Pierre Kawak

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Education

Brigham Young University (BYU) — Ph.D, Chemical Engineering — 2017 – Apr 2022
Funded Assistantship — *Advisor: Douglas R. Tree*
Dissertation: Simulation of Crystal Nucleation in a Polymer Melt

American University of Sharjah (AUS) — M.S. Chemical Engineering — 2015 – 2017
Full Scholarship; Only Graduate with 4.0 CGPA — *Advisor: Ghaleb A. Husseini*
Dissertation: Ultrasound Triggered Release of Estrone- Targeted Liposomes

American University of Sharjah (AUS) — B.S. Chemical Engineering — 2010 – 2015
Partial Scholarship — Minor Economics

Selected Research Experience

Polymer Crystal Simulation with Douglas Tree — 2017 – present

Skills & Tools: GitHub, C++, CUDA, Python, Bash, JSON, R, VMD, Adobe Illustrator, Adobe Premiere
Expertise: Crystallization, Nucleation Theory, Materials Science, Polymer Physics, 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

[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.

Teaching Experience

Graduate Teaching Assistant *Brigham Young University*	Thermodynamics & Thermo Lab Separations Engineering Process Dynamics & Control Heat & Mass Transfer	Winter 2021 Fall 2021 Fall 2018 Winter 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 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, etc.	2008 – present

Selected Academic Activities

Recipient of the BYU GSS Professional Presentation Award	Fall 2021
AUS Biomedical Engineering Symposium **Best Overall Talk Award**	Fall 2016
Recipient of three AUS dean's list awards for academic excellence	2010 – 2014
Certified Reviewer for American Chemical Society Journals (4 completed)	Fall 2021
Member & Volunteer of Out in Science, Tech., Engineering, & Maths. (oSTEM)	2021 – present
Cofounder & president of BYU ChemE Graduate Student Council	2018 – present
Cofounder of three successful student clubs	2012 – 2018
Volunteer science fair judge at local schools (3x)	present
American Physical Soceity (APS) & American Institute of Chem. Eng. (AIChE) **Member**	present
Member & Volunteer of Delta Alpha Pi (DAPi) International Honor Society	2021 – present
Past **Member** of various other scientific clubs & 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

References

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*