Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Data-Driven Analysis of Contact Line SAHAR ANDALIB, KUNIHIKO TAIRA, H. PIROUZ KAVEHPOUR, University of California - Los Angeles — Dynamics of droplet evaporation plays an important role in many industrial applications such as ink-jet printing, microfabrication, agricultural irrigation, and bio-diagnostics. Experiments of dropwise evaporation are generally time-consuming and expensive. In the present work, machine learning methods are utilized to analyze methanol droplet in controlled environmental conditions. Relative humidity is predicted by both data-driven classification and regression methods. With the classification approach, Bagged Decision Tree technique is found to outperform Nave Bayes and is independent of the input data distribution. Furthermore, regression technique enabled the prediction the relative humidity. Additionally, diameter and contact angle are estimated with the regression method. Predictions are more accurate for diameter due to its smooth evolution during droplet lifetime. The current work suggests the potential in using dropwise evaporation as a predictive tool for numerous applications where time-consuming experiments or simulations are not practical options. It also provides valuable insights on the physics of the evaporation phenomena.

Sahar Andalib
University of California - Los Angeles

Date submitted: 02 Aug 2020 Electronic form version 1.4