



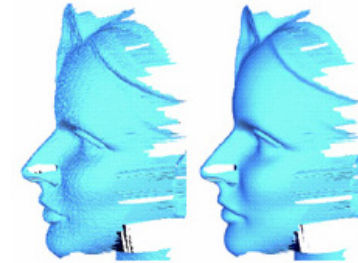
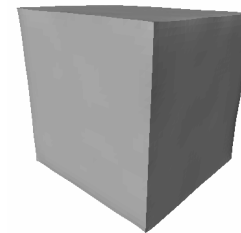
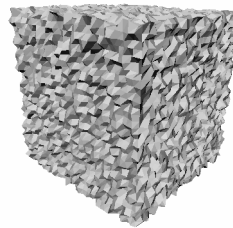
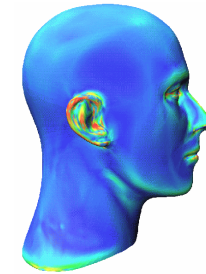
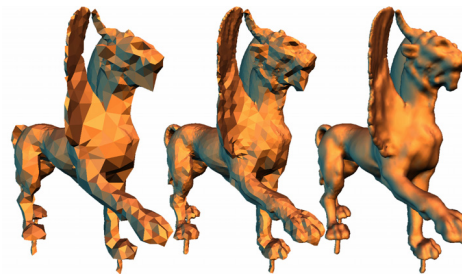
IMSC
Integrated
Media Systems
Center

INTEGRATED MEDIA SYSTEMS CENTER
A National Science Foundation
Engineering Research Center at the
UNIVERSITY OF SOUTHERN CALIFORNIA

PRINCIPAL INVESTIGATOR

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3D Modeling: Digital Geometry Processing



Adaptive semi-regular meshes, curvature approximation, and mesh denoising

Examples of digital surface processing applications.

USC STUDENTS (EXPECTED DEGREES):

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OTHER RESEARCHERS, AFFILIATIONS

Peter Schröder (Professor at Caltech), Denis Zorin (Assistant Professor at NYU), Alan H. Barr (Professor at Caltech), Ron DeVore (Professor at South Carolina)

BRIEF DESCRIPTION OF TECHNOLOGY DEMONSTRATION

We demonstrate a complete set of tools for analyzing, editing, or manipulating 3D meshes. This includes fast denoising techniques like implicit fairing, accurate discrete differential-geometry operators on irregular meshes, or remeshing techniques to provide the user with semi-regular meshes with good aspect ratio triangles. The overall goal of this research is to go from DSP (for signals such as music, images, video) to DGP, for 3D objects now.

UNIQUE OR DISTINGUISHING CHARACTERISTICS RELATIVE TO STATE-OF-THE-ART

Being able to handle arbitrary meshes as easily as a image, with guaranteed error bounds.

<p>APPLICATIONS</p> <p>Mesh editing, automatic denoising of scanned meshes, irregular mesh handling, shape analysis, compression, etc.</p>	<p>RECENT HIGHLIGHTS, LEVEL OF DEVELOPMENT, UPCOMING MILESTONES</p> <p>We recently proposed a realtime remeshing engine for arbitrary surfaces. We are now working on optimal surface approximation. We are also working on linking our approach to theoretical foundations well-known in differential geometry.</p>
<p>UNDERLYING TECHNOLOGIES</p> <ul style="list-style-type: none"> • Implicit fairing, for fast, yet robust denoising. • Curvatures approximations over arbitrary meshes. • Smooth parameterization for any 2-manifold • Realtime remeshing 	
<p>LIST OF PUBLICATIONS, REFERENCES, URLs</p> <ul style="list-style-type: none"> • Mathieu Desbrun, Mark Meyer, Peter Schröder, Alan Barr, <i>Implicit Fairing of Arbitrary Meshes</i>, ACM SIGGRAPH'99. • Mathieu Desbrun, Mark Meyer, Peter Schröder, Alan Barr, <i>Anisotropic Feature-Preserving Denoising</i>, Graphics Interface '00. • Mathieu Desbrun, Mark Meyer, Peter Schröder, Alan Barr, <i>Discrete Differential-Geometry Operators for 3D Meshes</i>, VisMath '02. • Pierre Alliez, Mark Meyer, Mathieu Desbrun, <i>Interactive Geometry Remeshing</i> , SIGGRAPH '02. • Pierre Alliez, David Cohen-Steiner, Olivier Devillers, Bruno Lévy, Mathieu Desbrun, <i>Anisotropic Polygonal Remeshing</i>, SIGGRAPH '03. • Thouis R. Jones, Frédo Durand, Mathieu Desbrun, <i>Non-iterative, Feature-Preserving Mesh Smoothing</i>, SIGGRAPH '03 • Zoë Wood, Hugues Hoppe, Mathieu Desbrun, Peter Schröder, <i>Isosurface Topology Simplification</i>, ACM TOG '04. <p>Check out: http://www-grail.usc.edu/</p>	

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