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Oil in Water: An Experimental Study of Splashing and Entrainment from Droplets and Jets RAINA MITTAL, James Madison High School, KRISTEN HALPER, Thomas Jefferson High School of Science and Technology, RAJAT MITTAL, Johns Hopkins University — This study is motivated by the interaction between oil and water that is associated with events such as oil spills, oil slicks and underwater oil leaks. For instance, the impact of rain drops on a floating oil slick can lead to the formation of satellite droplets and oil entrainment into the water, that could subsequently lead to further dispersion of the oil slick. Furthermore, the dynamics of high speed jets of oil in water is relevant to underwater oil leaks, but the motion of such oil jets is not well studied. In the current study, we use high-speed videography with various types of commonly available oils to study the impact of water droplets on oil slicks of varying thicknesses. Results show that an oil slick with intermediate thickness leads to the most significant formation of satellite droplets. This behavior seems to be related to the competing effect of oil viscosity and surface tension on the dynamics of splashing. We also use high-speed videography to study the motion and dispersion of underwater oil jets and correlate the breakup of the jet with the inclination of the jet.

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