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Mechanics of Graded Wrinkles SHABNAM RAAYAI-ARDAKANI, MARY BOYCE, Massachusetts Institute of Technology — Shark skin is known for its anti-fouling and self-cleaning properties. In attempts to mimic this pattern for getting similar properties, different surface patterns such as Sharklet and wrinkles have been previously introduced. Wrinkled patterns have gained importance in applications such as microfluidics, wetting and adhesion. Through buckling of a thin film of stiff material on a substrate of softer material, and maintaining symmetric geometries, ordered wrinkled patterns can be created. However, it can be shown that using the same principle, by changing the geometry of the surface, the dimensions of the wrinkles can be altered. This alteration turns ordered wrinkles into graded wrinkles which have more resemblance to shark skin than the ordered wrinkles, maintaining the same wave length while each wave having different amplitude. Here using finite element models, experiments and analytical solutions, the relations between different geometries and the resulting patterns were investigated.

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