Exponent®
Engineering & Scientific Consulting

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Professional Profile

Dr. Parker LaMascus is a consultant with deep experience in mechanical engineering, including mechanics of materials, lubrication science, and data-driven methods. His research background is in tribology – the study of friction, wear, adhesion, and lubrication – where he focused on nanomaterials in the power transmission of heavy vehicles and wind turbines. He also has industrial experience in manufacturing, technical writing, and scientific sales.

Dr. LaMascus has developed novel experimental methods and data-driven models to improve vehicle efficiencies and prevent wear-related failure. Before joining Exponent, Dr. LaMascus received his PhD in Mechanical Engineering from the University of Pennsylvania, where he worked to prevent wear in powertrains through modeling and optimizing metal oxide nanoparticle lubricant additives. This project was a collaboration between large-scale industrial research, national laboratories, and small tech companies. Dr. LaMascus was awarded an NDSEG Research Fellowship in 2020 for this work and an NSF Graduate Research Fellowship (declined).

Since joining Exponent, Dr. LaMascus has contributed to projects focusing on automobile accident reconstruction, including project management, photogrammetry, and optical methods. Dr. LaMascus also has work experience as a researcher and assistant instructor at Penn, a technical writer for PCS Instruments, a physics researcher at Harvard, a manufacturing engineer at Niagara Bottling LLC, and a customer specialist at McMaster-Carr Industrial Supply.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering and Applied Mechanics, University of Pennsylvania, 2024

M.S.E., Mechanical Engineering and Applied Mechanics, University of Pennsylvania, 2022

B.S., Mechanical Engineering, Oklahoma Christian University, 2018

Platinum Poster Award, Society of Tribologists and Lubrication Engineers, 2025

(Finalist) Penn Prize for Excellence in Student Teaching, The University of Pennsylvania, 2022

Gold Poster Award, Society of Tribologists and Lubrication Engineers, 2022

Philadelphia Graduate Student Scholarship, Society of Tribologists and Lubrication Engineers, 2021

Editor’s Selection: Best from STLE’s Research Community, Tribology & Lubrication Technology, 2020

National Defense Science and Engineering Graduate Fellow, US Department of Defense, 2020

(Declined) Graduate Research Fellow, National Science Foundation, 2020

Goldwater Scholar, Barry Goldwater Foundation, 2017

Prior Experience

Customer Solutions Specialist, McMaster-Carr Industrial Supply, 2026

Technical Writer, PCS Instruments, 2025-2026

Graduate Researcher & Assistant Instructor, The University of Pennsylvania, 2025

Doctoral Researcher, The University of Pennsylvania, 2019-2024

Research Fellow, Harvard University, 2018-2019

Manufacturing Solutions Engineer, Niagara Bottling LLC, 2018-2019

Professional Affiliations

Society of Tribologists & Lubrication Engineers – Member

Publications

Arushi Pradhan et al. "The Surface-Topography Challenge: A Multi-Laboratory Benchmark Study to Advance the Characterization of Topography." Tribology Letters, vol. 73, no. 3, 2025.

A MacLaren, P LaMascus, RW Carpick. "Enhancing the Range and Reliability of the Spacer Layer Imaging Method." Tribology Letters, vol. 72, no. 3, 2024.

P LaMascus, MB Elinski, D Delghandi, P Nautiyal, J Griffin, L Zheng, A Jackson, RJ Wiacek, RW Carpick. "Competition Between Growth and Removal in Zirconia Nanocrystal-Derived Tribofilms: The Role of Co-additives." Tribology Letters, vol. 72, no. 4, 2024.

MB Elinski, P LaMascus, L Zheng, A Jackson, RJ Wiacek, RW Carpick. ‘Correction to:“Cooperativity between zirconium dioxide nanoparticles and extreme pressure additives in forming protective tribofilms: Toward enabling low viscosity lubricants.”’ Tribology Letters, vol. 69, no. 4, 2021

MB Elinski, P LaMascus, L Zheng, A Jackson, RJ Wiacek, RW Carpick. "Cooperativity between zirconium dioxide nanoparticles and extreme pressure additives in forming protective tribofilms: toward enabling low viscosity lubricants." Tribology Letters, vol. 68, no. 4, 2020.

P LaMascus, A Shodunke, R Douglas-Miller. “Wind-for-Water Trade: Mathematical Validation of a Novel Policy Initiative in Wind Energy.” Aletheia, 2018.

Presentations

P LaMascus, A Kholoshenko, D Delghandi, P Nautiyal, S Fulco, N Ibekwe, M Fusha, A Jackson, RJ Wiacek, KT Turner, RW Carpick. “The Effect of Contact Stress on the Growth and Adhesive Transfer of Metal Oxide Antiwear Additives.” Oral presentation. Society of Tribologists and Lubrication Engineers (STLE) Annual Meeting, Atlanta, Georgia, 2025

P LaMascus, RW Carpick. “Teaching Effective Technical Writing: A Case Study.” Invited workshop. University of Pennsylvania Center for Teaching and Learning, Philadelphia, PA, 2025

P LaMascus. “Tribosintering of Metal Oxide Nanocrystal Antiwear Additives: Growth, Wear, and Modeling” Oral presentation. University of Pennsylvania, Philadelphia, Pennsylvania, 2024

P LaMascus, N Ibekwe, M Fusha, D Morgan, RJ Wiacek, RW Carpick. “Adhesive transfer of antiwear coatings deposited in situ from metal oxide nanoparticle additives.” Poster presentation. Gordon Research Conference, Lewiston, Maine, 2024

P LaMascus, G Guo, N Trask, RW Carpick. “Transparent Data-Driven Predictions for Formation and Friction of Tribo-Sintered Metal Oxide Antiwear Coatings.” Oral presentation. STLE Annual Meeting, Minneapolis, Minnesota, 2024

P LaMascus, MB Elinski, D Delghandi, P Nautiyal, J Griffin, L Zhang, A Jackson, RJ Wiacek, RW Carpick. “Tuning Growth vs. Removal of Zirconia Nanocrystal-Derived Tribofilms using Co-Additives.” Oral presentation. STLE Annual Meeting, Long Beach, California, 2023

P LaMascus, D Delghandi, J Griffin, M Yazdanparast, A Jackson, RJ Wiacek, RW Carpick. “Tribosintering of Metal Oxide Nanocrystal Anti-Wear Additives: Effect of Nanocrystal Composition. Poster presentation.” Gordon Research Conference, Lewiston, Maine, 2022

P LaMascus, D Delghandi, J Griffin, M Yazdanparast, A Jackson, RJ Wiacek, RW Carpick. “Tribosintering of Metal Oxide Nanocrystal Anti-Wear Additives: Effect of Nanocrystal Composition.” Oral presentation and poster presentation. NDSEG Fellows Conference, Boston, Massachussetts, 2022

N Thomas, J Hoffmann, L Lee, P LaMascus, SM Rubinstein, C Rycroft. “Using an Autoencoder to Reduce Experimental Noise.” Oral presentation. American Physical Society, Boston, Massachussetts, 2019

P LaMascus, M Owino, M Battles, M Ferringer, D Wood. “Field Testing of Miniature Wind Turbines,” Oral presentation. American Society of Mechanical Engineers Symposium, Oklahoma City, Oklahoma, 2018

P LaMascus, A Shodunke, R Douglas-Miller. “A new sustainability initiative: Assessing the wind resource of southwest Kansas.” Poster presentation. American Wind Energy Association “Windpower” conference, Anaheim, California, 2017

P LaMascus, A Shodunke, R Douglas-Miller. “Mathematical modeling of the wind resource.” Oral presentation. Kappa Mu Epsilon Student Conference, Springfield, Missouri, 2017

Project Experience

- Automobile accident investigation and reconstruction:
- Laser scanning, photogrammetry, and three-dimensional modeling of vehicles and environments
- Powertrain materials research
- At Penn, led tribological feasibility studies on lubricants for gears and bearings
- Experienced with AFM, SEM, Raman spectroscopy, optical interferometry, contact topography, including in cleanroom settings
- Designed novel, data-driven test methods to investigate nano-scale formation of anti-wear layers on test components
- Technical communication:
- Specialized in communicating scientific concepts clearly to any audience
- Developed multiple skills workshops for scientists, both for data visualization and technical writing

Advisory Appointments

AI Education Co-Chair, STLE Annual Meeting, 2024-2026

Tribology Session Co-Chair, Gordon Research Conference, 2024

Research Grants

- Toward High Performance Low Viscosity Lubricants, CCDC GVSC Small Business Technology Transfer Phase II Award DE-SC-0009222, 2020-2022
- Rapid and efficient deposition of metal oxide coatings for bearings and gears in harsh environments, Department of Energy DEEE0010211, 2022-2025

Peer Reviews

Reviewer for Tribology Letters

Tribology Transactions

Journal of Tribology