1154-05-2411 **Thomas C. Hull** (thull@wne.edu), **Manuel Morales*** (mamora22@asu.edu), **Sarah Nash** (sarah.nash18@ncf.edu) and **Natasha Ter-Saakov** (natalyat@mit.edu). *Graph properties of and algorithms on origami flip graphs for flat-foldable vertices with equal sector angles.*

The *origami flip graph* of a flat-foldable origami crease pattern C is a graph that represents the structure of valid mountain-valley (MV) assignments of C under *face flips*. That is, a MV assignment is a mapping $\mu : E(C) \to \{-1, 1\}$ where $\mu(c) = 1$ means that the crease c is a mountain (convex) and $\mu(c) = -1$ means c is a valley (concave). A face flip of a MV assignment μ is where we choose a face F of the crease pattern C and "flip" all the creases that border F (turning mountains to valleys and vice versa). Then the origami flip graph of C, denoted $OFG(C)$, is the graph whose vertices are all valid MV assignments of C and where two MV assignments μ_1 and μ_2 of C are joined by an edge if and only if we can turn μ_1 into μ_2 by flipping exactly one face. In this talk we examine the surprisingly complex case of a single-vertex crease pattern C where the sector angles of C are all equal. We construct algorithms to count the number of edges in $OFG(C)$ and to describe a path in $OFG(C)$ between any two vertices. We use the latter to prove that if the degree of the vertex in C is $2n$ then the diameter of $OFG(C)$ is n. If time permits, we will discuss other graph properties of $OFG(C)$ for this case. (Received September 17, 2019)