

SUMMARY

Dr. Katrina (Kat) Knauer is a polymer scientist who has dedicated her scientific career to solving the plastic waste problem. She has a PhD in Polymer Science and Engineering from the University of Southern Mississippi and completed the BASF PhD Leadership Development Program (LDP) in 2018 before taking a Senior Scientist role in BASF's Plastics Division. Her research efforts focused on advanced recycling technologies which ultimately led her to leading Materials Innovation R&D at Novoloop Inc., a chemical recycling startup. Currently, Dr. Knauer is a senior researcher at the National Renewable Energy Laboratory (NREL) and the Chief Technology Officer (CTO) of the Bio-Optimized Technologies to keep Thermoplastics out of Landfills and the Environment (BOTTLE™) Consortium where she is developing sustainable technologies to chemically upcycle today's existing plastic waste streams and develop new plastics for the future that are recyclable by design.

EDUCATION

Ph.D. Polymer Science and Engineering (May 2016)

The University of Southern Mississippi, Hattiesburg, MS

B.S. Chemical Engineering (April 2011)

Florida State University, Tallahassee, FL

PROFESSIONAL EXPERIENCE

National Renewable Energy Laboratory

Senior Researcher, Bioenergy Science and Technology Center
Chief Technology Officer, The BOTTLE Consortium
BEST Directorate Post-Doc Liaison

September 2021 – Present

University of Colorado, Boulder

Adjoint Professor, Chemical and Biological Engineering

January 2024 - Present

Novoloop (Formerly BioCellection, Inc.)

R&D Lead, Materials Innovation

July 2019 – July 2021

BASF Corporation

Senior Scientist, Polymer Additives
BASF Performance Chemicals, Tarrytown, NY

March 2018 – July 2019

Research Scientist, Enzyme Development

PhD Leadership Development Program, BASF Care Chemicals, Wyandotte, MI

July 2017 – March 2018

Product Application Scientist, Grain Processing Enzymes

PhD Leadership Development Program, BASF Enzymes LLC, San Diego, CA

November 2016 – July 2017

Formulation Scientist, Drug Delivery Development

PhD Leadership Development Program, BASF Pharma Solutions, Tarrytown, NY

March 2016 – November 2016

CORRESPONDING AUTHOR PUBLICATIONS

Clarke, R.; Carswell, B.; DesVeaux, J.; Hamernik, L.; Lincoln, C.; Konaganti, V.; Alam, R.; **Knauer, K.M.*** Re-Directing Mixed-Feed Deconstruction Products to Hybrid Polyesters: Tolerance Windows for Commodity Plastics Reconstruction. *Submitted and in revision.*

Curley, J.; Liang, Y.; DesVeaux, J.; Choi, H.; Clarke, R.; Maurya, A.; Michener, W.; Stanley, L.; Wu, Y.; Hesse, S.; Baer, A.; Tassone, C.; Jacobsen, A.; Mante, O.; Beckham, G.; **Knauer, K.M.*** Closed-loop recycling of mixed polyesters via catalytic methanolysis and monomer separations. *Submitted and in revision.*

Lee, M.; Liang, Y.; Cuthbertson, A.; Choi, H.; Michener, W.; Lahive, C.; Miscall, J.; Lincoln, C.; Banakis, N.; Allen, R.; Beckham, G.*; **Knauer, K.M.*** Effective dye-extraction from poly(ethylene terephthalate) fabrics using bio-based solvents for textile recycling. *Submitted and in revision.*

Baer, A.L.; Clarke, R.W.; Gowda, R.R.; Heese, S.A.; Zu, S.; Curley, J.B.; Urgan, M.; Tassone, C.j.; Konagonti, V.K.; Che, E.Y.; **Knauer, K.M.*** Compatibilization of Poly(L-Lactic Acid) and Poly(δ -Valerolactone) Blends for Tough, Thermally Robust, and Circular Packaging Technologies. *Submitted and in revision*.

DesVeaux, J.; Uekert, T.; Curley, J.; Choi, H.; Liang, Y.; Singh, A.; Mante, O.; Beckham, G.; Jacobsen, A.; **Knauer, K.M.*** Mixed polyester recycling can enable a circular plastic economy with environmental benefits. *One Earth* **2024**.

Clarke, R.W.; Rosetto, G.; Uekert, T.; Curley, J.B.; Moon, H.; Knott, B.C.; McGeehan, J.; **Knauer, K.M.*** Polyhydroxyalkanoates in emerging recycling technologies for a circular materials economy. *RSC Mats Adv* **2024**.

Knauer, K.M.*; Lee, M. Circular plastics technologies: open loop recycling of waste plastics into new chemicals. *Phys. Sci. Rev.* **2023**.

Knauer, K.M.*; Higginson, C.; Liang, Y.; Lee, M. Circular plastics technologies: depolymerization of polymers into parent monomers. *Phys. Sci. Rev.* **2023**.

Knauer, K.M.*; Higginson, C.; Lee, M. Pyrolysis of plastics to fuels and chemicals. *Phys. Sci. Rev.* **2023**.

Westlie, A.H.; Chen, E.; Holland, C.M.; Stahl, S.; Doyle, M.; Trenor, S.; **Knauer, K.M.*** Polyolefin Innovations toward Circularity and Sustainable Alternatives. *Macro. Rap. Comm.* **2022**, 2200492.

Knauer, K.M.* Chemical Recycling of Commodity Plastics. *Energy Transition: Climate Action and Circularity*. American Chemical Society Books, 567-585, **2022**.

Knauer, K.M.*; Speros, J.C.; Kemp, L.K.; Savin, D.A.; Bao, Z.; Coates, G.W.; Epps T.E.; Hawker, C.J.; Le Roy, J.; Morse, M.; Yu, O. Entrepreneurship in Polymer Chemistry. *ACS Macro Lett.* **2021**, 10, 864–872.

FIRST AUTHOR PUBLICATIONS

Knauer, K.M.; Brust, G.; Carr, M.; Cardona, R.J.; Lichtenhan, J.D.; Morgan, S.E. Rheological and crystallization enhancement in PPS and PEEK POSS nanocomposites. *J. of Appl. Polym. Sci.* **2016**, 134, 7.

Knauer, K.M.; Pollino, J.; Schwartz, J.; Moore, L.M.J.; Morgan, S.E. Surface and Interfacial Segregation of Polyethersulfone Deuterated Chain Ends Determined by Neutron Reflectivity. *J. of Polym. Sci. Pt. B: Polym. Phys.* **2016**, 55, 293-301.

Knauer, K.M.; Jennings, A.R.; Bristol, A.N.; Iacono, S.T.; Morgan, S.E. Enhanced Surface Properties of Branched Poly(ether sulfone) from Semifluorinated POSS. *ACS Appl. Mat. and Interf.* **2016**, 8, 12434.

Knauer, K.M.; Zhu, Y.; Storey, R.F.; Morgan S.E. Phase separation and permeability in polyisobutylene-based miktoarm star polymers. *J. of Polym. Sci. Pt. B: Polym. Phys.* **2016**, 54, 916.

Knauer, K.M.; Greenhoe, B.M.; Wiggins, J.S.; Morgan, S.E. Surface composition control via chain end segregation in polyethersulfone solution cast films. *Polymer* **2015**, 57, 88-98.

CO-AUTHOR PUBLICATIONS

Lahive, C.W.; Dempsey, S.H.; Reiber, S.E.; Pal, A.; Stevenson, K.R.; Michener, W.E.; Alt, H.M.; Rognerud, E.G.; Lincoln, C.L.; Clarke, R.W.; DesVeaux, J.S.; Uekert, T.; Rorrer, N.A.; **Knauer, K.M.**; Beckham, G.T., Acetolysis of epoxy-amine resins for carbon fiber-reinforced polymer recycling. *Accepted, embargo*.

Hee Joo, S.; **Knauer, K.M.**; Su, C.; Toborek, M. Antibiotic resistance in plastisphere. *J. Environ. Chem. Eng.*, **2025**, 13.

Megill, M.; Shaw, K.; **Knauer, K.M.**; Seeley, M.; Lynch, J. Plastic additives in the ocean: Use of a comprehensive database for meta-analysis and method development. *Chemosphere*, 142172, **2024**.

Quinn, E.; **Knauer, K.M.**; Beckham, G.B.; Chen, E.Y.-X. Mono-material product design with bio-based, circular, and biodegradable polymers. *One Earth*, **2023**, 6.

Uekert, T.; Singh, A.; DesVeaux, J.S.; Ghosh, T.; Bhatt, A.; Yadav, G.; Afzal, S.; Walzberg, J.; **Knauer, K.M.**; Nicholson, S.R.; Beckham, G.T.; Carpenter, A.C. Technical, Economic, and Environmental Comparison of Closed-Loop Recycling Technologies for Common Plastics. *ACS Sustainable Chem. Eng.*, **2023**, 11, 3.

Liang, Y.; **Knauer, K.M.** Trends and future outlooks in circularity of desalination membrane materials. *Front. In Mem. Sci. and Tech.* **2023**, 2, 1169158.

Lynch, J.; **Knauer, K.M.**; Shaw, K. Plastic Additives in the Ocean. *Plastics and the Ocean: Origin, Characterization, Fate, and Impacts*. John Wiley & Sons, Inc., 43-76, **2022**.

Misasi, J.M.; Jin, Q.; **Knauer, K.M.**; Morgan, S.E.; Wiggins, J.S. Hybrid POSS-Hyperbranched polymer additives for simultaneous reinforcement and toughness improvements in epoxy networks. *Polymer*, **2015**, 117, 54-63.

Sahagun, C. M.; **Knauer, K. M.**; Morgan, S. E., Molecular network development and evolution of nanoscale morphology in an epoxy-amine thermoset polymer. *J. Appl. Polym. Sci.* **2012**, 126 (4), 1394-1405.

PATENTS

Knauer, K.M. et al. Conversion of polyethylene to polyesters. US20250084213A1 (**2025**).

Knauer, K.M. et al. Low temperature base catalyzed methanolysis of polyesters. WO2024173754A1 (**2024**).

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Knauer, K.M. et al. Methods and systems for dye removal from polymer textiles. WO2024108081A1 (2024).
Knauer, K.M. et al. Dissolution purification and recovery for polymer recycling. US18166331 (2023).
Knauer, K.M. et al. Thermoplastic Polyurethane Compositions Comprising Nitro-Substituted Polyester Diols. US11028217B1 and EP4118131A4 (2021). ***Commercialized product, LifeCycled™.**
Knauer, K.M. et al. Polymerizable compositions comprising nitro substituted polyester diols. US11111334B1 (2021).
Knauer, K.M. et al. Uses of surfactants in starch processing. WO2019226845A1 (2019).

AWARDS & HONORS

ORNL Neutron Sciences Beam Time Award – 2025 B Cycle
 Energy and Emissions Intensive Industries IEDO Grant Awardee 2024
 EPA Science to Achieve Results (STAR) Grant Awardee 2024
 Green Chemistry Emerging Investigator – Article will be published in 2025
 ARPA-E IGNIITE Early Career Researcher Award – June 2024
 RASEI Seed Grant Award – June 2024
 University of Colorado Research and Innovation Office (RIO) Frontiers Grant Award – April 2024
 Colorado Outstanding Woman in STEM Nominee (2024)
 NREL High Impact Award – December 2023
 NREL Business Development Platinum Award – December 2023
 OEDIT Advanced Industries Accelerator Grant – October 2023
 NREL Outstanding Post-Doc Mentor Award – April 2023
 ISS Sustainability Challenge Grant – July 2022
 DARPA Grant, BAA HR001119S0084 – January 2020
 Beyond Benign *Chemist Invent Green* – November 2019
 BASF Emerging Technical Leader Award – March 2019
 BASF Circular Economy Research Grant – October 2018
 BASF Technical Day Challenge – October 2018
 ACS C&EN Magazine “Must See Talk” – August 2018
 BASF Tarrytown Technical Challenge – November 2016
 PhD Leadership Development Program Research Grant – March 2016
 2015 ACS-PMSE Ford Student Award – August 2015
 USM Induction to the Graduate Student Hall of Fame – April 2015
 Milliken Graduate Student Symposium Scholar – April 2015
 3rd Place 3-Minute Thesis, Regional Competition – March 2015
 1st Place Paper Presentation, Waterborne Symposium – February 2015
 USM 3-Minute Thesis Grand Champion – November 2014
 SPE/PMAD Writing Challenge 2014 Winner – May 2014
 National School on Neutron and X-ray Scattering – August 2013
 SPE/PMAD Writing Challenge 2013 Winner – April 2013

SYNERGISTIC ACTIVITIES

Polymer Solutions for the Environment (POSE) Founder
 Center for Plastics Innovation (CPI) - Advisory Board Member
 NextCycle Colorado – Advisory Board Member
 University of Puerto Rico P-Box Mentor and Organizer
 Student Training in Applied Research (STAR) Mentor
 NREL Westgate Incubator – Principal Investigator
 Shell Game Changer – Principal Investigator
 NSF’s Advancing Social and Environmental Equity through Plastics Research: Education, Innovation, and Inclusion (ASPIRE) – Advisory Board Member
 Schmidt Futures Bioeconomy Taskforce – Advisory Board Member
 Bio2P2 Network – Advisory Board Member
 World Plastic Association – Delegate
 Ocean Plastic Recovery Project – Senior Advisor
 American Chemical Society (ACS)
 Executive Board Member – Division of Polymer Chemistry
 REMADE Institute Reviewer

Journal Reviewer: PNAS, Chem, Chem Catalysis, Nature Chemistry, Nature Materials Reviews, Journal of Materials Science, JACS Au, Polymer, Nature, Nature Communications, Science Advances, ACS Sustainable Chemistry and Engineering