1145-D1-1815 **John R Jungck*** (jungck@udel.edu), 221 Academy St., ISE Lab 402, University of Delaware, Newark, DE 19716. *Exploring Nanobiological Structures with 3D Nanotomography, 4D Printing Via Self-Assembly, and Graph Theory.* Preliminary report.

How does a viral capsid self-assemble? While Olson, Tibbits, and colleagues demonstrated self-assembly of dodecahedral viral capsid models via 4D printing, most capsids are icosahedral. We used Dürer nets, Schlegel diagrams, and CAD software to design triangular pieces which self-assemble into a icosahedron. A crucial design problem was realizing the importance of convex properties of the surface of the 3D printed equilateral triangular pieces interacting with the concaveness of the interior of the vessel used to assemble the pieces into the final icosahedral shape. We also have been printing 3D radiolarian representations built upon our 3D X-ray nanotomography data, analyzing them with medial axial transforms, and digital dissection. Using our software: Ka-me: A Voronoi Image Analyzer we not only re-examine Haeckel's illustrations, but compare them with the geometry and topology of actual specimens. A web site of our radiolarian work is at: (¡https://spark.adobe.com/page/lm464/¿). By sharing our data via an open science depository: MorphoSource, other investigators will be able to analyze the raw data and/or print their own 3D models based upon the 3D voxel data. The artist Bathsheba Grossman used our 3D file to build embedded crystal glass representations of our radiolaria. (Received September 24, 2018)