Preface

This book covers selected research papers submitted to AuxDefense 2018 – 1st World Conference on Advanced Materials for Defense held in Lisbon, Portugal. Auxdefense 2018 was the meeting point for everyone interested in these outstanding advanced materials, including researchers, technicians, technologists, militaries and students**.** This conference focused on advanced materials research in the forward-looking R&D domains where the intersection of key technologies in areas such as nano and micro-technology, biotechnology, stealth materials, smart materials and structures, and energy generation and storage is being explored.

This book is mainly divided into mainly three potential topics: ***Advanced materials for defense***, ***Properties and characterization*** and ***Modelling and simulation***. Some newly developed materials which can have potential application in defense area such as ***textile based electrodes*** for heart rate monitoring, ***functional textiles containing nanoparticles*** for chemical and biological protection, ***high performance cement based materials*** for defense infrastructures, etc. have been discussed in this book. ***Different testing methods and properties*** which are highly essential for the new materials to be used in defense sector such as impact and ballistic performance, micro-structural analysis, energy absorption, blast performance, thermal colour and emissivity, etc. are also presented. This book is also enriched with recent research findings on ***novel modelling and simulation techniques*** of different materials, e.g. composites, metal alloys, textile materials, etc. used in defense.

This book provides a collection of most recent research and development activities taking place in the multi-disciplinary research areas addressing the defense applications. We strongly believe that ***the book has both academic/scientific and industrial importance*** and will highly benefit a wide range of readers including students, researchers, leading scientists in the field and R&D team members from different related industries.

Raul Fangueiro, University of Minho, Portugal
Sohel Rana, University of Huddersfield, UK

Editors Biography

Prof. Raul Fangueiro is currently professor in the Department of Mechanical Engineering and senior researcher in the Center for Textile Science and Technology, at the University of Minho, Portugal. He is the head of the Fibrous Materials Research Group of the same university with expertise in advanced materials (nano, smart, composites) and structures (3D, auxetic, multiscale) with 45 researchers. He is the mentor and the coordinator of the FIBRENAMICS International Platform including 300 partners developing promotion, dissemination, technology transfer and research activities on fiber-based advanced materials. He has more than 160 published papers in international reputed scientific journals, 420 conference publications, 36 books and 20 patents. He coordinated more than 50 national and international research projects on advanced fibrous and composite materials, manly for defense, building, architectural and health-care applications. He supervised 20 PhD and Pos-Doc scientific works and is member of the editorial board of several leading international scientific journals on composite and fibrous materials. Raul Fangueiro is the scientific coordinator of ICNF – International Conference of Natural Fibers and AUXDEFENSE – Advanced Materials for Defense.

Dr. Sohel Rana is currently a Lecturer in Technical Textiles in the School of Applied Sciences, University of Huddersfield, UK. Previously, he worked as a Senior Researcher and Leader of Composite Materials at the Fibrous Materials Research Group (Fibrenamics), University of Minho, Portugal (2010-2018). He obtained his bachelor's degree in Textile Technology from University of Calcutta, India (2002), and Master's degree (2005) and Ph.D. in Fibre Science and Technology (2011) from Indian Institute of Technology (IIT, Delhi), India. Dr. Rana is actively involved in the research and development of smart fibrous and composite materials, nanocomposites, bio-composites, natural fibres, electrospinning, etc. He has been a key researcher in developing 'multi-functional and bio-based hierarchical composites' and high performance 'auxetic structures and composites' for personal protection applications. He has been a mentor for several PhD and Post-doc students at the University of Minho. Benefited from his long experience, Dr. Rana has edited a number of books on advanced textile and composite materials with the leading publishers, among which "Advanced Composites in Aerospace Engineering" (Woodhead Publishing), "Braided Structures and Composites" (CRC Press), "Fibrous and Textile Materials for Composite Applications" (Springer) received well recognition within the scientific community. To his credit, Dr. Rana has published over 35 papers in peer reviewed international journals and contributed to 14 book chapters and more than 60 papers in international conferences.

Dr. Rana is a former member of the European Society for Composite Materials and served as the member of organizing and scientific committee of many international conferences (e.g. ICNF 2015, ICNF 2017, ICNF 2019, etc.). He has been invited to deliver keynote and invited talks in several international conferences and meetings focused on fibre science and composite materials. He also participates in the guest editorial board of several scientific journals (e.g. Journal of Nanomaterials, Key Engineering Materials, International Journal of Polymer Science, Journal of Biobased Materials and Bioenergy, Advances in Polymer Technology, etc.) and is a potential reviewer for numerous scientific journals including Green Chemistry, Carbohydrate Polymers, Composite Science and Technology, Composites Part A & B, Dyes and Pigments, RSC Advances, Composite Interfaces, Journal of Composite Materials, Journal of Reinforced Plastics and Composites, Powder Technology, Journal of Nanomaterials, Journal of Applied Polymer Science, Fibres and Polymers, and so on.