

Douglas R. Tree

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Education

UC Santa Barbara <i>Materials Research Laboratory</i>	Postdoctoral Scholar <i>Glenn Fredrickson</i>	2014–2017
University of Minnesota <i>Chemical Eng. & Materials Sci.</i>	Ph.D, Chemical Engineering <i>Kevin Dorfman</i>	2009–2014
Brigham Young University	B.S. Chemical Engineering <i>magna cum laude</i>	2003–2009

Appointments

Brigham Young University <i>Chemical Engineering</i>	Assistant Professor	2017 – present
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Awards

Journal of Polymer Science Poster Prize, Kramer Memorial Conference	2016
APS Padden Award Finalist	2014
University of Minnesota Doctoral Dissertation Fellowship	2013 – 2014
Honorable Mention, NSF Graduate Research Fellowship	2011
Brigham Young University Heritage Scholarship	2003 – 2009

External Grants

<i>American Chemical Society, Petroleum Research Fund, Doctoral New Investigator,</i> The role of nucleation in melt memory effects in semi-crystalline polymers	2018–2020
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Courses Taught

Ch En 374	Undergraduate Fluid Mechanics	Fall 2017–2019
Ch En 263	Undergraduate Numerical Tools	Winter 2018–2019
Ch En 391	Undergraduate Carrer Skills	Winter 2019

Professional Activities

<i>Session Chair/Co-Chair</i> , AICHE Annual Meeting, 08A Polymers Area	2018-2019
<i>Member</i> , Society of Rheology	2017 – present
<i>Member</i> , American Physical Society (DPOLY, GSOF)	2011 – present
<i>Member</i> , American Institute of Chemical Engineers	2007 – present
<i>Member</i> , American Electrophoresis Society	2011 – 2014
<i>Peer Reviewer</i> : <i>Macromolecules</i> , <i>Physical Review Letters</i> , <i>ACS Nano</i> , <i>Journal of Statistical Physics</i> , <i>Journal of Engineering Mathematics</i> , <i>Physical Review E</i> , <i>ACS Petroleum Research Fund</i>	

Public Outreach

Faculty lead for a class project where undergraduate BYU Fluid Mechanics students participate in a science/engineering fair-style project with students from a local high school (Mountain View HS)	2017
Presentation on non-Newtonian fluid mechanics to underrepresented minorities at Olson Middle school in Bloomington, Minnesota	2013
Participated in University of Minnesota's "Energy and U" events for local elementary school students in the Twin Cities area	2011–2014
Judge at Central Utah Science and Engineering Fair	2009

Publications

- [19] Douglas R. Tree, Lucas F. Dos Santos, Caden B. Wilson, Timothy R. Scott, Jan Ulric Garcia, and Glenn H. Fredrickson (Cover Article). "Mass-transfer driven spinodal decomposition in a ternary polymer solution". *Soft Matter* 15.23 (2019), pp. 4614–4628. DOI: [10.1039/c9sm00355j](https://doi.org/10.1039/c9sm00355j).
- [18] Douglas R. Tree, Tatsuhiro Iwama, Kris T. Delaney, Joshua Lee, and Glenn H. Fredrickson. "Marangoni Flows during Nonsolvent Induced Phase Separation". *ACS Macro Letters* 7 (2018), pp. 582–586. DOI: [10.1021/acsmacrolett.8b00012](https://doi.org/10.1021/acsmacrolett.8b00012).
- [17] Douglas R. Tree, Kris T. Delaney, Hector D. Cenicerros, Tatsuhiro Iwama, and Glenn H. Fredrickson. "A multi-fluid model for microstructure formation in polymer membranes". *Soft Matter* 13 (2017), pp. 3013–3030. DOI: [10.1039/C6SM02839J](https://doi.org/10.1039/C6SM02839J).
- [16] Kevin D. Dorfman, Damini Gupta, Aashish Jain, Abhiram Muralidhar, and Douglas R. Tree. "Hydrodynamics of DNA confined in nanoslits and nanochannels". *Eur. Phys. J. Spec. Top.* 223 (2014), pp. 3179–3200. DOI: [10.1140/epjst/e2014-02326-4](https://doi.org/10.1140/epjst/e2014-02326-4).
- [15] Abhiram Muralidhar, Douglas R. Tree, and Kevin D. Dorfman. "Backfolding of Wormlike Chains Confined in Nanochannels". *Macromolecules* 47 (2014), pp. 8446–8458. DOI: [10.1021/ma501687k](https://doi.org/10.1021/ma501687k).
- [14] Douglas R. Tree, Wesley F. Reinhart, and Kevin D. Dorfman. "The Odijk Regime in Slits". *Macromolecules* 47.11 (2014), pp. 3672–3684. DOI: [10.1021/ma500647v](https://doi.org/10.1021/ma500647v).

- [13] Abhiram Muralidhar, Douglas R. Tree, Yanwei Wang, and Kevin D. Dorfman. "Interplay between chain stiffness and excluded volume of semiflexible polymers confined in nanochannels". *J. Chem. Phys.* 140, 084905 (2014). DOI: [10.1063/1.4865965](https://doi.org/10.1063/1.4865965).
- [12] Douglas R. Tree, Yanwei Wang, and Kevin D. Dorfman. "Modeling the Relaxation Time of DNA Confined in a Nanochannel". *Biomicrofluidics* 7 (2013), p. 054118. DOI: [10.1063/1.4826156](https://doi.org/10.1063/1.4826156).
- [11] Douglas R. Tree, Abhiram Muralidhar, Patrick S. Doyle, and Kevin D. Dorfman. "Is DNA a Good Model Polymer?" *Macromolecules* 46 (2013), pp. 8369–8382. DOI: [10.1021/ma401507f](https://doi.org/10.1021/ma401507f).
- [10] Douglas R. Tree, Yanwei Wang, and Kevin D. Dorfman. "Extension of DNA in a Nanochannel as a Rod-to-Coil Transition". *Phys. Rev. Lett.* 110 (2013), p. 208103. DOI: [10.1103/PhysRevLett.110.208103](https://doi.org/10.1103/PhysRevLett.110.208103).
- [9] Liang Dai, Douglas R. Tree, Johan R. C. van der Maarel, Kevin D. Dorfman, and Patrick S. Doyle. "Revisiting Blob Theory for DNA Diffusivity in Slitlike Confinement". *Phys. Rev. Lett.* 110 (2013), p. 168105. DOI: [10.1103/PhysRevLett.110.168105](https://doi.org/10.1103/PhysRevLett.110.168105).
- [8] Kevin D. Dorfman, Scott B. King, Daniel W. Olson, Joel D. P. Thomas, and Douglas R. Tree. "Beyond Gel Electrophoresis: Microfluidic Separations, Fluorescence Burst Analysis, and DNA Stretching". *Chem. Rev.* 113.4 (2013), pp. 2584–2667. DOI: [10.1021/cr3002142](https://doi.org/10.1021/cr3002142).
- [7] Wesley F. Reinhart, Douglas R. Tree, and Kevin D. Dorfman. "Entropic depletion of DNA in triangular nanochannels". *Biomicrofluidics* 7.2 (2013), p. 024102. DOI: [10.1063/1.4794371](https://doi.org/10.1063/1.4794371).
- [6] Bradley E. Skidmore, Ryan A. Baker, Dila R. Banjade, Jason M. Bray, Douglas R. Tree, and Randy S. Lewis. "Syngas fermentation to biofuels: Effects of hydrogen partial pressure on hydrogenase efficiency". *Biomass and Bioenergy* 55 (2013), pp. 156–162. DOI: [10.1016/j.biombioe.2013.01.034](https://doi.org/10.1016/j.biombioe.2013.01.034).
- [5] Douglas R. Tree, Yanwei Wang, and Kevin D. Dorfman. "Mobility of a Semiflexible Chain Confined in a Nanochannel". *Phys. Rev. Lett.* 108 (2012), p. 228105. DOI: [10.1103/PhysRevLett.108.228105](https://doi.org/10.1103/PhysRevLett.108.228105).
- [4] Yanwei Wang, Wes F. Reinhart, Douglas R. Tree, and Kevin D. Dorfman. "Resolution limit for DNA barcodes in the Odijk regime". *Biomicrofluidics* 6.1 (2012), pp. 014101–9. DOI: [10.1063/1.3672691](https://doi.org/10.1063/1.3672691).
- [3] Yanwei Wang, Douglas R. Tree, and Kevin D. Dorfman. "Simulation of DNA Extension in Nanochannels". *Macromolecules* 44.16 (2011), pp. 6594–6604. DOI: [10.1021/ma201277e](https://doi.org/10.1021/ma201277e).
- [2] Deshun Xu, Douglas R. Tree, and Randy S. Lewis. "The effects of syngas impurities on syngas fermentation to liquid fuels". *Biomass and Bioenergy* 35.7 (2011), pp. 2690–2696. DOI: [10.1016/j.biombioe.2011.03.005](https://doi.org/10.1016/j.biombioe.2011.03.005).
- [1] Peng Hu, Douglas R. Tree, and Randy S. Lewis. "Bioenergy and Biofuel from Biowastes and Biomass". Ed. by Samir K. Khanal, Rao Y. Surampalli, Tian C. Zhang, Buddhi P. Lamsal, R.D. Tyagi, and C.M. Kao. 11. American Society of Civil Engineers, 2010. Chap. Syngas fermentation to ethanol: Challenges and opportunities, pp. 230–232.

Presentations

- [22] Douglas R. Tree, Pierre Kawak, Andrew Gibson, and Beverly Delgado. "Developing a Tractable Simulation of Primary Crystal Nucleation in a Polymer Melt". AICHE Annual Meeting. 2019. URL: <https://aiche.confex.com/aiche/2019/meetingapp.cgi/Paper/574670>.

- [21] Douglas R. Tree, Dakota Banks, Hayden Hedworth, Timothy R. Scott, and Caden B. Wilson. "Nonsolvent Induced Phase Separation in Films and Droplets". AICHE Annual Meeting. 2019. URL: <https://aiche.confex.com/aiche/2019/meetingapp.cgi/Paper/574490>.
- [20] Douglas R. Tree, Lucas Francisco Dos Santos, Caden B. Wilson, Timothy R. Scott, Jan Ulrich Garcia, and Glenn Fredrickson. "Diffusion driven nonsolvent induced phase separation". APS March Meeting. 2019. URL: <https://meetings.aps.org/Meeting/MAR19/Session/C25.11>.
- [19] Douglas R. Tree, Lucas Francisco Dos Santos, and Glenn H. Fredrickson. "Modeling the Effects of Mass Transfer on Microstructure Formation in Polymer Membranes (Poster)". AICHE Annual Meeting. 2018. URL: <https://aiche.confex.com/aiche/2018/meetingapp.cgi/Paper/525637>.
- [18] Douglas R. Tree, Lucas Francisco Dos Santos, and Glenn H. Fredrickson. "Modeling the effects of mass transfer on microstructure formation in nonsolvent induced phase separation (Poster)". Gordon Research Conference on Polymer Physics. 2018.
- [17] Douglas R. Tree, Kris Delaney, and Glenn H. Fredrickson. "Interfacial Marangoni Flows During Non-Solvent Induced Phase Separation of a Ternary Polymer Solution". APS March Meeting. 2018. URL: <https://meetings.aps.org/Meeting/MAR18/Session/E54.3>.
- [16] Douglas R. Tree. "Modeling Phase Separation Dynamics in Polymeric Fluids". Complex Fluids Design Consortium Annual Meeting (Invited). 2018.
- [15] Douglas R. Tree and Glenn H. Fredrickson. "Marangoni Instability during the Non-Solvent Induced Phase Separation of a Ternary Polymer Solution". AICHE Annual Meeting. 2017. URL: <https://aiche.confex.com/aiche/2017/meetingapp.cgi/Paper/494129>.
- [14] Douglas R. Tree and Glenn H. Fredrickson. "Modeling the Effects of Mass Transfer on Microstructure Formation in Phase-Inversion Membranes". AICHE Annual Meeting. 2017. URL: <https://aiche.confex.com/aiche/2017/meetingapp.cgi/Paper/494135>.
- [13] Douglas R. Tree and Glenn H. Fredrickson. "A multi-fluid model of phase-inversion in membrane formation". The Society of Rheology 88th Annual Meeting. 2017. URL: <https://www.rheology.org/SoR172/ViewPaper?ID=92>.
- [12] Douglas R. Tree and Glenn H. Fredrickson. "A multi-fluid model of phase-inversion membrane formation". American Institute of Chemical Engineers Annual Meeting. 2016. URL: <https://aiche.confex.com/aiche/2016/webprogram/Paper458670.html>.
- [11] Douglas R. Tree and Glenn H. Fredrickson. "Multi-fluid models of polymeric liquids". American Physical Society March Meeting. 2016. URL: <https://meetings.aps.org/Meeting/MAR16/Session/B34.5>.
- [10] Douglas R. Tree, Kris Delaney, and Glenn Fredrickson. "Dynamics Phase Field Models for Polymeric Liquids". American Institute of Chemical Engineers Annual Meeting. 2015. URL: <https://aiche.confex.com/aiche/2015/webprogram/Paper423100.html>.
- [9] Douglas R. Tree, Kris Delaney, and Glenn Fredrickson. "Multi-fluid simulations of polymer dynamics". American Physical Society March Meeting. 2015. URL: <http://meetings.aps.org/link/BAPS.2015.MAR.T42.5>.
- [8] Douglas R. Tree and Kevin D. Dorfman. "On the crossover from Odijk to de Gennes in tube-confined semiflexible polymers". American Physical Society March Meeting. 2014. URL: <http://meetings.aps.org/Meeting/MAR14/Session/G22.6>.

- [7] Douglas R. Tree, Abhiram Muralidhar, Yanwei Wang, Patrick S. Doyle, and Kevin D. Dorfman. "When is DNA Flexible and Non-Draining?" American Institute of Chemical Engineers Annual Meeting. 2013. URL: <https://aiche.confex.com/aiche/2013/webprogram/Paper340899.html>.
- [6] Douglas R. Tree. "DNA Confined in Nanochannels". Advanced Doctoral Student Seminar Series (*Invited*). University of Minnesota Department of Chemical Engineering and Materials Science. 2013.
- [5] Douglas R. Tree, Yanwei Wang, and Kevin D. Dorfman. "Mobility of DNA in a Nanochannel". Advances in Microfluidics and Nanofluidics. 2013.
- [4] Douglas R. Tree, Yanwei Wang, and Kevin D. Dorfman. "Universal Regimes of a Semiflexible Polymer Confined in a Channel". American Physical Society March Meeting. 2013. URL: <http://meetings.aps.org/Meeting/MAR13/Event/188340>.
- [3] Douglas R. Tree, Yanwei Wang, and Kevin D. Dorfman. "Mobility of a Semiflexible Chain in a Nanochannel". APS Division of Fluid Dynamics. 2012. URL: <http://meetings.aps.org/link/BAPS.2012.DFD.G30.9>.
- [2] Douglas R. Tree, Yanwei Wang, and Kevin D. Dorfman. "Extension and Diffusion of DNA in Nanochannels". American Physical Society March Meeting. 2012. URL: <http://meetings.aps.org/link/BAPS.2012.MAR.Q39.6>.
- [1] Yanwei Wang, Douglas R. Tree, and Kevin D. Dorfman. "DNA Extension in Nanochannels". American Institute of Chemical Engineers Annual Meeting. 2011. URL: <http://www3.aiche.org/Proceedings/Abstract.aspx?PaperID=221677>.