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R. R. Slehta* (ryan@stthomas.edu). *Reassembling Humpty Dumpty: 3D Puzzles and Invariant Signature Curves.*

The end goal of this research is to virtually reconstruct a broken ostrich egg by devising an algorithm to automatically solve 3D jigsaw puzzles. In order to determine which egg pieces fit together, we look to use "snake" techniques to extract invariant signature curves and easily compare the egg piece boundaries. A method currently exists to assemble 2D puzzles, and we address the complications associated with extending it to 3D. In addition, we attempt to develop an efficient method to randomly generate 3D puzzles with no severe restrictions on shape or arrangement, enabling us to easily test the efficiency of the reassembly method. (Received September 15, 2014)