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Two-Dimensional Ordering of DNA Origami Using Stacking Bonds YOSUKE SUGISHITA, LEE WIZDA, PRASHANT SHARMA, Department of Physics, Suffolk University — Utilizing the DNA Origami method we have designed nano-scale self-assembled structures. These structures are made using a 7000 base pair long single stranded DNA as a scaffold that is held in place by shorter single stranded DNA molecules using Watson-Crick DNA base pairings. The staples were chosen to attach at certain specific sites of the scaffold DNA so that a well-defined planar structure of double stranded DNA can be created at room temperature. In designing these origami structures we made use of the computer application caDNAno. Two geometrical structures with differing symmetries were created using the same scaffold. Edges of these structures were modified in such a way that the double stranded DNA of one structure's edge can stack onto the edge of the second structure. Similar modifications were recently shown by Woo and Rothemund (Nat Chem., 1755-4330, 2011) to enable the formation of extended DNA origami structures. We intend to extend this method to create two-dimensional square and triangular lattice structures. We discuss our experimental results and implications of this method for nano-scale self-assembly.

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