Reconstruction: Internal Interaction between People and Space
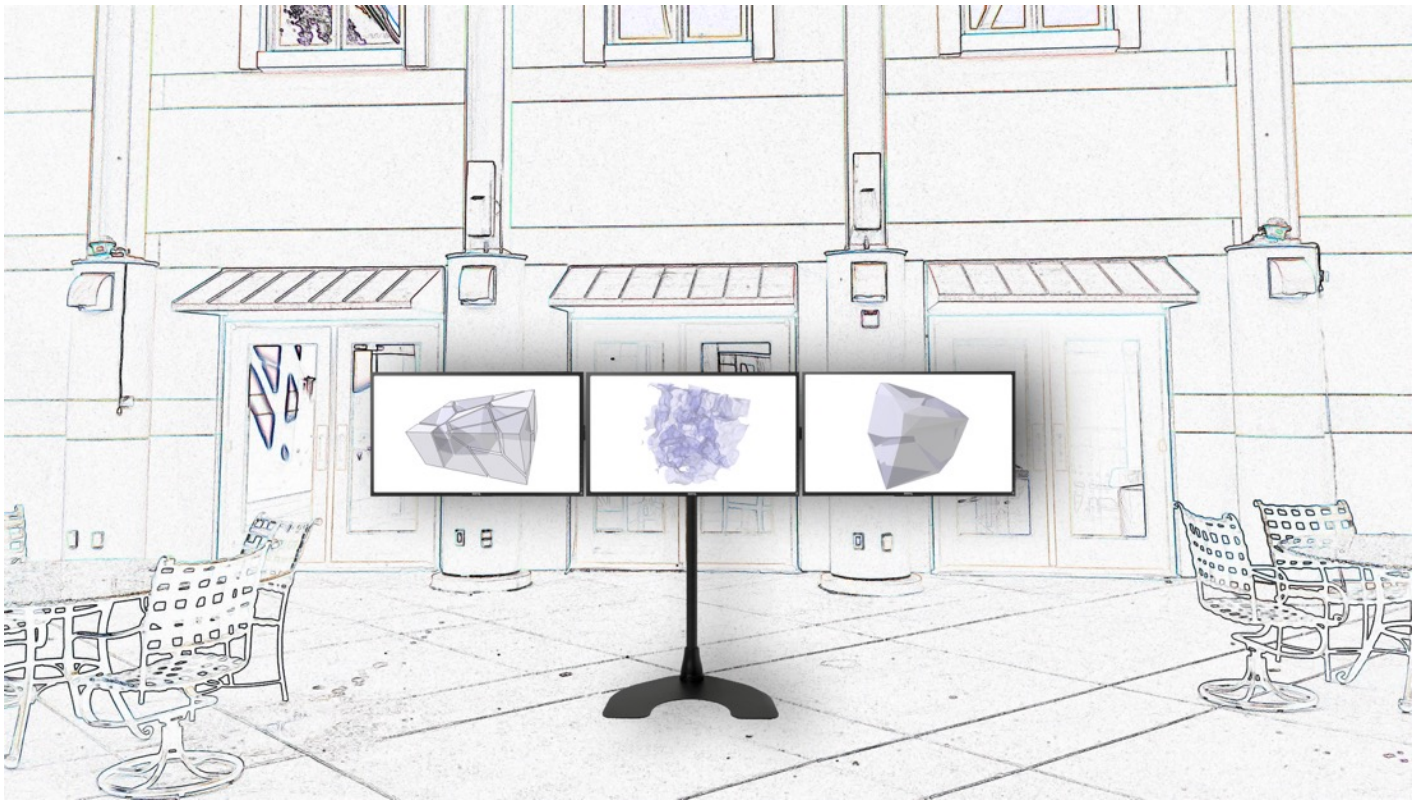Site Specific Art Proposal: Courtyard of Kohn Hall, UC Santa Barbara

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Introduction

This site-specific art project seeks to implement an interactive installation on campus to explore different meanings of space by creating virtual 3D sculptures, which considers human beings as essential elements. The overreaching goal is to create and install three sets of virtual 3D sculpture generating installation in the courtyard of Kohn Hall at UC Santa Barbara.

The idea of the project is exploring and redefining the relationship between individuals and three-dimensional environment as the space encounters lots of people everyday and each individual is different to the space in terms of physical locations, but the interactions between people and environment are seldom noticed and discussed.

The initial research and drafted designs have been completed on the subject of this project. And this report severs as a proposal to install a completed art project in the courtyard of the Kohn Hall at UC Santa Barbara for a period of time in the near future.

Figure 1: Conceptual Image of the Installation

Objectives

The main objectives of this art project are as follows: (1) to utilize the courtyard of Kohn Hall at UC Santa Barbara as a primary case study to redefine the relationship between individuals and three dimensional environment. (2) to inspire our campus and community to think about people's role in a 3D space. (3) to provide opportunity for the artist to study and think the difference between art and engineering in terms of research methodologies.
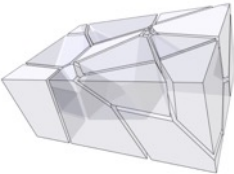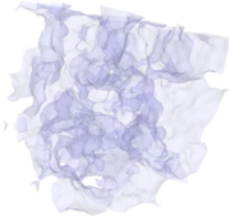
Motivations for Use of Courtyard of Kohn Hall

The Kohn Hall received the American Institute of Architects' highest honor — the Gold Medal, and is named for the institute's founding director and Nobel Laureate, Walter Kohn. Hence, the courtyard of the Kohn Hall is a focal point of the Physics/Engineering and UC Santa Barbara's campus as a whole. Interestingly, as a great place for scientists, the Kohn Hall contains many art pieces all over the building. However, the courtyard of the hall is still waiting to be filled with an artwork, which can fit well with the environment.

Description of Art and Installation

Basically, the installation of the project contains one TPZ (Tilt, Pan and Zoom) camera, one Mac Mini and three High Definition LED screens. The job of the camera is looking for people in the space and record their XYZ locations. Then the live data stream will be applied to three different geometric diagrams for generating a continuous evolving 3D virtual sculpture, which will be eventually displayed on the three LED screens. The table below shows the diagrams and visualized demos of the project (*Please see Appendix for the more specific description of each diagram*):

Table 1: Brief Description of the Installation

	Installation One	**Installation Two**	**Installation Three**
Camera	TPZ Camera		
Data	XYZ Postions		
Diagrams	Voronoi	Convex Hull	ISO Surface
Visualization Demos			

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Reference

George Legrady, "Swarm Vision", <http://www.mat.ucsb.edu/g.legrady/glWeb/Projects/sv/swarmvision.html>
Giuseppe Randazzo, "Nova Structutura", <http://www.novastructura.net/wp/about/>
Ursula Damm, "Memory of Space", <http://ursuladamm.de/memory-of-space-2002/>

Appendix

	Wiki Definition	Reason to be Chosen
Voronoi	In mathematics, a Voronoi diagram is a partitioning of a plane into regions based on 'closeness' to points in a specific subset of the plane. That set of points (called seeds, sites, or generators) is specified beforehand, and for each seed there is a corresponding region consisting of all points closer to that seed than to any other. These regions are called Voronoi cells.	In 3D space, all the points in a voronoi space has the closest distance to the generator. This exclusive relationship is similar with the concept of personal space. Therefore, it's interesting to see a public space being filled with many tiny personal spaces.
Convex Hull	In mathematics, the convex hull or convex envelope of a set X of points in the Euclidean plane or Euclidean space is the smallest convex set that contains X. For instance, when X is a bounded subset of the plane, the convex hull may be visualized as the shape formed by a rubber band stretched around X.	The idea of convex hull is about using smallest space to contain all the points, which, on the other hand, can be interpreted as the points (people's locations in the project) build a self-contained space. Some interesting interaction may be generated between the real physical space and the self-contained space.
ISO Surface	An isosurface is a three-dimensional analog of an isoline. It is a surface that represents points of a constant value (e.g. pressure, temperature, velocity, density) within a volume of space; in other words, it is a level set of a continuous function whose domain is 3D-space.	We, as human, are all different. Physically, everyone is different in height, weight and many other features. But, in macroscopic, we have no difference. The ISO Surface is trying to play this interesting situation by inserting different people into a 3D shape which the surface has the constant value.

Table 2: Explanation of Diagrams and Their Metaphors