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Moving Water Droplets on Aluminum and Copper Surfaces Using Surface Tension Gradients MUIDH ALHESIBRI, NATHANIEL ROGERS, ANDREW SOMMERS, KHALID EID, Miami University — The behavior of water droplets on metal surfaces is very important for many applications, especially in heat exchangers in air conditioning and refrigeration. We use photolithography and/or shadow masks to create alternating hydrophobic/hydrophilic Cu micro-channels on an aluminum surface and to move water droplets on the surface. The contact angle that is formed between water droplets and the surface is clearly asymmetrical due to the different surface properties at the contact line between the droplets and the patterned surface. An HDFT self-assembled mono-layer allows for a large change in the water droplet contact angle on the copper, but seems to have no effect on the aluminum surface. We will show our results on the effect of the surface patterning and surface roughness on water droplet behavior. We also demonstrate that the engineered surface gradients cause water droplets to travel more than 1” on a horizontal or upward tilted surface.

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