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Tomohiro Tachi* (tachi@idea.c.u-tokyo.ac.jp). *Overconstrained Rigid Origami Mechanisms.*

Rigid origami mechanisms, rigid plate and hinge mechanisms, are applied for the design of deployable and transformable structures. Normally, rigid origami structures are flexible when the number of variables (the fold angle for each interior edge) exceeds the number of constraints (three rotational constraints for each interior vertex). However, there are known families of rigid origami that are transformable even if they have smaller number of variables than that of constraints. This is due to the degenerate constraints originating from local and global symmetry of the crease pattern. A well-known example of such mechanisms, i.e., overconstrained mechanisms, is Miura-ori.

The speaker talks about recent studies on shape and topology generalizations of overconstrained rigid origami mechanisms and their uses for designing unusual structural systems. Computational methods are also introduced for solving the design problem with geometric constraints to obtain non-trivial degeneracy. By combining compatible mechanical in a non-trivial way, we are able to obtain deployable systems with high stiffness against undesirable deformation modes and unusual flexibility against the pre-designed deployment mode. (Received September 21, 2015)