SPECIAL ISSUE: Modeling

Foreword

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Welcome to the modeling issue of the Journal of Engineered Fibers and Fabrics (JEFF). This special issue is aimed at providing a snapshot of the current state of computational modeling in the field of engineered fibers and fabrics.

With the rapid advancement of our computational power, one can now model many fiber manufacturing processes and fabric properties that once were only possible via cumbersome, time consuming, expensive and sometimes erroneous, experimentation.

As you will see in this issue for instance, accurate predictions of heat, mass, and/or nanoparticle transfer through a nonwoven structure are now possible via "digital experimentation". The motivation for developing this issue was to inform our readers of current university and government computational research that may well be relevant to the needs of the industry. In soliciting these contributions, utmost attention was paid to the novelty and newness of the research as well as brevity and conciseness of the information presented.

The first four papers in this issue are on modeling properties of nonwoven materials when challenged with heat, mass, and particle flows or an external mechanical force. This collection begins with the seminal work of Gibson on heat and mass transfer in protective clothing, and continues with the simulations of Qashou et al. on radiative heat transfer through 2-D geometries resembling a nonwoven sheet. The third paper describes the work of Zhu and Hinestroza on modeling the collection efficiency of filters with Y-shaped fibers. The fourth paper dealing with property simulation is the computational-experimental work of Hou et al. on the study the tensile Behavior of thermally bonded nonwovens.

Our collection concludes with a paper focused on modeling the challenging problem of fiber Melt-spinning by Jeon and Cox. In this paper, a numerical simulation of multifilament semi-crystalline polymer fiber spinning based on a flow-enhanced crystallization approach is presented.