Meeting: 1047, Urbana, Illinois, SS 7A, Special Session on Mathematical Visualization

John C. Hart* (`jhc@cs.uiuc.edu`), Department of Computer Science, Siebel Center, 201 N. Goodwin, Urbana, IL 61801. *It's Nice To See This Stuff Actually Used For Something.* Preliminary report.

The title quotes John Milnor's comment after I nervously gave an interview talk on Morse theory and its application in computer graphics. In the 1930s Marston Morse invented a method for determining the shape of a manifold from the critical points of a smooth, generic real valued function. A generation later, Raoul Bott, and his students took Morse's methods into the realm of infinite dimensional manifolds, well beyond the practical. Milnor wrote the definitive text accessible to graduate students. Another generation later, the ideas reached computer graphics. With Milnor's quote as encouragement, I'll survey some applications of Morse theory to computer graphics, including isosurface triangulation, surface flattening, quad meshing, illustration and the topology of the space of light in a scene. (Received January 27, 2009)