Caltech Department of Computer Science

in conjunction with

Department of Applied Mathematics

Thursday,
February 18th, 4.30pm
Refreshments 4pm
Beckman Auditorium
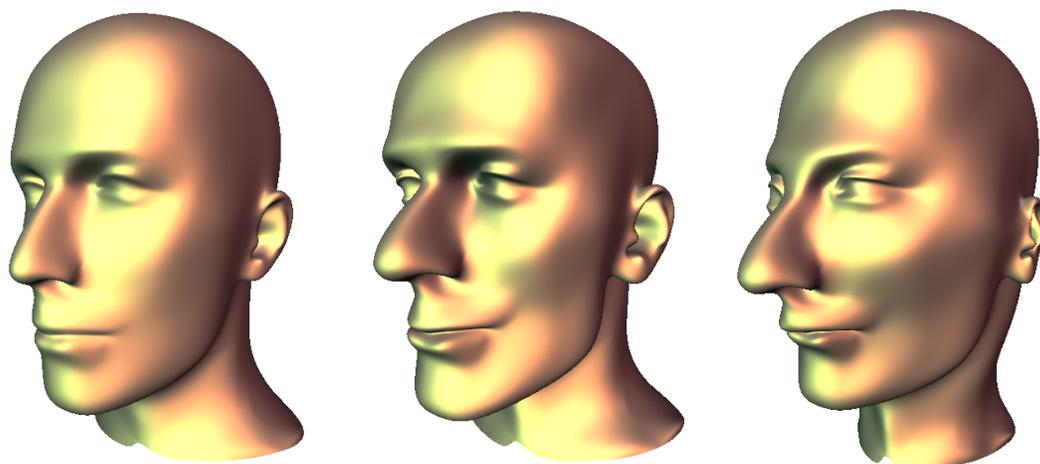
Irregular Subdivision and Signal Processing for Arbitrary Surface Triangulations

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Recent progress in 3D acquisition techniques and mesh simplification methods has made triangulated mesh hierarchies of arbitrary topology a basic geometric modeling primitive. These meshes typically have no regular structure so that classical processing methods such as Fourier and Wavelet transforms do not immediately apply.

In this talk I will report on some very recent work which is aimed at building signal processing type algorithms for unstructured surface triangulations. In particular I will introduce a new non-uniform relaxation technique which lets us build a Burt-Adelson type detail pyramid on top of a mesh simplification hierarchy (Progressive Meshes of Hoppe). The resulting multiresolution hierarchy makes it easy to perform a full range of standard signal processing tasks such as smoothing, enhancement, filtering and editing of arbitrary surface triangulations. I will explain the basic components of our approach, the motivation behind it, and show some examples demonstrating the power of our method.

Joint work with Wim Sweldens and Peter Schröder