

UNDERSTANDING FRICTION AND ITS INTRINSIC MULTI-SCALE NATURE – LESSONS LEARNED FROM LEONARDO AND NEW TRENDS IN TRIBOLOGY

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Abstract

It is now a well-documented fact that Leonardo Da Vinci studied the topic of friction for more than 20 years, linking empirical evidence of friction to models for several mechanical systems. Although his contributions have not influenced the development of the subject in at least four of the last five centuries, Leonardo holds a unique position as the father of friction laws. But what we have certainly learned as scientists from Leonardo is much deeper, and this is the will to strive to understand the underlying physical mechanisms that control our lives. This talk will start by reviewing recent advances made in tribological modelling to explain complex friction behaviours and will take the audience through some of the key discoveries enabled by looking at friction as a multi-scale phenomenon, governed by what happens at the nano- and micro-scale but perceived at the macroscale. The presentation will conclude with an outlook at future trends and examples of how to tackle problems ranging from biomedical devices to triboelectricity.