

Reconstructing the Ancient City of Pachacamac

Adam Mally, Norman I. Badler, Clark L. Erickson

SIG Center for Computer Graphics, University of Pennsylvania

Abstract

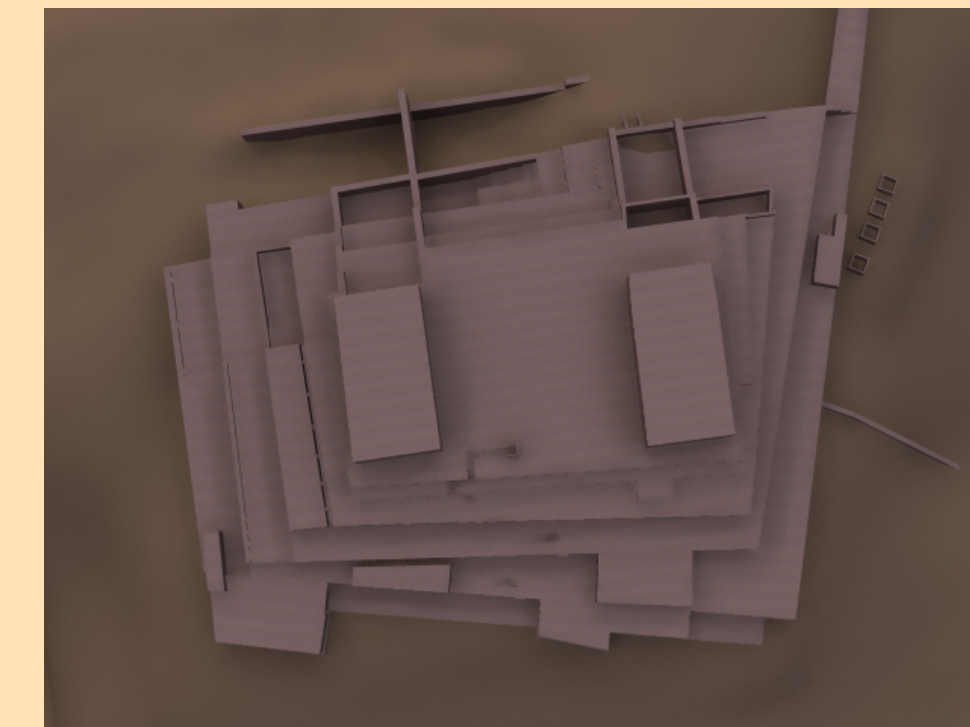
The goal of the Pachacamac Site Simulation project is to digitally reconstruct the ancient city of Pachacamac in Lima, Peru. This reconstruction will be part of a museum exhibit of the city; museum visitors will be able to control a virtual avatar through Pachacamac and explore it as if they were there themselves during the time when it was still inhabited by the Incans. The virtual site is planned to be populated by virtual Incans controlled by crowd simulation algorithms in order to make the now-ruined Pachacamac once more filled with life and hopefully immerse visitors in the exhibit. My contribution to this exhibit is the reconstruction of the now-ruined buildings of Pachacamac.

Method for Building Reconstruction

Buildings from the site were reconstructed using various maps and photos as reference images:
Floorplans of various buildings drawn by Go Matsumoto within the last five years.
Architectural drawings from the late 1890s drawn by Dr. Max Uhle during his study of the site.
Photographs of the ruins of Pachacamac taken by Professor Clark Erickson.

Building foundations were modeled first, then extruded upwards to create walls. Window and door openings were cut out of the walls once the basic structures had been modeled.

Results



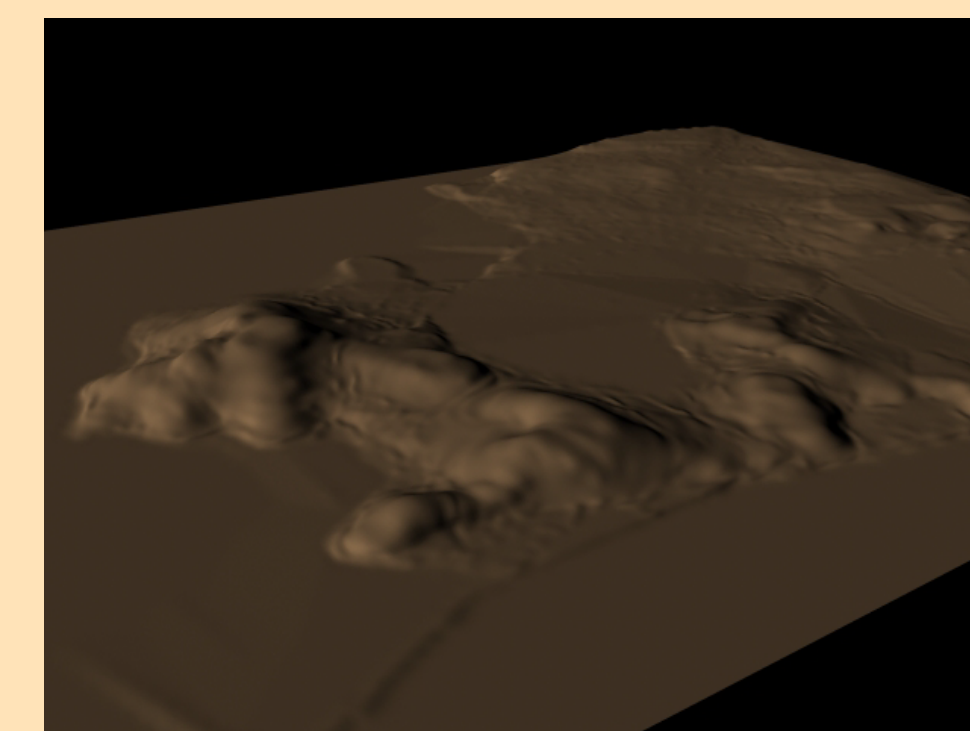
Sun Temple (Top)



Sun Temple (Southwest)



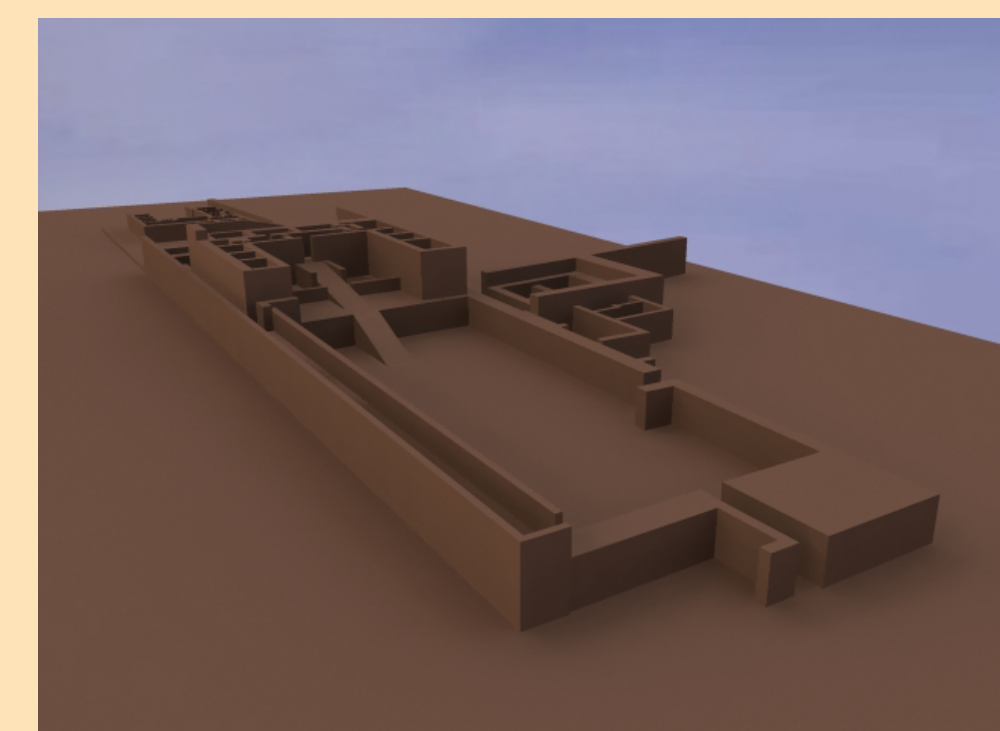
Sun Temple (Northeast)



Pachacamac Terrain

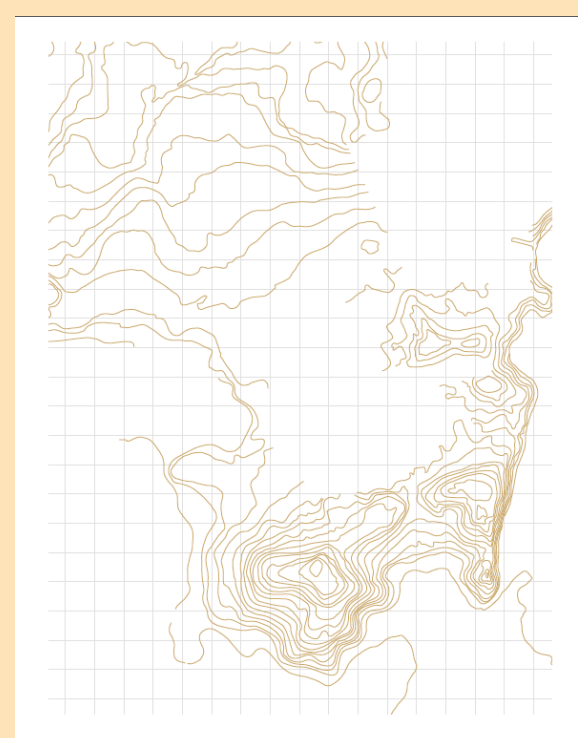


Mamacona Convent

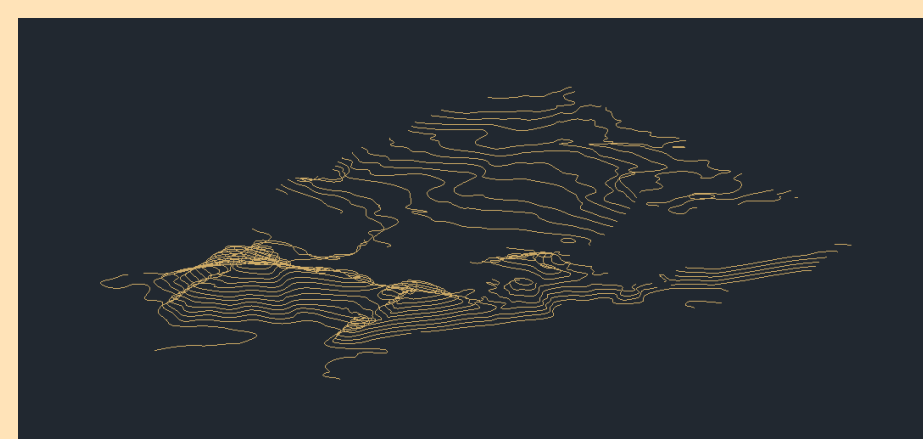


Pyramidal Building

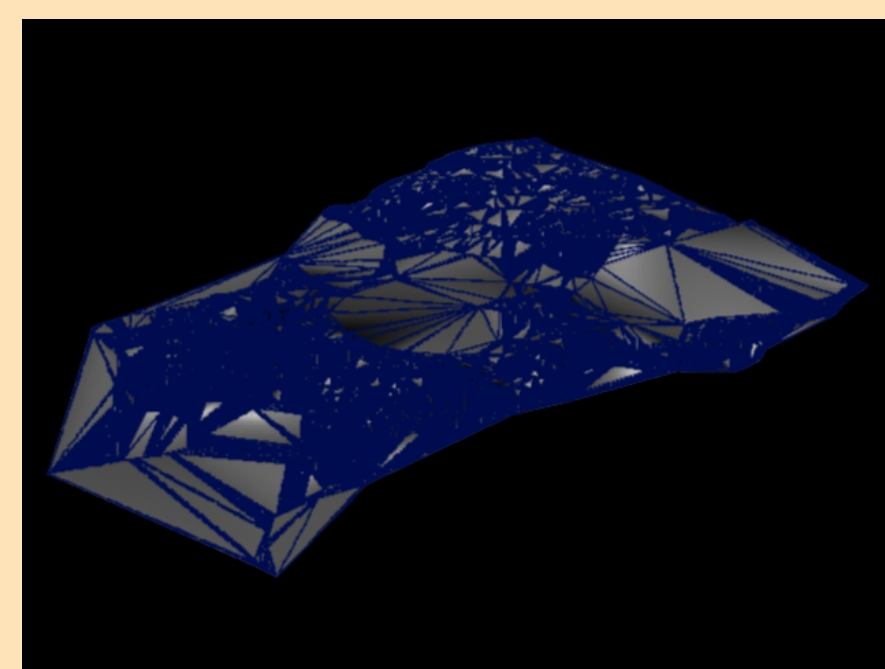
Method for Terrain Creation



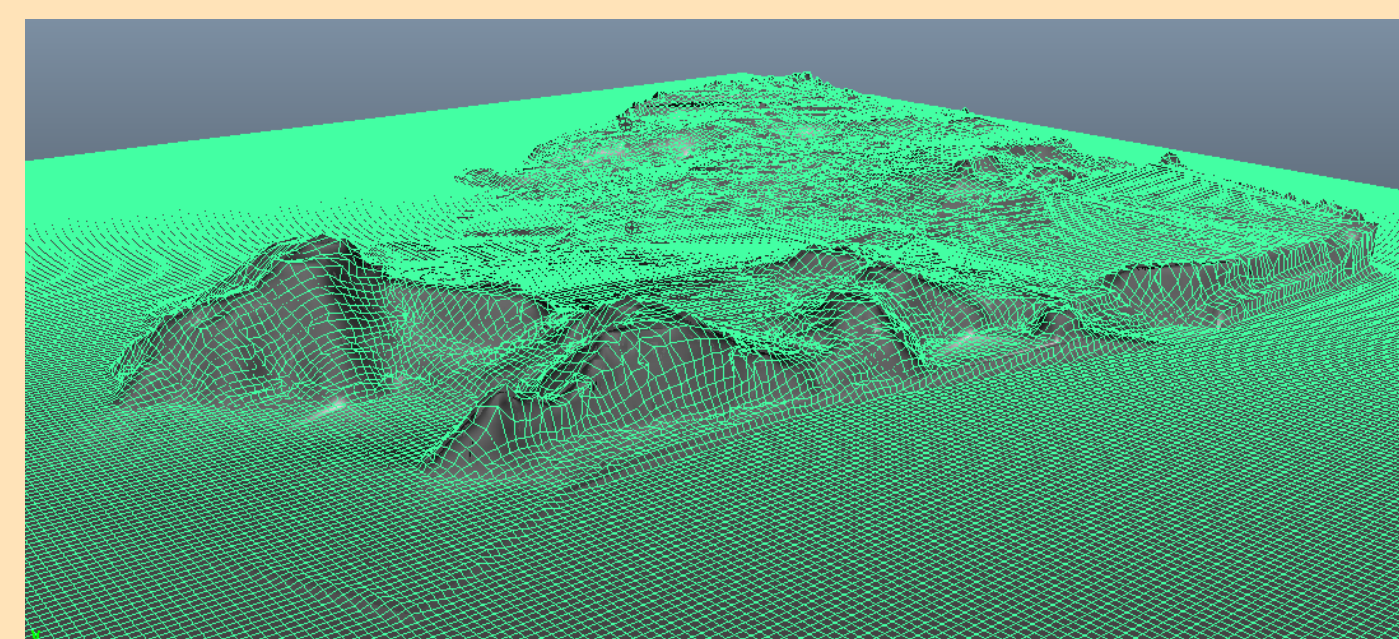
Export topological curves from Illustrator into AutoCAD.



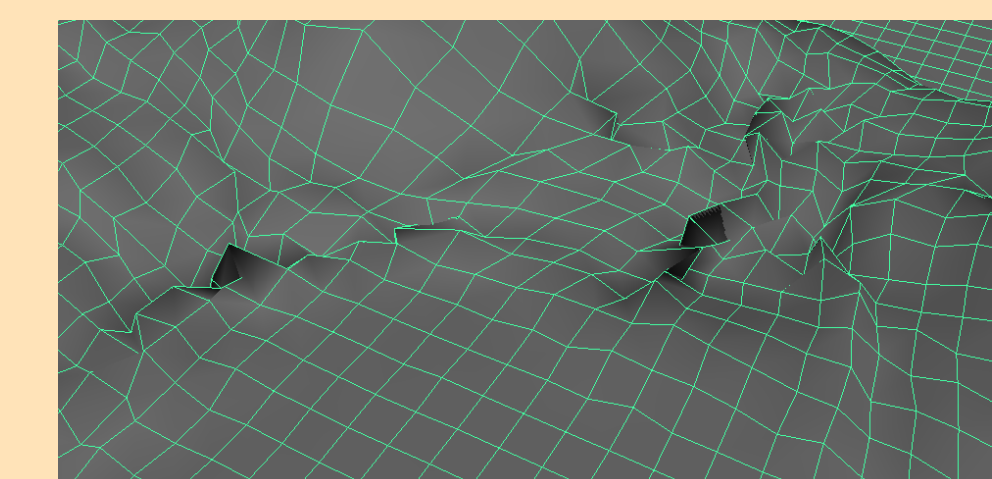
Raise curves to proper heights in AutoCAD.



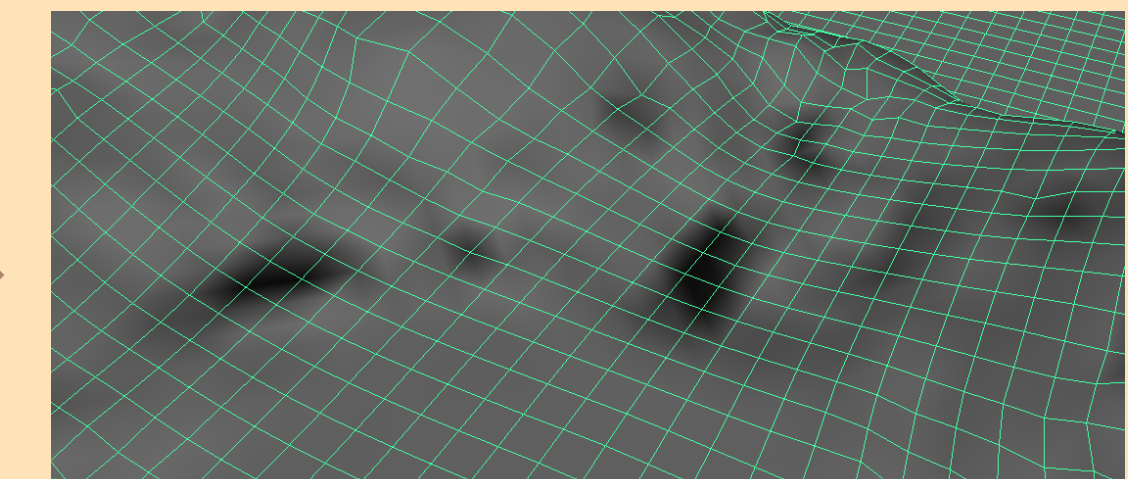
Export into 3DS Max, then use Max's terrain generator tool to create a mesh from the curves.



Export generated mesh into Maya since the mesh has poor face size uniformity. In Maya, drape nCloth over generated terrain to make mesh with uniformly-sized faces.



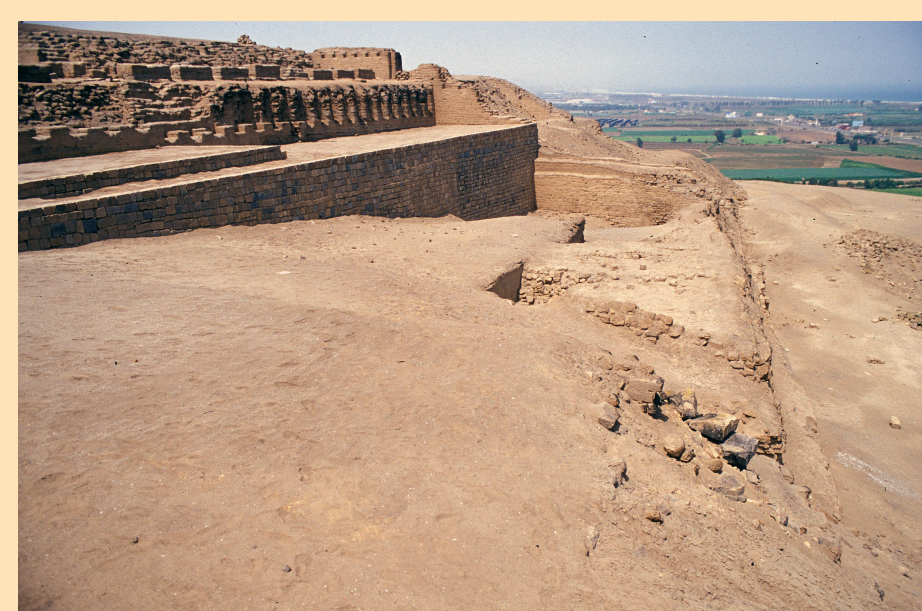
Smooth out intersecting faces created by nCloth algorithm.



Relation to Overall Exhibit and Future Work

The terrain and reconstructed buildings will be used as part of a virtual environment that museum visitors can explore with a virtual Incan avatar in order to better learn how the Incans lived. However, since only three buildings were reconstructed this summer, many more ruined buildings must be reconstructed in the same manner. Additionally, models of Incan people and Incan artifacts must be created in order to flesh out the environment created from the terrain and buildings.

Photographs of Pachacamac



Sun Temple (Southwest)



Sun Temple (Northeast)



Mamacona Convent



Pyramidal Building