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Zainal Abidin, A.N.S.<sup>a c</sup>, Jamaludin, A.S.<sup>a</sup>, Nasir, A.<sup>b</sup>, Sufian, A.H.<sup>a</sup>, Rosli, A.M.<sup>a</sup>

**Current Developments and Future Prospects in Vehicle Tire Technologies: A Review**  
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<sup>a</sup> Faculty of Manufacturing and Mechatronic Engineering Technology, Universiti Malaysia Pahang Al-Sultan Abdullah, Pahang, Pekan, 26600, Malaysia

<sup>b</sup> Faculty of Electrical and Electronic Engineering Technology, Universiti Malaysia Pahang Al-Sultan Abdullah, Pahang, Pekan, 26600, Malaysia

<sup>c</sup> Malaysian Institute of Road Safety Research, Taman Kajang Sentral, Selangor, Kajang, 43200, Malaysia

### Funding details

Universiti Malaysia PahangUMP

### Correspondence Address

Jamaludin A.S.; Faculty of Manufacturing and Mechatronic Engineering Technology, Pahang, Malaysia; email: shahir@umpsa.edu.my

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Radhiyah Abd. Aziz  
Zulhelmi Ismail  
A. K. M. Asif Iqbal  
Irfan Ahmed *Editors*

# Intelligent Manufacturing and Mechatronics

Selected Articles from iM3F 2023, 7–8  
August, Pekan, Malaysia

 Springer

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Radhiyah Abd. Aziz · Zulhelmi Ismail ·  
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Editors

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### *Editors*

Radhiyah Abd. Aziz  
Faculty of Manufacturing and Mechatronic  
Engineering Technology  
Universiti Malaysia Pahang Al-Sultan  
Abdullah  
Pekan, Pahang, Malaysia

Zulhelmi Ismail  
Faculty of Manufacturing and Mechatronic  
Engineering Technology  
Universiti Malaysia Pahang Al-Sultan  
Abdullah  
Pekan, Pahang, Malaysia

A. K. M. Asif Iqbal  
Department of Mechanical, Materials  
and Manufacturing Engineering  
University of Nottingham Ningbo China  
Ningbo, China

Irfan Ahmed  
Department of Physics  
Government College Balakot  
Khyber Pakhtunkhwa, Pakistan

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# Preface

The fourth edition forum of the Innovative Manufacturing, Mechatronics and Materials Forum 2023 (iM3F 2023) organized by Universiti Malaysia Pahang Al-Sultan Abdullah through its Faculty of Manufacturing and Mechatronic Engineering Technology was held on 7 and 8 August 2023. The main field focuses on Manufacturing, Mechatronics as well as Materials.

About 95 submissions were received during iM3F 2023 and were reviewed in a single-blind manner, and 48 papers were advocated by the reviewers to be published in this Springer Proceedings of Materials. The editors would like to express their gratitude to all the authors who submitted their papers. The paper published in this proceeding has been thoroughly reviewed by the appointed technical review committee which consists of various experts in the field of materials and manufacturing engineering.

The conference had brought a new outlook on cutting-edge issues shared through keynote speeches by Assoc. Prof. Ir. Dr. Haji Nik Mohd Zuki Nik Mohamed, Prof. Eng Hwa Yap and Prof. Gian Antonio Susto.

Finally, the editors hope that readers find this volume informative as we thank Springer Proceedings in Materials for undertaking this volume publication. We also would like to thank the conference organization staff and the international program committees' members for their hard work.

Pekan, Pahang, Malaysia  
November 2022

Radhiyah Abd. Aziz  
Zulhelmi Ismail  
A. K. M. Asif Iqbal  
Irfan Ahmed

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# Current Developments and Future Prospects in Vehicle Tire Technologies: A Review

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[Ahmad Noor Syukri Zainal Abidin](#), [Ahmad Shahir Jamaludin](#) , [Abdul Nasir](#), [Amirul Hakim Sufian](#) & [Ainur Munira Rosli](#)

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## Abstract

This review discusses vehicle tire technology advancements and their transformative effects on vehicle dynamics. Recent advances in material science, design, and manufacturing have transformed the tire industry. The introduction of “smart tires,” which have sensors for continuous monitoring, is a major development. These tires analyze pressure, temperature, and tread depth to improve safety and fuel efficiency. Nanogenerators in tires demonstrate the automotive industry's move toward independence. Decision trees and analytical tools have been used to refine the process using retreading techniques, which are environmentally friendly and economically beneficial. The industry is focusing more on integrating intelligent tires with autonomous vehicles. Tire data combined with autonomous driving algorithms could set new safety and efficiency standards. Despite these advances, there is still room for innovation, particularly in commercializing energy harvesters for Tire Pressure Monitoring Systems (TPMS) and developing tire wear monitoring methods. Intelligent tires are increasingly important for vehicle performance and safety as autonomous vehicles become more common. This review discusses tire technologies' current state, future prospects, and future direction, positioning them as drivers of safer, more sustainable transportation.



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## Author information

---

### Authors and Affiliations

Faculty of Manufacturing and Mechatronic Engineering Technology, Universiti Malaysia Pahang Al-Sultan Abdullah, 26600, Pekan, Pahang, Malaysia

Ahmad Noor Syukri Zainal Abidin, Ahmad Shahir Jamaludin, Amirul Hakim Sufian & Ainur Munira Rosli

Faculty of Electrical and Electronic Engineering Technology, Universiti Malaysia Pahang Al-Sultan Abdullah, 26600, Pekan, Pahang, Malaysia

Abdul Nasir

Malaysian Institute of Road Safety Research, Taman Kajang Sentral, 43200, Kajang, Selangor, Malaysia

Ahmad Noor Syukri Zainal Abidin

### Corresponding author

Correspondence to [Ahmad Shahir Jamaludin](#).

## Editor information

---

### Editors and Affiliations

Faculty of Manufacturing and Mechatronic Engineering Technology, Universiti Malaysia Pahang Al-Sultan Abdullah, Pekan, Pahang, Malaysia

Radhiyah Abd. Aziz

Faculty of Manufacturing and Mechatronic Engineering Technology, Universiti Malaysia Pahang Al-Sultan Abdullah, Pekan, Pahang, Malaysia

Zulhelmi Ismail

Department of Mechanical, Materials and Manufacturing Engineering, University of Nottingham Ningbo China, Ningbo, China

A. K. M. Asif Iqbal

Department of Physics, Government College Balakot, Khyber Pakhtunkhwa, Pakistan  
Irfan Ahmed