

# Pierre Kawak

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## Education

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

## Selected Research Experience

|   |                |
|---|----------------|
| Polymer Crystal Simulation with Douglas Tree  | 2017 – present |
| <ul style="list-style-type: none"><li>• Studied and simulated coarse-grained polymer models using molecular simulation methods</li><li>• Evaluated progress of and exposed trends in crystallization by employing varied order parameters</li><li>• Constructed accelerated, efficient and novel codes using C++, CUDA, Python, Bash, JSON, R, etc.</li><li>• Illustrated scientific results using VMD, Adobe Suite, etc.</li></ul>               |                |
| Ultrasound-sensitive smart drug delivery systems with Ghaleb Hussein  | 2014 – 2017    |
| <ul style="list-style-type: none"><li>• Synthesized, validated and tested novel nanoparticle carrier for treatment of breast cancer cells</li><li>• Mastered lab methods including film hydration, centrifugation, extrusion, membrane filtration, etc.</li><li>• Analyzed release of nanoparticle carrier using NMR, DLS, ultrasound probe, spectrofluorometer, etc.</li><li>• Developed lab protocols that remain in contemporary use</li></ul> |                |

## 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](https://doi.org/10.1063/5.0067788).
- [2] Najla M. Salkho, Vinod Paul, Pierre Kawak, Rute F. Vitor, Ana M. Martins, Mohammad Al Sayah, and Ghaleb A. Hussein. “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](https://doi.org/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<br><i>Brigham Young University</i>            | Thermodynamics & Thermo Lab        | Winter 2021      |
|   | Separations Engineering            | Fall 2021        |
|   | Process Dynamics & Control         | Fall 2018        |
|   | Heat & Mass Transfer               | Winter 2018      |
| Volunteer Course Instructor; <i>University of the People</i>              | College Algebra                    | Spring 2018      |
| Graduate Instructor; <i>American University of Sharjah</i>                | Principles of ChemE                | 2016 – 2017 (3x) |
| Graduate Teaching Assistant<br><i>American University of Sharjah</i>      | Corrosion Lab                      | 2016 – 2017 (2x) |
|   | ChemE Lab I                        | 2015 – 2016 (2x) |
|   | Desalination (Grad.)               | Spring 2015      |
|   | Wastewater Treatment               | Spring 2015      |
| Undergraduate Teaching Assistant<br><i>American University of Sharjah</i> | Mass Transfer                      | 2014 – 2015 (3x) |
|   | Kinetics                           | Fall 2014        |
|   | Thermodynamics                     | Spring 2014      |
| Private Tutor   | Maths, Engineering, Business, etc. | 2008 – present   |

## Selected Miscellaneous Memberships and Academic Activities

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|---|----------------|
| <b>Recipient</b> of the BYU GSS Professional Presentation Award                                       | Fall 2021      |
| AUS Biomedical Engineering Symposium <b>Best Overall Talk Award</b>                                   | Fall 2016      |
| <b>Recipient</b> of three AUS dean's list awards for academic excellence                              | 2010 – 2014    |
| <b>Certified Reviewer</b> for American Chemical Society Journals (4 completed)                        | Fall 2021      |
| <b>Member and Volunteer</b> of Out in Science, Technology, Engineering, and Mathematics (oSTEM), Inc. | 2021 – present |
| <b>Cofounder and president</b> of BYU ChemE Graduate Student Council                                  | 2018 – present |
| <b>Cofounder</b> of three successful student clubs  | 2012 – 2018    |
| Current <b>Member</b> of APS, AIChE and DAPi Honor Society  | present        |
| Past <b>Member</b> of various other scientific clubs and societies (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 schools   | 2021 – 2022    |

## References

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|---|-------------------|--|
| Douglas R. Tree   | +1 (801) 422-5162 | <a href="mailto:tree.doug@byu.edu">tree.doug@byu.edu</a>           |
| Assistant Professor of Chemical Engineering; Brigham Young University |                   | <i>PhD Advisor</i>   |
| Ghaleb A. Hussein   | +971 (6) 515-2970 | <a href="mailto:g Hussein@aus.edu">g Hussein@aus.edu</a>           |
| Professor of Chemical Engineering; American University of Sharjah     |                   | <i>MS Advisor</i>  |
| Thomas A. Knotts  | +1 (801) 422-9158 | <a href="mailto:thomas.knotts@byu.edu">thomas.knotts@byu.edu</a>   |
| Professor of Chemical Engineering; Brigham Young University           |                   | <i>Dissertation Committee Member</i>                               |
| John D. Hedengren   | +1 (801) 422-2590 | <a href="mailto:john_hedengren@byu.edu">john_hedengren@byu.edu</a> |
| Associate Professor of Chemical Engineering; Brigham Young University |                   | <i>Graduate Committee Head</i>                                     |
| William G. Pitt   | +1 (801) 422-2589 | <a href="mailto:pitt@byu.edu">pitt@byu.edu</a>                     |
| Professor of Chemical Engineering; Brigham Young University           |                   | <i>Dissertation Committee Member</i>                               |