Joseph D Peterson

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EDUCATION

- Postdoctoral Studies — University of Cambridge, UK — (2019 –)
- Chemical Engineering, PhD — University of Santa Barbara, CA. — (2013 – 18) — GPA 3.9
  ***Advisors**: Gary Leal, Glenn Fredrickson*
- Chemical Engineering, BS — University of Minnesota, Twin Cities. — (2011 – 13) — GPA 3.7
- Applied Mathematics, BS — Northwestern College — (2008 – 11) — GPA 3.9

RESEARCH INTERESTS

- Soft matter and complex fluids
- Nonlinear dynamics of biological systems

TEACHING EXPERIENCE

- Co-instructor — Numerical Methods for Chemical Engineers (undergraduate) — 2016
- Reader — Advanced Transport Phenomena (graduate) — 2015
- Reader — Thermodynamics — 2014
- Private Tutor — Undergraduate Chemical Engineering (ESTEEM program) — 2015

INDUSTRY EXPERIENCE

- 3M Company, Technical Aide (2010 – 2012) and Intern (2013), Safety and Graphics Laboratory
  - Schlieren Imaging – designed and operated flow visualization equipment
  - Nonwovens – testing new product ideas at pilot scale and lab scale
  - Filled polymers – testing new product ideas at pilot scale and lab scale
- Postdoctoral scholar at University of Cambridge, funded by Unilever Corporation
  - Wormlike Micelles – constitutive models for formulation and processing
  - Dense Emulsions – constitutive equations for emulsification

HONORS

- Best presentation, UCSB graduate student symposium (2017)
- CSP teacher/scholar fellowship (2016)
- Heslin Fellowship (2013)
- Dow Outstanding Junior Award (2012)
- Northwestern College Honors Scholarship (2008 – 2011)

PUBLIC OUTREACH

- St. Lawrence Primary School (Cambridge UK), Origami Club, 2019 - 2020

PUBLICATIONS

- **Peterson, J. D**., M. Cromer, G. H. Fredrickson, and L. G. Leal. "Shear banding predictions for the two-fluid Rolie-Poly model." Journal of Rheology 60.5 (2016): 927-951.
- **Peterson, J. D**., G. H. Fredrickson, and L. G. Leal. "Does shear induced demixing resemble a thermodynamically driven instability?" Journal of Rheology 63.2 (2019): 335-359.
- Boudara, V., **J. D. Peterson**, L. G. Leal, and D. J. Read. "Nonlinear rheology of polydisperse blends of entangled linear polymers: Rolie-Double-Poly models." Journal of Rheology 63.1 (2019): 71-91.
- **Peterson, J. D.**, G. H. Fredrickson, and L. G. Leal. "Shear Induced Demixing in Bidisperse and Polydisperse Polymer Blends: Predictions From a Multi-Fluid Model." accepted for publication, Journal of Rheology (2020)
- Gillissen, J.J., C. Ness, **J.D. Peterson**, H. J. Wilson, and M. E. Cates, 2019. Constitutive model for time-dependent flows of shear-thickening suspensions. Physical Review Letters, 123.21, p.214504.
- Gillissen, J. J. J., C. Ness, **J. D. Peterson**, H. J. Wilson, and M. E. Cates. "Constitutive model for shear-thickening suspensions: Predictions for steady shear with superposed transverse oscillations." Journal of Rheology 64.2 (2020): 353-365.
- **Peterson, J. D**. and M. E. Cates, "A full-chain tube-based constitutive model for living linear polymers." accepted for publication, Journal of Rheology (2020)
- **Peterson, J. D**. and M. E. Cates, "Constitutive Models for Living Polymers Beyond the fast-breaking Limit", pending approval from industry sponsor for submission to Journal of Rheology.
- Adhikari, R., et al [**J. D. Peterson**]. "Inference, prediction and optimization of non-pharmaceutical interventions using compartment models: the PyRoss library." arXiv preprint arXiv:2005.09625 (2020).
- **Peterson, J. D**. and R. Adhikari, "Efficient and flexible methods for time since infection models." arXiv preprint [**link when available**]

RESEARCH TALKS (CONFERENCES)

- "A population balance model for the non-linear rheology of well entangled wormlike micelles", Joseph Peterson, Mike Cates, Condensed Matter Physics Seminar, Durham University July 2020
- "Predictions for the Linear and non-linear rheology of living Rolie Poly polymers", Joseph Peterson, L. Gary Leal, Invited talk, INNFM 2019, Lake Vyrnwy, Wales.
- "A simple constitutive model for polymer blends: Predictions and experimental comparisons for viscometric and non-viscometric flows," Joseph D. Peterson, Victor Boudara, Daniel J. Read, Chandi Sasmal, and L. Gary Leal. SOR 2018, Houston, TX.
- **"**Predictions for non-linear flows of polydisperse blends from a differential-constitutive double reptation model," Joseph Peterson, L. Gary Leal, Glenn H. Fredrickson, AICHE 2017, Minneapolis
- "Shear induced demixing in large amplitude oscillatory shear flows," Joseph D. Peterson**,** L. Gary Leal. AICHE 2016, San Francisco.
- "Predictions of flow-induced demixing and shear banding in polydisperse polymer melts," Joseph D. Peterson, L. Gary Leal, Glenn H. Fredrickson, SOR 2017, Denver
- "Flow Induced Inhomogeneity for a Polymer Solution in Oscillatory Shear Flow", Joseph D. Peterson, L. Gary Leal. International Conference on Theoretical and Applied Mechanics 2016, Montreal, Canada. (Abstract and proceedings available upon request)

- "Theoretical Studies of Shear Banding in Polymer Solutions," Joseph D. Peterson, Michael Cromer, Glenn H. Fredrickson, and L. Gary Leal. International Congress on Rheology 2016, Kyoto, Japan.

RESEARCH TALKS (RECORDED

- "Modelling polymer blends in flow," Joseph D. Peterson, Glenn H. Fredrickson, L. Gary Leal. Thesis defense (2018). https:/bit.ly/2IRJPmf
- "Two-fluid models for polymer melts and solutions," Joseph D. Peterson, Glenn H. Fredrickson, L. Gary Leal. KITP dense suspensions workshop (2018). (talk begins at 1:00:58) https://bit.ly/2xe7OFl

REFERENCES

- Dr. Gary Leal, Professor of Chemical Engineering, UCSB (primary advisor, PhD). lgl20@engineering.ucsb.edu
- Dr. Glenn Fredrickson, Professor of Chemical Engineering, UCSB (secondary advisor, PhD). ghf@mrl.ucsb.edu
- Dr. Mike Cates, Lucasian Professor of Mathematics, University of Cambridge (postdoc supervisor). m.e.cates@damtp.cam.ac.uk
- Dr. Ronojoy Adhikari, Faculty of Mathematics, University of Cambridge (RAMP supervisor) ra413@damtp.cam.ac.uk