



Recent Advances in Machine Learning in Tribology

Max Marian ^{1,2,*}  and Stephan Tremmel ³ 

¹ Department of Mechanical and Metallurgical Engineering, School of Engineering, Pontificia Universidad Católica de Chile, Vicuña Mackenna 4860, Macul 6904411, Región Metropolitana, Chile

² Institute of Machine Design and Tribology (IMKT), Leibniz University Hannover, An der Universität 1, 30823 Garbsen, Germany

³ Engineering Design and CAD, University of Bayreuth, Universitätsstraße 30, 95447 Bayreuth, Germany; stephan.tremmel@uni-bayreuth.de

* Correspondence: max.marian@uc.cl

Tribology, the study of friction, wear, and lubrication, has been a subject of interest for researchers exploring the complexities of materials and surfaces. Recently, machine learning has emerged as a valuable tool in this field, offering new avenues for understanding. The second Special Issue in the journal *Lubricants* dedicated to this partnership signifies a step forward in our exploration of these concepts. Machine learning's ability to analyze large datasets and extract patterns has broadened our understanding of tribology. This collaboration between traditional methods and computational techniques has enabled researchers to uncover insights previously inaccessible. From predicting frictional behavior to optimizing lubricant compositions, machine learning's applications in tribology are diverse.

The nine research and two review articles, as well as one technical note, covered in this Special Issue embrace a wide range of topics, from fundamental research on friction mechanisms to practical studies improving industrial machinery performance. Predictive modeling stands out as an area of interest, allowing researchers to forecast tribological properties accurately. This includes predicting material wear rates and optimizing lubricant formulations for specific conditions. Furthermore, machine learning has facilitated the exploration of complex phenomena across different scales, providing a comprehensive understanding of tribological processes. The convergence of tribology and machine learning offers opportunities for synergy and discovery, marking a significant moment in the field's evolution.

The Guest Editors extend their gratitude to all authors and reviewers for their contributions, as well as to the editorial staff of MDPI journal *Lubricants* for their support and guidance.

Conflicts of Interest: The authors declare no conflicts of interest.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.



Citation: Marian, M.; Tremmel, S.

Recent Advances in Machine Learning in Tribology. *Lubricants* **2024**, *12*, 168. <https://doi.org/10.3390/lubricants12050168>

Received: 4 May 2024

Accepted: 8 May 2024

Published: 9 May 2024



Copyright: © 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).