# Pierre Kawak

# Engineering Building, EB 312 Brigham Young University, Provo, UT 84602

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#### Education

Brigham Young University (BYU) Full Scholarship	Ph.D, Chemical Engineering Advisor: Douglas R. Tree	2017 – Apr 2022
Dissertation: Simulation of Crystal Nucleation i	n a Polymer Melt	
American University of Sharjah (AUS)  Full Scholarship; Only Graduate with 4.0 CGPA  Thesis: Ultrasound Triggered Release of Estrone	M.S. Chemical Engineering  Advisor: Ghaleb A. Husseini  - Targeted Liposomes	2015 – 2017
American University of Sharjah (AUS)  Partial Scholarship	B.S. Chemical Engineering Minor Economics	2010 – 2015

## Selected Research Experience

#### Polymer Crystal Simulation with Douglas Tree

2017 - present

- Studied and simulated coarse-grained polymer models using molecular simulation methods
- Evaluated progress of and exposed trends in crystallization by employing varied order parameters
- Constructed accelerated, efficient and novel codes using C++, CUDA, Python, Bash, JSON, R, etc.
- Illustrated scientific results using VMD, Adobe Suite, etc.

## Ultrasound-sensitive smart drug delivery systems with Ghaleb Husseini

2014 - 2017

- Synthesized, validated and tested novel nanoparticle carrier for treatment of breast cancer cells
- Mastered lab methods including film hydration, centrifugation, extrusion, membrane filtration, etc.
- Analyzed release of nanoparticle carrier using NMR, DLS, ultrasound probe, spectrofluorometer, etc.
- Developed lab protocols that remain in contemporary use

#### **Publications**

- [4] Pierre Kawak and Douglas R. Tree. "Free energy trends in soft semiflexible 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

- [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.

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Graduate Committee Head

Graduate Teaching Assistant Brigham Young University	Thermodynamics & Thermo L Separations Engineering Process Dynamics & Control Heat & Mass Transfer	ab Winter 2021 Fall 2021 Fall 2018 Winter 2018
Volunteer Course Instructor; <i>University of the People</i>	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 Desalination (Grad.) 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,	1 0
Selected Miscellaneous Memberships and Acad	emic Activities	
Recipient of the BYU GSS Professional Presentation Award		Fall 2021
AUS Biomedical Engineering Symposium Best Overall Talk Award Recipient of three AUS dean's list awards for academic excellence Certified Reviewer for American Chemical Society Journals (4 completed)		Fall 2016
		2010 - 2014
		Fall 2021
<b>Member and Volunteer</b> of Out in Science, Technol (oSTEM), Inc.	ogy, Engineering, and Mathema	atics 2021 – present
Cofounder and president of BYU ChemE Graduate	Student Council	2018 – present
Cofounder of three successful student clubs  Current Member of APS, AIChE and DAPi Honor Society		2012 – 2018
		present
Past Member of various other scientific clubs and soceities (IEEE, SPE, EMBS)		2012 – 2017
Attendance of the oSTEM Professional Development Summit		Fall 2021
Attendance of the UCSD SDSC High Performance Computing Summer Institute		Summer 2018
Two time <b>Volunteer</b> science fair judge at local school	ls	2021 – 2022
References		
Douglas R. Tree +1 (80 Assistant Professor of Chemical Engineering; Brigham	1) 422-5162 Young University	tree.doug@byu.edu PhD Advisor
Ghaleb A. Husseini +971 ( Professor of Chemical Engineering; American Univers	6) 515-2970 ity of Sharjah	ghusseini@aus.edu <i>MS Advisor</i>
Thomas A. Knotts +1 (80 Professor of Chemical Engineering; Brigham Young U	,	homas.knotts@byu.edu tation Committee Member
	•	hn_hedengren@byu.edu

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

Associate Professor of Chemical Engineering; Brigham Young University