material Acceleration Platforms

Accelerate Conference, Toronto, ON, Canada *August 2022*
Poster: Performance Evaluation of Distance Metrics in Material Acceleration Platforms

96th ACS Colloids and Surface Science Symposium, Golden, CO, USA *July 2022*
Contributed Talk: Effect of "Distance Metrics" in AI-Driven Autonomous Retrosynthesis of Nanomaterials

Awards

Materials Research Society Spring Meeting	Best Oral Presentation of the Symposium, April 2025
AIChE Poster Competition	1st place in the poster competition at the annual meeting, October 2024
University of Washington - Clean Energy Institute	Travel Grant, July 2022, March 2023
The D. D. and Sylvia M. Drowley Fellowship	UW ChemE, 2020
Runstad Family Endowed Fellowship in Chemical Engineering	UW ChemE, 2020
Chemical Engineering Alumni Fellowship Endowment	UW ChemE, 2020
Eugene Half Marathon Finisher	April 2025