1047-00-116 **Andrew J. Hanson*** (hansona@indiana.edu), Computer Science Department, Lindley Hall 215, Indiana University, Bloomington, IN 47405. *Experiencing the Fourth Dimension.* Preliminary report.

Human interaction with the 3D world is responsible for grounding our understanding of our environment. We learn from this experience, for example, how to correctly interpret 2D images of the 3D world. A wide variety of methods that produce 2D experiences of 3D worlds can be extended to simulate 3D experiences of 4D worlds. We explore recent progress in simulating and interacting with 4D worlds. Examples include interactive volume rendering of 3-manifolds and thickened 2-manifolds embedded in 4D and projected to a 3D image, interactive adjustment of complex thickening features to provide additional richness to renderings of embedded 2-manifolds, and in general how to exploit the latest GPU techniques to assist 4D visualization. Other examples include the possibility of 3D touch-based interaction with (simulated) physically colliding 4D objects, and the challenges of extending interactive graphics approaches to 4-manifolds such as the K3 surface. (Received January 23, 2009)