

IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)
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SHAPE CHANGING ORIGAMI STRUCTURES FOR ADAPTIVE SPACE STRUCTURE
APPLICATIONS**Abstract**

Commonly, space structures and system are designed to fulfill one purpose or one application, solar arrays for generating power, AOCS for orienting the spacecraft, antennas for up and downlink and so on. By providing a structure that can alter its properties a multipurpose structure can be applied to fit multiple applications. This paper has the purpose to combine the application driven development carried out at DcubeD on the origami multimatrix composite deployables (like the 1U 100W deployable solar array) PowerCube with the the shape shifting space structures research carried out at the Reconfigurable and Active Structures Lab Adaptive Structures Team at Stanford University to create new adaptive structure concepts that enable new applications. The paper will start with an overview on the dual-matrix origami concept and applicable adaptive materials/smart structural concepts, then delve into a non-exhaustive summary of application cases such a adaptive space structure can be used for. On the example of a deployable SmallSat radiator, the concepts will be evaluated. The radiator shall change its shape to adapt to the thermal cycles of the spacecraft as well as the environment to ensure that the spacecraft stays within its temperature range.