

Curriculum vitae: Ralm Gerick Ricarte

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Education

Ph.D., Chemical Engineering 2016
University of Minnesota-Twin Cities, Minneapolis, MN
Advisors: Timothy P. Lodge and Marc A. Hillmyer

B.S. with High Special Honors, Chemical Engineering 2011
The University of Texas at Austin, Austin, TX
Advisor: Benny D. Freeman

Appointments

Assistant Professor 2020-Present
Florida A&M University-Florida State University College of Engineering
Department of Chemical and Biomedical Engineering

Marie Curie and PRESTIGE Postdoctoral Fellow 2017–2019
ESPCI Paris
Chimie Moléculaire, Macromoléculaire, et Matériaux
Advisor: Ludwik Leibler

Selected awards and honors

3M Non-Tenured Faculty Award 2023
Florida State University Outstanding Teaching in the Major
(Undergraduate) Award Nominee 2023
Oak Ridge Associated Universities Ralph E. Powe Junior Faculty
Enhancement Award 2022
Florida State University Advising Award Nominee 2022
National Science Foundation CAREER Award 2021
Campus France PRESTIGE Postdoctoral Research Fellowship 2017
Robert V. Mattern Fellowship 2011
National Science Foundation Graduate Research Fellowship 2011
University of California, Berkeley Amgen Scholar 2010
Omega Chi Epsilon Chemical Engineering Honor Society 2009
Tau Beta Pi Engineering Honor Society 2009
John Philip Sousa Award 2007

Peer-reviewed publications

14) Ricarte, R.G.;* Shanbhag, S.* A Tutorial Review of Linear Rheology for Polymer Chemists: Basics and Best Practices for Covalent Adaptable Networks. *Accepted for publication in Polymer Chemistry*. (*Corresponding authors)

13) Ricarte, R.G.;* Shanbhag, S.;* Ezzeddine, D.; Barzycki, D.C.; Fay, K. Time-temperature superposition of polybutadiene vitrimers. *Macromolecules* **2023**, *56*, 6806–6817. (*Corresponding authors) DOI: 10.1021/acs.macromol.3c00883

- 12) Shanbhag, S.; **Ricarte, R.G.** On the Effective Lifetime of Reversible Bonds in Transient Networks. *Macromol. Theory Simul.* **2023**, *32*. DOI: 10.1002/mats.202300002
- 11) Li, G.; Barzycki, D.C.; **Ricarte, R.G.** Encapsulation of phenylacetic acid in block copolymer nanoparticles during polymerization induced self-assembly. *AIChE Journal* **2023**, *69*. DOI: 10.1002/aic.18014
- 10) Taleb, O.; Barzycki, D.C.; Germosen Polanco, C.; **Ricarte, R.G.**; Hallinan, D. Assessing Effective Medium Theories for Conduction through Lamellar Grains. *International Journal of Heat and Mass Transfer* **2022**, *188*, 122631. DOI: 10.1016/j.ijheatmasstransfer.2022.122631
- 9) **Ricarte, R.G.**,* Shanbhag, S.* Unentangled Vitriimer Melts: Interplay between Chain Relaxation and Cross-link Exchange Controls Linear Rheology. *Macromolecules* **2021**, *54*, 3304–3320. (*Corresponding authors) DOI: 10.1021/acs.macromol.0c02530
- 8) **Ricarte, R.G.**,* Tournilhac, F.; Cloître, M., Leibler, L.* “Linear viscoelasticity and flow of self-assembled vitrimers: the case of a polyethylene/dioxaborolane system.” *Macromolecules* **2020**, *53*, 1852–1866. (*Corresponding authors) DOI: 10.1021/acs.macromol.9b02415
- 7) **Ricarte, R.G.**; Van Zee, N.J.; Li, Z.; Johnson, L.M.; Lodge, T.P.; Hillmyer, M.A. “Recent advances in understanding the micro- and nanoscale phenomena of amorphous solid dispersions.” *Molecular Pharmaceutics* **2019**, *16*, 4089–4103. DOI: 10.1021/acs.molpharmaceut.9b00601
- 6) **Ricarte, R.G.**,* Tournilhac, F.; Leibler, L.* “Phase separation and self-assembly in vitrimers: hierarchical morphology of molten and semi-crystalline polyethylene/dioxaborolane maleimide systems.” *Macromolecules*, **2019**, *52*, 432–443. (*Corresponding authors) DOI: 10.1021/acs.macromol.8b02144
- 5) **Ricarte, R.G.**; Li, Z.; Johnson, L.M.; Ting, J.M.; Reineke, T.M.; Bates, F.S.; Hillmyer, M.A.; Lodge, T.P. “Direct Observation of Nanostructures During Aqueous Dissolution of Polymer/Drug Particles.” *Macromolecules*, **2017**, *50*, 3143–3152. DOI: 10.1021/acs.macromol.7b00372
- 4) Ting, J.M.; **Ricarte, R.G.**;† Schneiderman, D.K.;† Saba, S.A.; Jiang, Y.; Hillmyer, M.A.; Bates, F.S.; Reineke, T.M.; Macosko, C.M.; Lodge, T.P. “Polymer Day: Outreach Experiments for High School Students.” *Journal of Chemical Education*, **2017**, *94*, 1629–1638. (†Equal authorship) DOI: 10.1021/acs.jchemed.6b00767
- 3) Li, Z.; Johnson, L.; **Ricarte, R.G.**; Yao, L.J.; Hillmyer, M.A.; Bates, F.S.; Lodge, T.P. “Enhanced Performance of Blended Polymer Excipients in Delivering a Hydrophobic Drug through the Synergistic Action of Micelles and HPMCAS.” *Langmuir*, **2017**, *33*, 2837–2848. DOI: 10.1021/acs.langmuir.7b00325

2) **Ricarte, R.G.**; Lodge, T.P.; Hillmyer, M.A. "Elucidation of the spatial distribution of small molecules in amorphous polymer matrices by electron energy-loss spectroscopy." *Langmuir* **2016**, *32*, 7411–7419. DOI: 10.1021/acs.langmuir.6b01745

1) **Ricarte, R.G.**; Lodge, T.P.; Hillmyer, M.A. "Detection of pharmaceutical drug crystallites in solid dispersions by transmission electron microscopy." *Molecular Pharmaceutics* **2015**, *12*, 983–990. DOI: 10.1021/mp500682x

Awarded research support

5) Project: Acquisition of a Tosoh EcoSEC Elite Size Exclusion Chromatography Instrument with Multiple Angle Light Scattering Detection for Materials Research (Principal Investigator)

Source of Support: Florida State University Office of Research

Amount: \$85,157

Period Covered: 01/2024 to 12/2024

4) Project: 3M Non-Tenured Faculty Award (Principal Investigator)

Source of Support: 3M

Amount: \$45,000

Period Covered: 08/2023 to 07/2025

3) Project: CAREER: VitriMER gels as a platform for homogeneous and meso/nanostructured networks (Principal Investigator)

Source of Support: National Science Foundation

Amount: \$677,644

Period Covered: 08/2022 to 07/2027

2) Project: Ralph E. Powe Junior Faculty Enhancement Award (Principal Investigator)

Source of Support: Oak Ridge Associated Universities

Amount: \$10,000

Period Covered: 05/2022 to 04/2023

1) Project: First Year Assistant Professor Award: Highly durable and processable heart valves from block vitrimers (Principal Investigator)

Source of Support: Florida State University Office of Research

Amount: \$20,000

Period Covered: 08/2021 to 07/2022

Selected presentations

19) **Ricarte, R.G.** "Linear rheology of vitriMER melts." **Invited oral presentation** at the 18th Pacific Polymer Conference in Puerto Vallarta, Mexico, 2023.

18) **Ricarte, R.G.** "Linear viscoelasticity of vitriMER melts." **Invited oral presentation** at the Martin Luther University Seminar Series in Halle, Germany, 2023.

17) **Ricarte, R.G.** "Linear viscoelasticity of vitriMER melts." **Invited oral presentation** at the Leibniz Institute of Polymer Research Seminar Series in Dresden, Germany, 2023.

16) **Ricarte, R.G.** "Linear viscoelasticity of vitriMER melts." **Invited oral presentation** at the National Renewable Energy Lab Justice, Equity, Diversity, and Inclusion Technical Seminar Series, 2023.

- 15) **Ricarte, R.G.** “Modeling and measuring the linear viscoelasticity of vitrimer melts.” **Invited oral presentation** at the University of South Florida Department of Chemical, Biological, and Materials Engineering Seminar, 2022.
- 14) Li, G.; Barzycki, D.C.; **Ricarte, R.G.** “Encapsulation of a hydrophobic drug in block copolymer nanoparticles during polymerization induced self-assembly.” **Invited oral presentation** at the American Chemical Society Fall Meeting, 2022.
- 13) **Ricarte, R.G.**; Shanbhag, S. “Generalized Rouse theory for modeling the linear viscoelastic behavior of unentangled vitrimer melts.” **Invited oral presentation** at the American Chemical Society Florida Annual Meeting and Exposition, 2022.
- 12) **Ricarte, R.G.**; Shanbhag, S. “Unentangled Vitrimer Melts: Generalized Rouse Theory Reveals Impact of Cross-link and Backbone Chemistry on Linear Viscoelasticity.” **Invited oral presentation** at American Chemical Society Southeastern Regional Meeting, 2021.
- 11) **Ricarte, R.G.**; Shanbhag, S. “Unentangled Vitrimer Melts: Generalized Rouse Theory Reveals Impact of Cross-link and Backbone Chemistry on Linear Viscoelasticity.” Oral presentation at American Institute of Chemical Engineering Annual Meeting, 2021.
- 10) **Ricarte, R.G.**; Shanbhag, S. “Unentangled vitrimer melts: generalized Rouse theory illuminates interplay of cross-link exchange and backbone relaxations on linear viscoelasticity.” Oral presentation at Society of Rheology Annual Meeting, 2021.
- 9) **Ricarte, R.G.**; Shanbhag, S. “Unentangled Vitrimer Melts: Generalized Rouse Theory Reveals Impact of Cross-link and Backbone Chemistry on Linear Viscoelasticity.” Virtual presentation at American Chemical Society Fall Meeting, 2021.
- 8) **Ricarte, R.G.**; Shanbhag, S. “Unentangled Vitrimer Melts: Generalized Rouse Theory Reveals Impact of Cross-link and Backbone Chemistry on Linear Viscoelasticity.” Virtual presentation at American Physical Society March Meeting, 2021.
- 7) **Ricarte, R.G.**; Tournilhac, F.; Cloître, M., Leibler, L. “Linear viscoelasticity and flow of self-assembled vitrimers: the case of a polyethylene/dioxaborolane system.” On demand oral presentation at American Chemical Society Fall Virtual Meeting, 2020.
- 6) **Ricarte, R.G.**; Tournilhac, F.; Leibler, L. “Remarkable hierarchical morphology of molten and semi-crystalline polyethylene vitrimers.” **Invited oral presentation** at Braskem Seminar Series, Pittsburgh, PA, 2018.
- 5) **Ricarte, R.G.**; Leibler, L. “Linear viscoelasticity of vitrimer melts: a theoretical understanding of their peculiar rheological behavior.” Oral presentation at American Institute of Chemical Engineering Annual Meeting, Pittsburgh, PA, 2018.
- 4) **Ricarte, R.G.**; Tournilhac, F.; Leibler, L. “Mesoscopic structure of semi-crystalline vitrimers: the remarkable case of polyethylene.” **Invited oral presentation** at Gordon Research Conference and Seminar: Polymer Physics, South Hadley, MA, 2018.

3) **Ricarte, R.G.**; Hillmyer, M.A.; Lodge, T.P. "Direct observation of remarkable nanostructure evolution during aqueous dissolution of polymer/drug blends." Oral presentation at American Institute of Chemical Engineering Annual Meeting, Minneapolis, MN, 2017.

2) **Ricarte, R.G.**; Lodge, T.P.; Hillmyer, M.A. "Electron diffraction and energy-loss spectroscopy of soft pharmaceutical materials." **Invited oral presentation** at Industrial Partnership for Research in Interfacial Materials and Engineering Mid-Year Workshop, Minneapolis, MN, 2016.

1) **Ricarte, R.G.**; Lodge, T.P.; Hillmyer, M.A. "Characterization of polymeric solid dispersions using electron microscopy." **Invited oral presentation** at Milliken Graduate Research Symposium, Spartanburg, SC, 2015.

Doctoral students mentored

Yuxuan Dai 2023–Present
Institution: FAMU-FSU College of Engineering
Major: Chemical Engineering

Dana Ezzeddine 2022–Present
Institution: FAMU-FSU College of Engineering
Major: Chemical Engineering

Daniel Barzycki 2021–Present
Institution: FAMU-FSU College of Engineering
Major: Chemical Engineering

Guanrui Li 2020–Present
Institution: FAMU-FSU College of Engineering
Major: Chemical Engineering

Masters students mentored

Daniel Barzycki 2020–2021
Institution: FAMU-FSU College of Engineering
Major: Chemical Engineering
Thesis Title: Structure and Dynamics of Homogeneous Vitrimer Gels

Undergraduate students mentored

Cassie Duclos 2023–Present
Institution: FAMU-FSU College of Engineering
Major: Chemical Engineering

Nat Torres 2023–Present
Institution: FAMU-FSU College of Engineering
Major: Chemical Engineering

Marie Chmara 2022–Present
Institution: FAMU-FSU College of Engineering
Major: Biomedical Engineering

Kevin Fay 2022–2023
Institution: FAMU-FSU College of Engineering
Major: Chemical Engineering

Emma Pollard 2022–2023
Institution: FAMU-FSU College of Engineering
Major: Chemical Engineering

Lauren Bishop 2021–2023
Institution: FAMU-FSU College of Engineering
Major: Chemical Engineering

Sydney Carrow 2021
Institution: FAMU-FSU College of Engineering
Major: Biomedical Engineering

Zachary Bauer 2020–2022
Institution: FAMU-FSU College of Engineering
Major: Chemical Engineering
Honors Thesis Title: Compatibilization of Polymer Blends Utilizing Vitrimers Chemistry

High school students mentored

Naa Okantey 2023
Institution: Rickards High School

Selected service and outreach

Advisory Board, GradMAP Philippines Since 2023

Mentor, Future Faculty Workshop Since 2023

Founder and Faculty Advisor, FAMU-FSU/Rickards High School STEM Since 2022

Theory Outreach Program

Faculty Co-Advisor, FAMU-FSU POLY/PMSE Student Chapter Since 2021

FAMU-FSU Diversity, Equity, and Inclusion Committee 2021–2022

Founder and President, UMN Science for All Outreach Program 2014–2016

Head Coordinator, UMN Polymer Day 2012–2014

Professional Societies

Society of Rheology Since 2021

American Chemical Society Since 2015

American Physical Society Since 2014

American Institute of Chemical Engineering Since 2008