

Hyperspatial Geometry and Artistic Research

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4-dimensional space (hyperspace, 4-space, higher space) is an abstract concept of adding an extra spatial dimension perpendicular to our three dimensions of length, height and width. The research on its properties is made possible by generalizing the geometric principles acquired by studying more familiar spaces of lower dimensions. Originated in philosophy and mathematically formulated in geometry, the concept has roused interpretations in mysticism, physics, literature and art. Lately the availability of digital visualization technologies has given artists a chance to study higher space with a greater fidelity to the precise geometry of the concept.

Just as 3-dimensional structures can be drawn, unfolded, sliced, photographed or otherwise projected onto a 2-dimensional medium like paper or computer screen, these methods of representation can be generalized to get 3-dimensional visualizations of 4-dimensional structures like the polychora, hyperspatial counterparts of the familiar Platonic solids. My doctoral work in the interdisciplinary context of mathematics and art studies the possibilities of making 3-dimensional objects that represent hyperspatial content. I experiment in graphic, plastic and virtual media, informed by the theoretical background of low-dimensional topology and projective geometry. I expect the results to facilitate the grasping of 4-dimensional geometry, to improve the overall visual quality of hyperspatial imagery, to enrich and contextualize the spatial repertory of visual art practice and to make a contribution to the methodology of artistic research.

Although my theoretical framework and subject matter comes from geometry and topology, I wish to set myself aside from the mathematical visualization community, for whom the questions of style, color, composition and material are not of primary concern. Even if a full understanding of the artifacts requires some knowledge of 4D space, I hope that my results will also evoke immediate visual interest, even in the lay audience.

Institutionally I belong to the community of artistic research, and I use methods from visual art practice to achieve my objectives. Still theoretically, my work is on the margin with respect to the mainstream of AR discussion, which often seems to echo problems from humanities and social sciences. In such a context, research concerning points, lines, planes and spaces, and how they might look like from a specific viewing point, feels a bit of a guilty pleasure. Yet I maintain that as a scholar in visual arts I am entitled to investigate such matters that are superficial by definition, but by no means trivial.