Pierre Kawak

Interdisciplinary Research Building, Office 211
University of South Florida, Tampa, FL 33613
+1 (801) 762-7999 • pskawak@gmail.com • linktr.ee/pkawak

Education

Brigham Young University (BYU) *Funded Assistantship; 3.81 GPA*	Ph.D, Chemical Engineering *Advisor: Douglas R. Tree*	2017 – 2022
Dissertation: Simulation of Crystal Nucleation in a Polymer Melt		
American University of Sharjah (AUS) *Full Scholarship; 4.0 GPA*	M.S. Chemical Engineering *Advisor: Ghaleb A. Husseini*	2015 – 2017
Dissertation: Ultrasound Triggered Release of Estrone-Targeted Liposomes		
American University of Sharjah (AUS) *Partial Scholarship*	B.S. Chemical Engineering Minor Economics	2010 – 2015

Selected Research Experience

Molecular Origins of Polymer Nanocomposite Toughness (PNC) with David S. Simmons 2022 – Present

Expertise: Nonequilibrium MD, Rouse Modes Analysis, Polymer Viscoelasticity, Shear Dissipation

- Developing equilibrium & non-eq. LAMMPS MD simulators to study rheology of filled rubber (PNCs)
- Analyzing nonlinear rheological response via local & global metrics to identify origin of toughness

Polymer Crystal Simulation with Douglas R. Tree 2017 – 2022

Skills & Tools: GitHub, C++, CUDA, Python, Bash, JSON, R, VMD, Adobe Illustrator, Adobe Premiere
Expertise: Free Energy Sim. (MC, MD), Morphology Analysis, Nucleation Theory, High Performance Comp.

- Developed and maintained 2 molecular simulators to study coarse-grained polymers
- Evaluated progress of and exposed trends in crystallization by employing varied order parameters

Ultrasound-sensitive smart drug delivery systems with Ghaleb Husseini 2014 – 2017

Skills & Tools: Assays, NMR, DLS, Spectrofluorometer, Centrifuge, Extruder, Membrane Filter, GC
Expertise: Liposomes, Chemotherapy, Drug Delivery, Surface Mod., Breast Cancer, Ultrasound

- Synthesized, validated and tested novel nanoparticle carrier for treatment of breast cancer cells
- Developed lab protocols that remain in contemporary use

Publications

[5] Douglas R. Tree and Pierre Kawak. "Review: Insights into crystal nucleation mechanisms in a polymer melt from molecular simulations" (in preparation).

[4] Pierre Kawak and Douglas R. Tree. "Chain stiffness controls crystal nucleation mechanisms in polymers" (in preparation).

[3] Pierre Kawak, Dakota S. Banks, and Douglas R. Tree. "Semiflexible oligomers crystallize via a cooperative phase transition". *Journal of Chemical Physics* 155 (2021), p. 214902. DOI: 10.1063/5.0067788.

[2] Najla M. Salkho, Vinod Paul, Pierre Kawak, Rute F. Vitor, Ana M. Martins, Mohammad Al Sayah, and Ghaleb A. Husseini. "Ultrasonically controlled estrone-modified liposomes for estrogen-positive breast cancer therapy". *Artificial Cells, Nanomedicine, and Biotechnology* 46 (2018), pp. 462–472. DOI: 10.1080/21691401.2018.1459634.

[1] Pierre Kawak. "Ultrasound triggered release of estrone- targeted liposomes". *American University of Sharjah Theses & Dissertations: Masters Theses* (2017).

Selected Presentations

[7] Pierre Kawak et al. "Acute Sensitivity of Polymer Crystallization Phase Behavior to Intermolecular Interactions". AIChE Annual Meeting. American Institute of Chemical Engineers. Phoenix, AZ, 2022.
[6] Pierre Kawak. "Be the Black Sheep: Standing out from the crowded field and setting yourself apart from your origins". oSTEM Conference. Out in STEM Incorporated. Boston, MA, 2022.
[5] Pierre Kawak et al. "Free Energy Analysis of Polymer Crystal Nucleation Indicates Cooperative Crystallization and Nematic Alignment". APS March Meeting. American Physical Society. Chicago, IL, 2022.
[4] Pierre Kawak et al. "Free Energy Surfaces for Homogeneous Nucleation in a Polymer Melt". AIChE Annual Meeting. American Institute of Chemical Engineers. Boston, MA, 2021.
[3] Pierre Kawak et al. "GPU-accelerated Wang-Landau Simulation of Polymer Crystallization". APS March Meeting. American Physical Society. Virtual, 2021.
[2] Pierre Kawak et al. "Investigating Primary Nucleation in Polymer Melts using GPU-Accelerated Wang-Landau Simulations". AIChE Annual Meeting. American Institute of Chemical Engineers. Virtual, 2020.
[1] Pierre Kawak et al. "Wang-Landau Simulation of the Free Energy Surface of Crystallization in a Polymer Melt". APS March Meeting. American Physical Society. Virtual, 2020.

Selected Academic Activities

Nomination & candidacy for APS DPOLY EC & APS FDI member of executive committee	Fall 2022
Awarded **APS Career Mentor** Fellowship & **APS FIP Distinguished Student** Award	Fall 2022
BYU University Accessibility Center Banquet Scholarship for **gifted disabled students**	Fall 2021
Awarded BYU GSS Prof. Presentation & BYU ChemE Dept. Travel	Fall 2021
AUS: Biomed. Eng. Symposium **Best Talk Award**; 3× dean's list for **academic excellence**	2010 – 2016
Certified Reviewer for American Chemical Society Journals (4 peer review)	Fall 2021
Member & Volunteer of Out in Science, Tech., Engineering, & Maths. Inc. (oSTEM)	2021 – now
Cofounder & president of BYU ChemE Graduate Student Council	2018 – now
Regular **Volunteer** judge at local school and district science fairs	-
Member & Volunteer of Delta Alpha Pi (DAPi) International Honor Society	2021 – now
Fully-funded attendance of oSTEM 2021 Professional Dev. Summit & 2022 conference	2021 – 2022
Attendance of the UCSD SDSC High Performance Computing Summer Institute	Summ 2018

Teaching Experience

Graduate Teaching Assistant *Brigham Young University*	Thermodynamics Separations Engineering Heat & Mass Transfer Process Dynamics & Control	Winter 2021 Fall 2021 2018 – 2021 (3x) Fall 2018
Volunteer Course Instructor; *University of the People*	College Algebra	Spring 2018
Graduate Instructor; *American University of Sharjah*	Principles of ChemE	2016 – 2017 (3x)
Graduate Teaching Assistant *American University of Sharjah*	Corrosion Lab ChemE Lab I Graduate Desalination Wastewater Treatment	2016 – 2017 (2x) 2015 – 2016 (2x) Spring 2015 Spring 2015
Undergraduate Teaching Assistant *American University of Sharjah*	Mass Transfer Kinetics Thermodynamics	2014 – 2015 (3x) Fall 2014 Spring 2014
Private Tutor	Maths, Engineering, Business, etc.	2008 – now

References

David S. Simmons +1 (813) 974-4988 dssimmons@usf.edu
Associate Professor of Chemical Engineering; University of South Florida *Postdoc Advisor*

Douglas R. Tree +1 (801) 422-5162 tree.doug@byu.edu
Assistant Professor of Chemical Engineering; Brigham Young University *PhD Advisor*

Ghaleb A. Husseini +971 (6) 515-2970 ghusseini@aus.edu
Professor of Chemical Engineering; American University of Sharjah *MS Advisor*

Thomas A. Knotts +1 (801) 422-9158 thomas.knotts@byu.edu
Professor of Chemical Engineering; Brigham Young University *Dissertation Committee Member*

John D. Hedengren +1 (801) 422-2590 john_hedengren@byu.edu
Associate Professor of Chemical Engineering; Brigham Young University *Graduate Committee Head*

William G. Pitt +1 (801) 422-2589 pitt@byu.edu
Professor of Chemical Engineering; Brigham Young University *Dissertation Committee Member*