1116-35-1583 **John Gemmer*** (john_gemmer@brown.edu), Division of Applied Mathematics, Brown University, 182 George St., Providence, RI 02906, **Shankar Venkataramani** (shankar@math.arizona.edu), Department of Mathematics, University of Arizona, 617 N. Santa Rita Ave., Tucson, AZ , and **Eran Sharon** (erans@vms.huji.ac.il), Racha Institute of Physics, Hebrew University of Israel, Jerusalem, Israel. *Isometric Immersions and Self Similar Buckling in Non-Euclidean Elastic Sheets.*

The edge of torn elastic sheets and growing leaves often form a hierarchical buckling pattern. Within non-Euclidean plate theory this complex morphology can be understood as low bending energy isometric immersions of hyperbolic Riemannian metrics. In this talk we show that for a large class of growth profiles there exist periodic and self-similar deformations of the sheet with vanishing in-plane strain. The construction of these surfaces consists of gluing together local solutions of an isometric immersion problem along "lines of inflection' and "branch points' in such a manner that the resulting surface has finite bending energy. For hyperbolic non-Euclidean sheets, complex wrinkling patterns are thus possible and our results identify the key role the regularity of the isometric immersion plays in determining the global structure of a non-Euclidean elastic sheet. (Received September 20, 2015)