

Pierre Kawak, Ph.D.

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- Computational polymer scientist with 11 years of experience in simulation, analysis, & mentorship across materials & drug delivery research.
- Enjoy building scalable tools & models to accelerate discovery in polymers, crystallization, & therapeutic systems – with 5 publications & 27+ conference presentations.
- Seeking research-driven roles in industry or government where I can lead impactful projects at the intersection of materials science, computation, & collaboration.

Technical Skills

- **Programming & Automation:** Python, C++, C, CUDA, MATLAB, Bash, R
- **Simulation & Modeling:** LAMMPS, GROMACS, Gaussian, AMBER, OPLS, Monte Carlo, Molecular Dynamics, Atomistic, Coarse-Graining, Free Energy Calculations
- **Data Analysis & Visualization:** VMD, OVITO, NumPy, Pandas, Matplotlib
- **HPC & Workflow Optimization:** Slurm, Open MPI, Cluster Management, Parallelization, Large-Scale Data Processing (50TB+)
- **Experimental Techniques:** Drug Encapsulation, DLS, NMR, Liposomal Formulations
- **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. Candidate 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.
- Played key role in a successful \$500K NSF CAREER proposal.

Researcher American University of Sharjah Prof. Ghaleb Hussein 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, optimizing ultrasonic parameters for clinical stability and efficacy.
- 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.

Selected Peer-Reviewed Publications

- [4] **P. Kawak**, H. Bhapkar, and D. Simmons. “On the origin of heating-induced stiffening and enthalpic reinforcement in elastomeric nanocomposites” (2025). arXiv: [2501.06971](https://arxiv.org/abs/2501.06971).
- [3] **P. Kawak**, H. Bhapkar, and D. Simmons. “Central role of filler-polymer interplay in nonlinear reinforcement of elastomeric nanocomposites”. *Macromolecules* 57 (2024). doi: [10.1021/acs.macromol.4c00489](https://doi.org/10.1021/acs.macromol.4c00489).
- [2] **P. Kawak**, C. Akiki, and D. Tree. “Effect of local chain stiffness on oligomer crystallization from a melt”. *Phys. Rev. Mater.* 8 (2024). doi: [10.1103/PhysRevMaterials.8.075606](https://doi.org/10.1103/PhysRevMaterials.8.075606).
- [1] **P. Kawak**, D. Banks, and D. Tree. “Semiflexible oligomers crystallize via a cooperative phase transition”. *J. Chem. Phys.* 155 (2021). doi: [10.1063/5.0067788](https://doi.org/10.1063/5.0067788).

Education

Ph.D.	Chemical Engineering	Brigham Young University	2022
Masters	Chemical Engineering	American University of Sharjah	2017
Bachelors	Chemical Engineering (Econ. Minor)	American University of Sharjah	2015

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