



You are cordially invited to

The End of the Road for Empirical Correlations for Drop Impact Studies: A Machine Learning Approach

given by

Prof. Alidad Amirfazli

Department of Mechanical Engineering, York University, Toronto, Canada

on **April 8, 2026**, at **11:00 am CET** in the **Leonard Sosnowski Auditorium**, Al.

Lotników 32/46, 02-668 Warszawa at IP PAS

and on Zoom:

<https://zoom.us/j/91037790833?pwd=3vxbYujtIEAe5dJUx5KNisIIXRBbaJ.1>

(Meeting id: 910 3779 0833, code: 127945)

Duration: 45 min + question time

Abstract of the talk:

There are many different empirical correlations in the literature to describe the maximum spreading of droplets upon their impact onto a surface. The reason for this has been various parameter ranges or impact conditions past studies have used to establish each of the correlations as per We and Re numbers, or wettability of the substrate. I will present our latest work on droplet impact onto surfaces where we have used a novel approach to predict the maximum spreading of a droplet in a unified matter over a wide range of Weber, Reynolds numbers, and wettability as characterized by contact angle. Regression models using machine learning demonstrate high accuracy in predicting the maximum spreading, providing valuable insights into the underlying dynamics of droplet impacts using dependency parameters (i.e., SHAP analysis). This approach surpasses traditional methods reliant on empirical correlations, offering robust generalization to unseen scenarios, both within and beyond the range of training data, and demonstrating significant transformative potential to advance the field of droplet impact studies. Furthermore, machine learning can be used to effectively generate detailed regime maps also for classification of impact outcomes as will be discussed for compound droplet impact.

About the Speaker:

Prof. Alidad Amirfazli is the founding Chair of the Department of Mechanical Engineering at York University, Toronto, Canada, where he is currently a Professor. His research interests include surface engineering, heat transfer, and fluid mechanics, particularly focusing on droplet surface interactions, and recently integration of AI in research. Prof. Amirfazli has contributed significantly to his field with numerous publications and patents, and he has been recognized with several awards and honors for his work, e.g. King Charles III Coronation Medal, Annual Killam Professorship, appointment to the College of New Scholars, Royal Society of Canada, and being a Fellow of Engineering Institute of Canada. He has also been involved in extensive collaboration with both industry and academic partners.