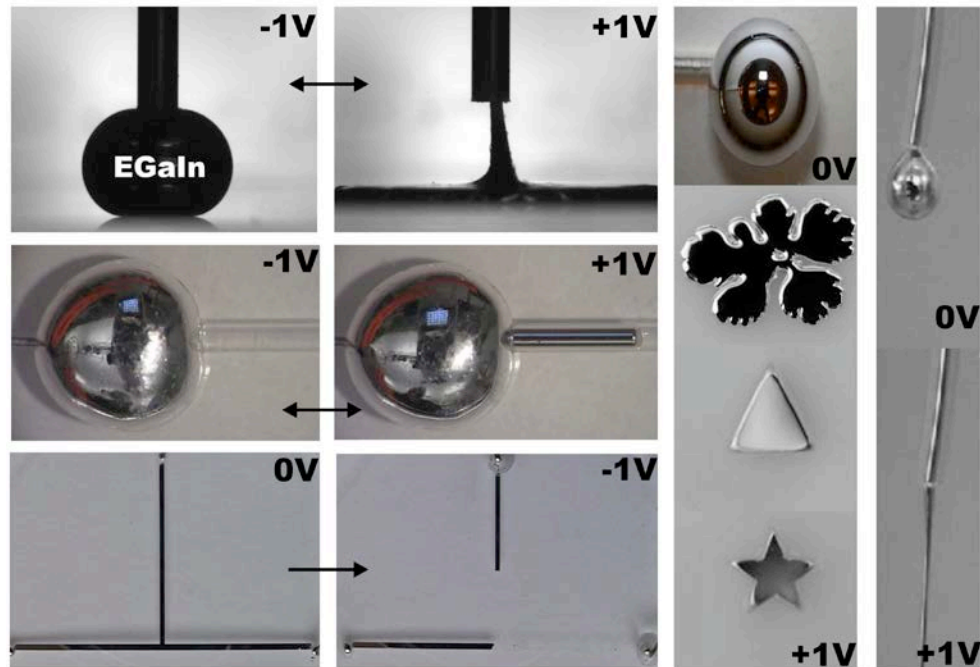


Terminator 2 is widely remembered for its metal shape-shifting villain. Impervious to bullets, explosives, and fire, the T-1000 robot was capable of changing shape at will. Researchers at the North Carolina State University have taken a step towards making science fiction a reality by developing a technique for controlling the surface tension of liquid metals using very low voltages. This technology paves the way for shape-reconfigurable metal components in electronic, electromagnetic, and microfluidic devices.



The researchers, led by Research Triangle MRSEC investigator Michael Dickey, used a liquid metal alloy of gallium and indium, which forms a spherical shape due to its large surface tension. By applying a small voltage ($<1V$) to the metal in a basic solution, an oxide forms on the surface of the metal, dramatically lowering the surface tension. This change allows the liquid metal to spread out, adopt new shapes, and flow in and out of capillary tubes. Reversing the voltage removes the oxide and returns the metal to its original spherical shape. These phenomena can be utilized to control the movement and shape of liquid metal for applications such as microelectromechanical switches, microactuators, tunable antennas, and field-programmable circuits.