



## EDITOR-IN-CHIEF'S WORD

Dear Readers,

The Croatian Academy of Engineering remains dedicated to bringing you the latest insights through Engineering Power, largely due to the remarkable efforts of our editor, Prof. Bruno Zelić.

This issue spotlights cutting-edge research in textile technology, featuring papers from the University of Zagreb on topics like ultrasonic welds, hospital textile treatments, polyester microplastics, and genetically engineered fibers. Modern textile tech is crucial for sustainable fashion, as emphasized by the European Technology Platform's strategic programs.

Additionally, we're excited to share a brief report on the Academy's recent 30<sup>th</sup> anniversary celebration.

Editor-in-Chief

Vedran Mornar, President of the Croatian Academy of Engineering



## EDITOR'S WORD

Dear readers,

I am pleased to introduce the Engineering Power issue, edited by Prof. Tanja Pušić, Ph.D. Four original scientific publications offer findings from research undertaken at the Faculty of Textile Engineering of the University of Zagreb. The fifth article provides a brief overview of the activities of the European Technology Platform for the Future of Textiles and Clothing (Textile ETP). This edition concludes with a brief recap of the Academy's regular annual assembly, which commemorated HATZ's 30<sup>th</sup> anniversary, as well as the list of

HATZ awards recipients in 2022.

I hope you like reading it!

Editor

Bruno Zelić, Vice-President of the Croatian Academy of Engineering



## FOREWORD

Dear readers,

Three original scientific papers, one scientific review and one report were selected for this issue of Engineering power. All papers are thematically related to the Research Strategy of the University of Zagreb Faculty of Textile Technology, for the period 2021-2027, which has development potential and is part of the strategic programmes of Europe Technology Platform.

The first paper presents the contribution of a group of innovators in the field of ultrasonic technology, discussing functional relationships between the fracture forces of ultrasonic welds and the speed as a function of the electrical power of the ultrasonic generator. The authors presented 43 parameters categorised into three main groups: polymer material parameters, acoustic parameters and technological parameters. The second paper was prepared by a group of authors as a contribution to the project HrZZ-UIP-2017-05-8780, HPROTEX in the field of functionalization of hospital textiles. The influence of pretreatment of cotton fabrics blended with polyester with sodium hydroxide on chitosan functionalisation was studied. The effects of functionalization and durability in three washing cycles were evaluated using physico-chemical methods, physico-mechanical methods and antimicrobial activity. The third paper is related to the project HrZZ-IP-2020-02-7575, InWaShed-MP, which includes research on polyester textiles and the problem of microplastics in washing wastewaters. Polyester knitted fabrics and wastewater from innovative and standard washing processes analysis is based on the surface properties of the fabric and the composition of the wastewater, with a focus on the content of particles released from the knitted fabric during ten washing cycles. The fourth paper is a scientific review of genetically engineered/modified fibres for 21<sup>st</sup> century textiles and fashion, providing an overview of the achievements in this field and their use in the context of contemporary thinking and sustainable textiles and fashion. According to the author's concluding remarks, the era of biotextiles represents a new epoch that is being realized not only through genetic design but also through synthetic biology. Finally, the European Technology Platform for the Future of Textiles and Clothing (Textile ETP) was presented as the largest European network for textile research and innovation. The ETP has launched 7 strategic programs for the period between 2020 and 2030: 1. circular economy; 2. bio-based fibres; 3. sustainable chemistry; 4. smart textiles; 5. high-performance technical textiles; 6. digital textile production; 7. digital EU fashion production.

Guest-Editor

Tanja Pušić, University of Zagreb Faculty of Textile Technology