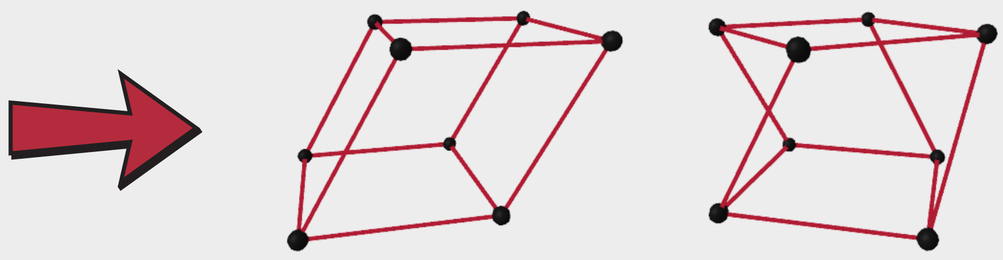
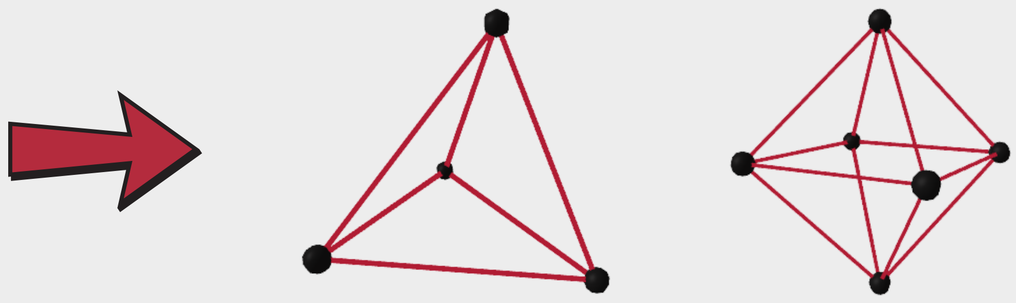
Knight's Move, 2025

by **Studio Infinity**, principal Glen Whitney
Anodized aluminum, steel links, and plastic
8' x 8' x 8'

If you've ever made a cubic frame, you might have noticed its tendency to rack or twist...

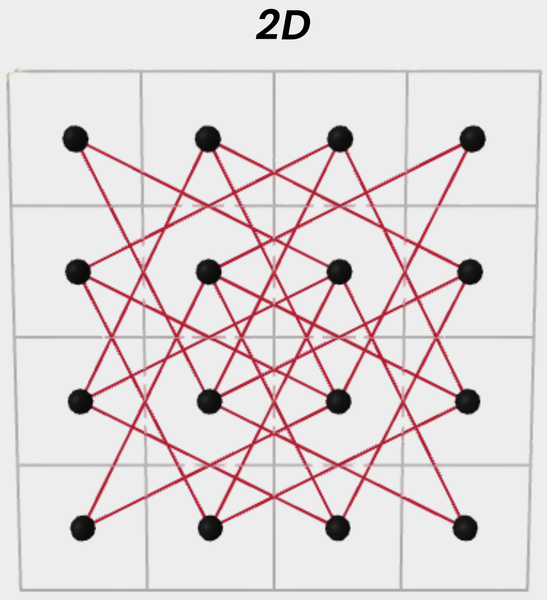


Some frameworks built from triangles, like others of the so-called "Platonic solids," will hold their shape even if their joints can swivel freely...

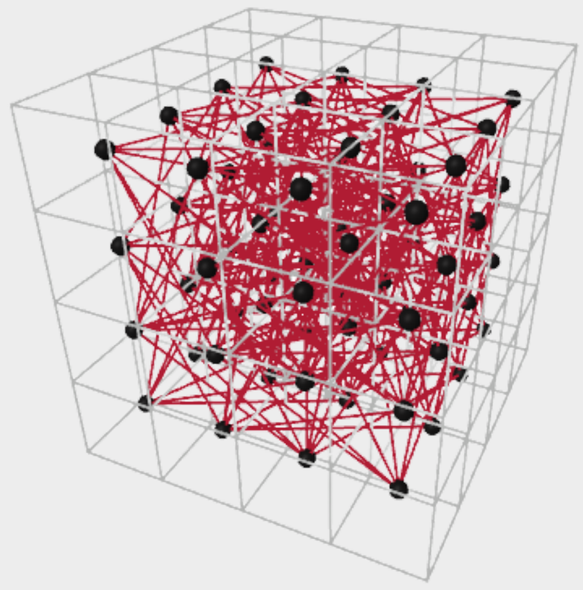


Some mathematicians wondered whether it's even possible for any framework without triangles to be rigid. The first examples were generated in the 1990s, and in 2018, Solymosi and White found an elegant new instance: The possible movements of a knight on a 4x4x4 chessboard give a rigid framework with no triangles!

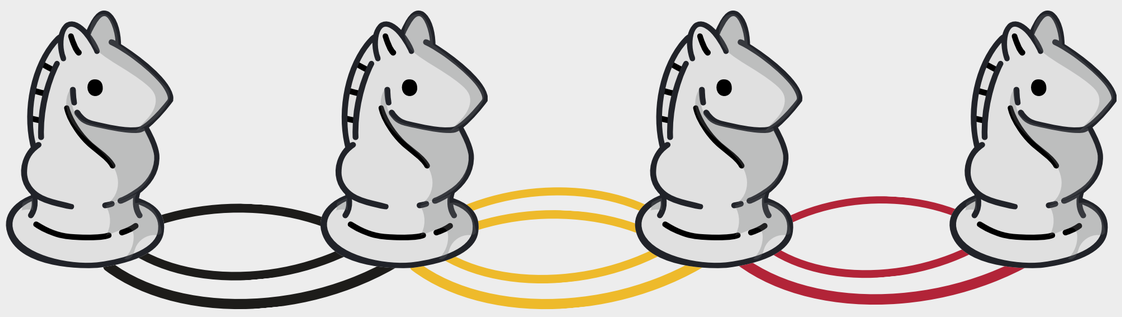
2D



3D



Knight's Move is based on their discovery, and is only able to stand here in front of you because of it! The colors of the edges show that this structure can't contain any triangles. The nodes break down into four separate groups. The black bars connect the first group to the second, the gold bars connect the second to the third, and red connects the third to the fourth. So no path of three steps returns to where it started.



Carnegie Mellon University

Knight's Move was installed 2025 August 29 by the Carnegie Mellon community under the leadership of the CMU Math Club.

To learn more and read about the contributing artists and materials for this exhibit, scan the QR code to the left.