Pierre Kawak, Ph.D.

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- 7 years of computational expertise in molecular modeling, material characterization, free energy analysis, computational chemistry, crystallization, & material mechanics.
- 4 years of experimental expertise in breast cancer treatment, liposomal formulations, surface functionalization, active targeting, drug delivery kinetics, & ultrasonification.
- Authored 5 peer-reviewed articles, contributing to advancements in copolymer theory, polymer dynamics modeling, filled rubber mechanics, & cancer drug delivery.
- Presented at 27 institutional, national, & intl. conferences (e.g., APS, ACS, AIChE, USF, AUS, GRC, IoP, etc.) to diverse audiences from industry, govt., & academia.
- Passionate about using computation to solve challenges in materials & pharma.

Technical Skills

- **Programming & Automation**: Python, C++, C, CUDA, MATLAB, Bash, R
- **Simulation & Modeling**: LAMMPS, GROMACS, Gaussian, AMBER, OPLS, Monte Carlo methods, Molecular Dynamics, Atomistic, Coarse-Graining
- **Data Analysis & Visualization**: VMD, OVITO, NumPy, Pandas, Matplotlib, Free Energy Calculations
- **HPC & Workflow Optimization**: Slurm, Open MPI, Cluster Management, Parallelization, Large-Scale Data Processing (50TB+)
- **Experimental Techniques**: Drug Encapsulation, DLS, NMR, Liposomal Formulations, Nanoparticle Synthesis
- **Communication & Leadership**: Public Speaking (27+ conferences), Scientific Writing (5 publications), Mentoring, DEI Advocacy, Event Coordination

Research Experience

Postdoc University of South Florida Prof. David Simmons 2022 – Present

- Simulate polymer deformation & stress, generating high-throughput nanoscale insights for composite design.
- Improve copolymer T_g by simulating specific sequences, optimizing stability without altering feedstock or process.
- Develop custom polymer rheology & dynamics analysis tools & extend in-house codebase, streamlining group workflows & accelerating junior researchers' productivity.
- Streamline HPC workflows to process 50+ TB datasets, accelerating studies by 90% & earning an NSF ACCESS grant.
- Mentor 11 researchers in HPC, Git, & simulation methods, fostering collaboration & earning APS Career Mentor Fellowship.

- Present at 17 conferences, winning awards at GRC (2024) & USF Symposium (2023) for research on rubber & copolymer design.

Ph.D. **Brigham Young University** **Prof. Douglas Tree** **2017 – 2022**

- Wrote two Monte Carlo simulation codes in C++/CUDA from scratch, accelerating crystallization studies 100× & enabling published 3D free energy landscapes.
- Constructed advanced phase diagrams using custom crystalline & orientational order parameters, quantifying key molecular transitions.
- Analyzed large 3D datasets via VMD & OVITO, extracting structural & kinetic insights across crystallization pathways.
- Mentored 4 undergraduates, co-authoring 2 papers & 6 conference abstracts, & supporting their admission to graduate programs.
- Earned APS Distinguished Student Award (2022) & BYU Presentation Award (2021) for scientific communication & research excellence.
- Directly contributed preliminary data & conceptual foundations for a successful $500K NSF CAREER proposal.

M.S. **American University of Sharjah** **Prof. Ghaleb Husseini** **2015 – 2017**

- Designed & synthesized estrone-functionalized ultrasound-sensitive drug carriers, improving drug stability & controlled release in breast cancer chemotherapy.
- Validated & characterized encapsulation & release kinetics using DLS & NMR, ensuring structural integrity & efficiency & optimizing ideal acoustic frequencies.
- Standardized lab protocols to improve reproducibility, collaboration, & data integrity, increasing research efficiency across teams.
- Presented at 3 conferences, earning Best Talk Award at AUS Biomed. Eng. Symposium.

Leadership & Community Engagement

- **President, Early Career Researchers in Polymer Physics (2022–):** Led a global 550-member community & organized the 2023 Virtual Symposium with 150+ attendees.
- **President & Founder, USF Postdoctoral Scholar Association (2023–):** Served 200+ postdocs via career events, DEI initiatives, & the NPA-funded ELEVATE Talk Series.
- **President & Founder, BYU Chem. Eng. Grad. Student Council (2019–2022):** Directed recruitment, outreach, & well-being programs impacting department policy.

Education

Ph.D.	Chemical Engineering	Brigham Young University	2022
M.S.	Chemical Engineering	American University of Sharjah	2017
B.S.	Chemical Engineering (Econ. Minor)	American University of Sharjah	2015

Comprehensive & updated list of publications & presentations available online at linktr.ee/pkawak