

Pierre Kawak, Ph.D.

• (801) 762-7999 • pskawak@gmail.com • linktr.ee/pkawak •

- 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, USE, AUS, GRC, IoP, etc.) to diverse audiences from industry, govt., & academia.
- Passionate about using computational methods to solve challenges in pharma & biotech.

Professional Experience

Postdoctoral Researcher	University of South Florida	2022 – Present
<ul style="list-style-type: none">• Developed & implemented large-scale molecular dynamics simulations using LAMMPS, GROMACS, Gaussian, AMBER, & OPLS, achieving high-throughput insights into nanoscale deformation, relaxation, & stress distribution in polymer composites.• Created novel molecular simulation analysis techniques for nonlinear rheology, identifying nanoscale toughening factors that favor enhanced rubber performance.• Optimized copolymer thermal stability by simulating coarse-grained & atomistic sequences, identifying novel sequences with enhanced glass transition temperatures T_g without changing feedstock or processing conditions.• Leveraged high-performance & parallelism to conduct multi-terabyte simulations on supercomputers, securing an NSF Discover ACCESS Compute Resource Grant (2023).• Developed Python, C++, bash, Slurm, Open MPI, & R automation tools for molecular modeling of polymer dynamics & mechanics, accelerating team-wide computational workflows, streamlining multi-terabyte data analysis, & improving research efficiency.• Mentored & trained 11 researchers in HPC, version control, & molecular simulations, boosting collaboration, productivity, & technical skill development & earning the APS Career Mentor Fellowship (2023).• Presented findings at 17 institutional, industrial, & academic conferences, highlighting advancements in rubber & copolymer technology, as well as polymer theory, & earning the Outstanding Poster Award at the Gordon Research Conference (2024) & the USF Annual Postdoctoral Research Symposium Best Poster Award (2023).• Founded & led the USF Postdoc. Scholar Association (PSA), serving 200+ postdocs through career programming, networking events, & advocacy, e.g., ELEVATE Talk Series, funded by prestigious NPA IMPACT Fellowship (2023, 6% acceptance rate).		
Doctoral Researcher	Brigham Young University	2017 – 2022
<ul style="list-style-type: none">• Developed, optimized, & deployed GPU-accelerated Monte Carlo simulations in C/CUDA, achieving 100× speedup in property computes, enabling experimental comparison.		

- Automated high-throughput simulations using Python, C++, bash, MATLAB, & R, sweeping multi-dimensional parameters & accelerating studies of polymer crystals.
- Constructed the first-ever 3D free energy landscapes for polymer crystallization, differentiating order-formation pathways inaccessible to classical simulations & resolving a long-standing theoretical controversy on polymer crystallization pathways.
- Developed advanced phase diagrams & applied order parameters for crystalline & orientational order, quantifying phase transitions in complex molecular landscapes.
- Visualized & analyzed large datasets of 3D molecular configurations using VMD & OVITO, extracting key structural & kinetic insights.
- Wrote 2 journal articles with 2 mentored undergraduates, supporting their careers.
- Secured research awards, e.g., APS Forum on Intl. Physics Distinguished Student Award (2022) & BYU Grad. Student Society Professional Presentation Award (2021).
- Presented at 6 conferences & directly contributed to an NSF CAREER Award (\$500,000) for continued crystallization research by producing critical preliminary findings.
- Founded & led the BYU Chemical Engineering Graduate Student Council (GSC), organizing recruitment, social & outreach events, social media content, & financial well-being initiatives for graduate students, e.g., Department Recruitment Poster Event (2019–2021) & Department BBQ Socials (2018–2021).
- Administered a financial health survey to assess graduate student well-being, influencing department policy discussions (2021).

Masters Research American University of Sharjah 2015 – 2017

- Developed ultrasound-sensitive drug delivery systems to improve chemotherapy efficiency, winning the AUS Biomedical Engineering Symposium Best Talk Award (2016).
- Designed & synthesized tumor-targeting liposomal drug carriers by functionalizing phospholipids with estrone ligands, improving breast cancer drug delivery precision.
- Formulated & optimized self-assembling chemotherapy nanoparticles using the dry film method, enhancing drug stability & controlled release kinetics.
- Validated encapsulation efficiency & nanoparticle integrity through NMR & DLS assays, ensuring high drug-loading capacity & structural robustness.
- Characterized & optimized ultrasound-triggered drug release kinetics, determining the ideal US frequency & intensity for future clinical applications.
- Standardized lab protocols to improve reproducibility, collaboration, & data integrity, increasing research efficiency across teams.
- Published findings in a peer-reviewed journal & presented at 3 conferences, disseminating contributions to biomedical engineering & drug delivery research.

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