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Laser printed interconnects for flexible electronics[1] ALBERTO PIQUE, IYOEL BENIAM, SCOTT MATHEWS, NICHOLAS CHARIPAR, Naval Research Laboratory — Laser-induced forward transfer (LIFT) can be used to generate microscale 3D structures for interconnect applications non-lithographically. The laser printing of these interconnects takes place through aggregation of voxels of either molten metal or dispersed metallic nanoparticles. However, the resulting 3D structures do not achieve the bulk conductivity of metal interconnects of the same cross-section and length as those formed by wire bonding or tab welding. It is possible, however, to laser transfer entire structures using a LIFT technique known as lase-and-place. Lase-and-place allows whole components and parts to be transferred from a donor substrate onto a desired location with one single laser pulse. This talk will present the use of LIFT to laser print freestanding solid metal interconnects to connect individual devices into functional circuits. Furthermore, the same laser can bend or fold the thin metal foils prior to transfer, thus forming compliant 3D structures able to provide strain relief due to flexing or thermal mismatch. Examples of these laser printed 3D metallic bridges and their role in the development of next generation flexible electronics by additive manufacturing will be presented.

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