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Surface Geometry Modification for Effective Water Spreading<sup>1</sup> RAUL BARBOSA, RODOLFO BECERRA, YOUNGGIL PARK, KYE-HWAN LEE, Univ of Texas Rio Grande Valley — Liquid spreading on solid surfaces depend on the kind of materials (liquid, solid, and vapor) and the interface geometries. Many applications involving liquid deposition by spraying and condensation require deliberate management of liquid spreading over the surfaces. In this work water spreading on solid surfaces with geometrical patterns are observed by experiments in an environmental chamber, which is controlled for temperature and humidity. Water will be deposited to the surfaces through spraying and condensation on a Peltier cooling stage. An optical microscope camera is utilized to observe static and dynamic liquid spreading behavior during the tests. Various test samples of different surface wettability and geometrical modifications are created by 3d printing technique. There are numerous studies that uses chemical coatings for wettability modification providing an effective solution. But these conventional techniques have limited long term reliability when the surface is exposed to environmental contamination which degrades the wetting behavior over time. By adding geometrical features less than a millimeter in the length scale, sustained "highways" are created on the surfaces, which provide an effective method for liquid drainage path with long term reliability. A successful implementation will lead to increased efficiency of applications such as dehumidifiers, heating and cooling systems in buildings and power plants.

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