

Exponent®
Engineering & Scientific Consulting

Sarah Parker, Ph.D.

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Professional Profile

Dr. Parker is a chemist who specializes in understanding how composition and formulation affect the performance of complex chemical systems and practical materials. She consults in the areas of fuel, oil, and lubricant formulations for automotive and industrial applications, as well as cosmetics and personal care products, pharmaceuticals, medical devices, paints and coatings, and industrial and specialty chemicals including fluorinated substances (PFAS). Dr. Parker has experience analyzing product composition and identifying potential contaminants and impurities through standardized and non-standard methods, and uses her expertise to help clients determine the source and potential impacts of chemical contamination in a range of products. Dr. Parker has also consulted for parties involved in intellectual property disputes, including trade secret, patent, and trademark litigation.

Dr. Parker analyzes product formulations and material compositions with a focus on understanding the role of component chemicals and their impacts on a product's performance. She leverages this analysis to assist clients in evaluating product characteristics and properties, assessing alternative formulations and/or materials, investigating adverse events, developing risk assessments, ensuring regulatory compliance, and conducting product stewardship activities. Her work often includes laboratory testing to determine chemical composition, as well as analysis of manufacturing records and the results of analytical testing. As part of her work with formulated products, Dr. Parker helps clients investigate, assess, and mitigate contamination. She is experienced in selecting appropriate sampling and analysis methods to accurately characterize the chemical composition of a product. Her expertise extends to the design and validation of new sampling and test methods utilized when appropriate standardized methods are not available. Dr. Parker uses this expertise to help clients analyze the potential past and future impacts of contamination, once identified, across a range of products including personal care products, pharmaceuticals, medical devices and assays, industrial and specialty chemicals, and petroleum products.

Dr. Parker also investigates the composition, quality, and end-use performance of engine and machine lubricant formulations (oils and greases) and fuels, including gasoline, diesel, biofuels, marine fuel, fuel oil products, and aftermarket fuel additives. She is familiar with common quality specifications and guidelines for lubricants and fuels set by industry organizations, original equipment manufacturers (OEMs), and regulatory bodies. Dr. Parker has utilized a variety of chemical analysis methods in these investigations, including Fourier-transform Infrared spectroscopy (FTIR), gas chromatography-mass spectrometry (GC-MS), and two-dimensional gas chromatography-mass spectrometry (GCxGC-MS), as well as various elemental analysis and specialized chemical analysis methods. Dr. Parker is well-versed in ASTM and ISO methods for lubricant and fuel characterization including rheological and tribological testing related to friction and wear (tribology) issues. She is also familiar with surface characterization, profilometry, and microscopy techniques.

Dr. Parker has also worked in the area of polymeric materials and coatings, specializing in the interaction of material and coating formulations with their environments. Her experience includes the characterization

and assessment of equilibrium processes such as absorption and off-gassing, as well as exposure to environmental stressors such as UV irradiation, temperature, and humidity. Dr. Parker's research experience also includes the synthesis and design of organic molecules and metal catalysts commonly used in the production of reinforced plastics and composite materials, inks and coatings, elastomers, and fine chemicals.

Prior to joining Exponent, Dr. Parker was a Senior Researcher at ExxonMobil Research & Engineering. In that role she developed new formulations for commercial vehicle (heavy-duty) engine oils and greases to meet API, ACEA, and automotive engine manufacturer specifications using a combination of industry standard bench tests, stationary fired-engine test stands, and field test programs. She explored new additives for lubricant applications including novel antioxidants, anti-wear additives, pour-point depressants, dispersants, and friction modifiers, and has contributed to patent applications related to this work. In addition, Dr. Parker provided failure analysis and lubricant product support to lubricant blenders, vehicle manufacturers, and end customers in the transportation, mining, construction, and agriculture industries. She was also involved in the technical validation and global deployment of new components and formulations with impact on product claims and specifications, the global supply chain, and product registration with foreign governments.

Academic Credentials & Professional Honors

Ph.D., Chemistry, Harvard University, 2014

B.A., Chemistry, Grinnell College, 2007

National Science Foundation Graduate Research Fellow, 2009-2012

Thomas J. Watson Fellow, 2007-2008

Archibald Prize for Highest Scholarship, Grinnell College, 2007

Chemistry Alumni Prize, Grinnell College, 2007

Barry M. Goldwater Scholar, 2005-2007

Trustee Honor Scholarship, Grinnell College, 2003-2007

Prior Experience

Senior Researcher, ExxonMobil Research & Engineering, 2014–2016

Professional Affiliations

American Chemical Society

ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants

Patents

Alessi ML, Jetter SM, Kennedy S, Parker SE, Burns RG. Lubricating oil compositions with oxidative stability in diesel engines. US Patent Application US16/171401, October 2018.

Alessi ML, Jetter SM, Kennedy S, Parker SE, Du, VA. Lubricating oil for improved wear protection and fuel efficiency. US Patent Application US15/667,066, August 2017.

Parker SE, Ritter T. 1,2-Hydrosilylation of dienes. US Patent Application US 61/772,218, March 2014.

Publications

Lee H, Campbell MG, Hernández Sánchez R, Börgel J, Raynaud J, Parker SE, Ritter T. Mechanistic insight into high-spin iron(I)-catalyzed butadiene dimerization. Organometallics 2016; 35: 2923–2929.

Parker SE, Börgel J, Ritter T. 1,2-Selective hydrosilylation of conjugated dienes. Journal of the American Chemical Society 2014; 136: 4857–4861.

Presentations

Parker SE. Understanding the Occurrence of PFAS in Products and Materials. American Society of Safety Professionals, Region VIII Technical Meeting, 2026.

Parker SE. Uses of PFAS in Lubricant Products and Packaging. Society of Tribologists and Lubrication Engineers, Annual Meeting, 2026.

Parker SE. Failure Analysis Workshop, Society of Tribologists and Lubrication Engineers Hydraulics Education Course, 2026.

Parker SE. PFAS in Consumer Products. Global Retailer & Manufacturer Alliance Annual Meeting, 2025.

Mazzone SE & Parker SE. The Evolving Landscape of PFAS in Consumer Products. American Institute of Chemical Engineers Northeast Regional Meeting, 2024.

Parker SE. Understanding PFAS in Products and Materials (Keynote Address). American Society of Safety Professionals Professional Development Conference, 2024.

Adams J, Casmere E, Parker SE, Walsh MA. PFAS Panel Discussion. FDCC 2024 Annual Meeting, 2024.

West J, Andersen J, Parker SE, Patterson A. Workshop B: Demystifying the PFAS Science. ACI's Summit on PFAS: Regulation, Compliance, and Litigation. 2024.

Bee M, Parker SE. Addressing Aerosol Product Compliance Challenges from Emerging HFC and PFAS Regulations. Household & Commercial Products Association Annual Meeting, 2022.

Parker SE. Benzene Contamination in Aerosol Personal Care Products. Consumer Healthcare Products Association Regulatory, Scientific & Quality Conference, 2022.

Dimitriou M, Gupta C, Parker SE, Streifel B, Vargas J, White C. Dripping Windows to Leaking Walls, Using Analytical Instrumentation to Solve Real-World Problems. Thermal Analysis Forum of Delaware Valley Polymer Characterization Short Course, 2021.

Rackl S, Worthen A., Parker S. Fluorinated Chemicals and Challenges to Product Stewardship. PSX, 2021.

Drollette BD, Millions D, Parker SE, Reitman, M. The PFAS Challenge: Beyond the Basics of PFAS in the Modern Era. Exponent Live Webinar Series, 2021.

Oelker, AM, Parker SE, Barry M. The Role of Technical Experts in Patent Litigation. American Chemical Society Fall Meeting, 2021.

Stern MC, Krill M, Parker SE, Oelker AM, Kytomaa HK. Patentable or Infringing? an Overview of Patent

Infringement and Validity Concepts for Researchers and Innovators, American Institute of Chemical Engineers Spring Meeting, 2020.

Favero, CVB., Parker, S., Stern, MC. and Kytomaa, HK., Impact of Time on Asphaltene Destabilization Detection in Unconventional Fuels, American Institute of Chemical Engineers Spring Meeting, 2019.

Parker SE, Ritter T. 1,2-Hydrosilylation of 1,3-dienes at a cyclometallated platinum catalyst. Organometallic Chemistry Gordon Research Seminar, 2013.

Parker SE, Börgel J, Ritter T. Platinum-catalyzed 1,2-hydrosilylation of butadiene. Boston Women in Chemistry Symposium, 2013.

Mobley TA, Parker SE. Synthesis and conformational characterization of Cp2WHSn(CN)Ph2. American Chemical Society National Meeting, 2007.