

Sheng-Jer Chen

📍 New Taipei City, Taiwan | ✉ samchen1999@gmail.com | 📧 D12524004@ntu.edu.tw
🌐 Website | 🐙 GitHub | 🎓 Google Scholar | 🏠 ORCID

Ph.D. candidate in Chemical Engineering at National Taiwan University and Project Research Assistant at the National Center for High-Performance Computing.

Education

National Taiwan University <i>Ph.D. Candidate, Chemical Engineering</i>	<i>Sep 2023 – Present</i> <i>Taipei, Taiwan</i>
National Taiwan University <i>M.S., Chemical Engineering</i>	<i>Sep 2021 – Aug 2023</i> <i>Taipei, Taiwan</i>
Chang Gung University <i>B.S., Chemical and Materials Engineering</i>	<i>Sep 2017 – Jun 2021</i> <i>Taoyuan, Taiwan</i>

Research and Professional Experience

Project Research Assistant <i>National Center for High-Performance Computing, HPC & Cloud Technologies Division</i>	<i>Feb 2024 – Present</i> <i>Taiwan</i>
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- Developed high-performance computing workflows for large-scale scientific simulation, including CUDA GPU acceleration.
- Extended and applied physics-informed machine learning methods to scientific computing problems.
- Supported reproducible model development and deployment for computational research projects.

Graduate Research Assistant <i>Complex Fluid Theory Lab</i>	<i>Sep 2021 – Present</i> <i>Taiwan</i>
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- Developed multivariate time-series and spatiotemporal deep learning models to predict phase-field morphology evolution.
- Built a GPU-enabled 3D solver for ternary nonsolvent-induced phase separation.
- Integrated phase-field simulation with physics-informed neural networks for forward and inverse modeling.
- Research focus: polymer field-theoretic simulation and self-consistent field theory.






Research Assistant <i>Process Engineering Lab</i>	<i>Sep 2020 – Jun 2021</i> <i>Taiwan</i>
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- Designed air separation unit processes for ultra-high-purity nitrogen and oxygen production.
- Developed hybrid membrane/cryogenic process models for industrial and experimental high-permeability membranes.
- Applied simulated annealing for reaction-kinetic parameter regression.
- Contributed to simulation and techno-economic analysis for hybrid membrane/cryogenic air-separation systems.




Intern <i>Fuburg Company</i>	<i>Jun 2020 – Sep 2020</i> <i>Taiwan</i>
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- Worked on experiments and product improvement for superabsorbent polymer materials.
- Conducted competitor analysis and technical data collection for company products.

Research Interests

-  High-performance computing for scientific simulation
-  Polymer field theory and self-consistent field theory
-  Phase-field modeling and microstructure evolution
-  Physics-informed neural networks and data-driven modeling
-  Low-dimensional representation and surrogate modeling for complex systems

Publications

- Chen SJ**, Yu HY. L-MAU: A multivariate time-series network for predicting the Cahn-Hilliard microstructure evolutions via low-dimensional approaches. *2024*
Computer Physics Communications [Link](#) 
- Lin LC, **Chen SJ**, Yu HY. Connecting Structural Characteristics and Material Properties in Phase-Separating Polymer Solutions: Phase-Field Modeling and Physics-Informed Neural Networks. *2023*
Polymers [Link](#) 
- Chen SJ**, Yu BY. Rigorous simulation and techno-economic evaluation on the hybrid membrane/cryogenic distillation processes for air separation. *2021*
Journal of the Taiwan Institute of Chemical Engineers [Link](#) 

Selected Presentations

- Exploring Novel Block Copolymer Microstructures via Reciprocal-Space Niching Genetic Algorithms and Self-Consistent Field Theory** *2026*
APS Global Physics Summit 2026 (APS March Meeting), Session MAR-L67, Denver, CO, USA
- Self-Consistent Field Theory for Nanostructure Discovery** *2025*
2025 Annual Conference of the Taiwanese Colloid and Interface Society and International Symposium on Interface Science, Taiwan
- Numerical Simulation for Nonsolvent-Induced Phase Separation by Ternary Phase-Field Theory** *2024*
2024 Symposium on Thermodynamics and Process Systems Engineering, Taiwan
- Innovative Machine Learning Approaches for Predicting the Dynamics of the Phase-Field Microstructures** *2023*
2023 Symposium on Thermodynamics and Process Systems Engineering, Taiwan
- Innovative Machine Learning Approaches for Predicting the Dynamics of the Phase-Field Microstructures** *2022*
2022 Chemical Engineering Conference by Taiwan Institute of Chemical Engineers (TwIChE), Taiwan
- Hybrid Membrane Process for Cryogenic Air Separation Unit** *2021*
2021 Symposium on Thermodynamics and Process Systems Engineering, Taiwan

Skills

Programming	Python, Julia, C/C++, CUDA, MATLAB
Scientific Computing	GPU acceleration, numerical methods, reproducible computational workflows, large-scale scientific simulation
Research Methods	Phase-field modeling, polymer field-theoretic simulation, self-consistent field theory, physics-informed neural networks, multivariate time-series and spatiotemporal deep learning
Process Systems	Gas separation process simulation, air separation units, hybrid membrane/cryogenic systems, techno-economic analysis

Honors and Awards

- Honorable Mention, Student English Oral Presentation Contest, 2025 TWCIS
- Honorable Mention, Student English Oral Presentation Contest, 2022 TwIChE
- Excellent Presentation Award, Symposium of Thermodynamics and Process System Engineering, 2021 NTU
- Second Place Award, Undergraduate Student Process Design Contest, 2021 TwIChE
- Undergraduate Academic Excellence Award, Chang Gung University, 2021 CGU

Service and Leadership

Vice Director
Piano Club, Chang Gung University

Sep 2018 – Sep 2019
Taiwan