

Course Projects

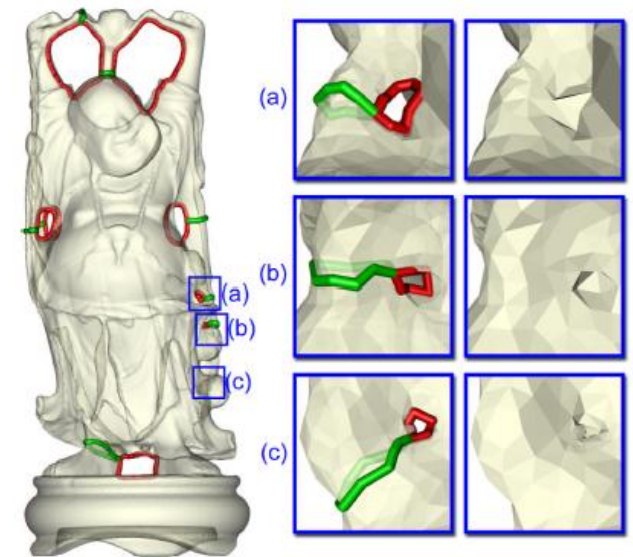
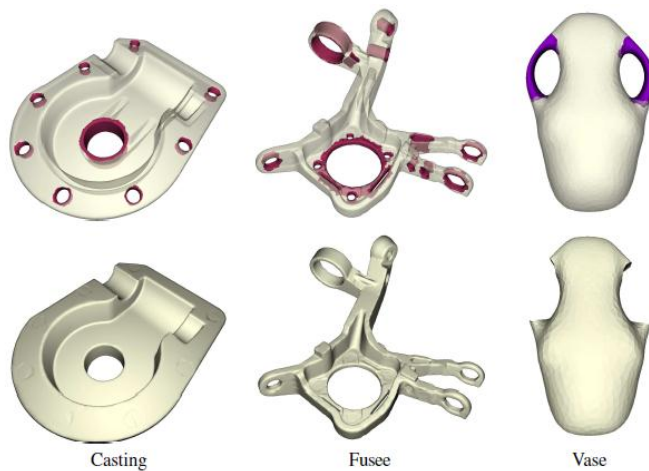
EE 7000

The Course Project

- Project Presentations (TBD, sometime around Dec. 5, 30 min/project)
 - Present 1) project algorithm, and demo 2) your implementation results
 - Submit 1) your slides, 2) a project summary, 3) your codes
- What you need to do this week:
 - Pick a topic/paper from the list (see the following pages), [email your team members and project topic to the instructor](#)
 - Team up if you need to (good to have 2 (at most 3) people per project)
 - Start to read the paper and implement it

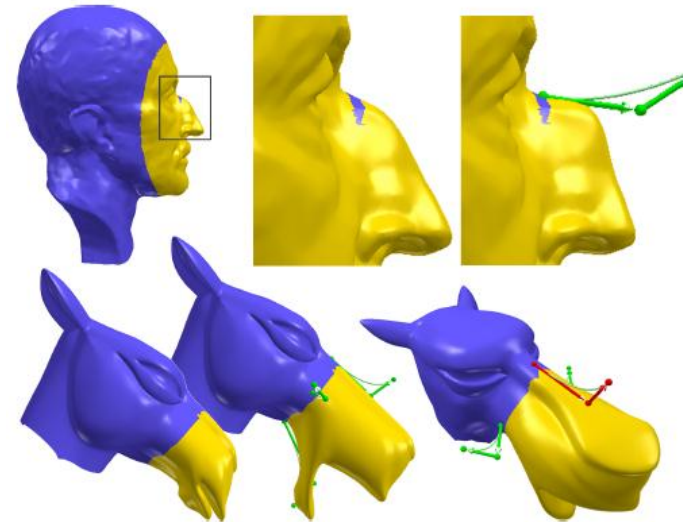
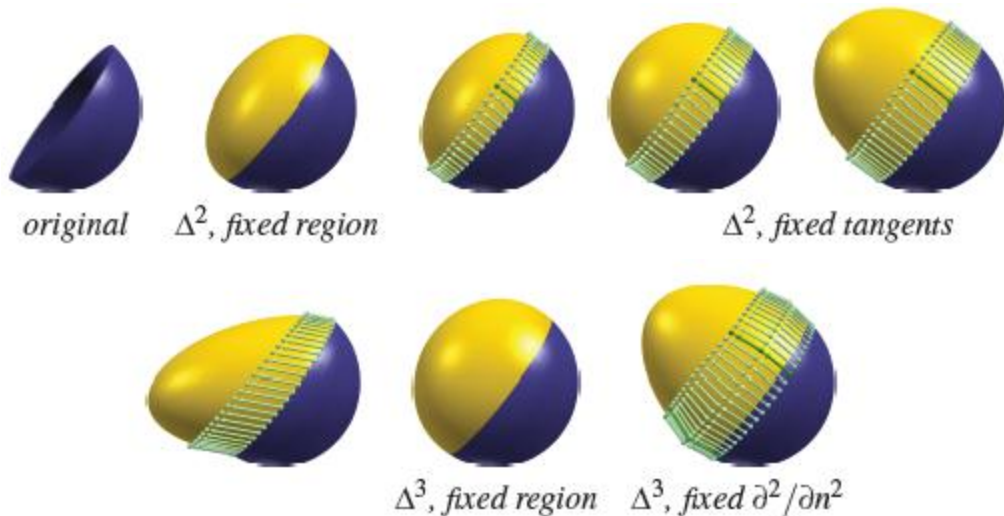
Course Project Topics

- Computing Handle and Tunnel Loops
 - Applications:
 - Feature detection, topology simplification ...
 - References:
 - T. Dey, K. Li, J. Sun, “On Computing Handle and Tunnel Loops” 2007.
 - T. Dey, K. Li, J. Sun, D, Cohen-Steiner, “Computing Geometry-aware Handle and Tunnel Loops in 3D Models”, 2008.



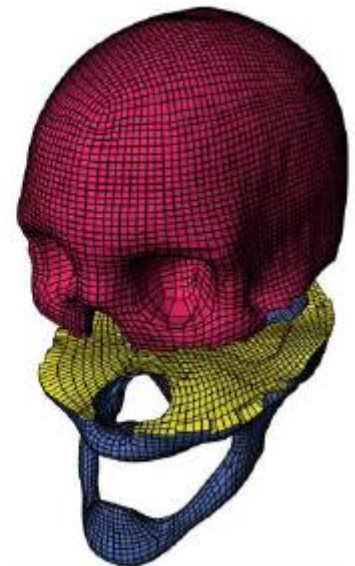
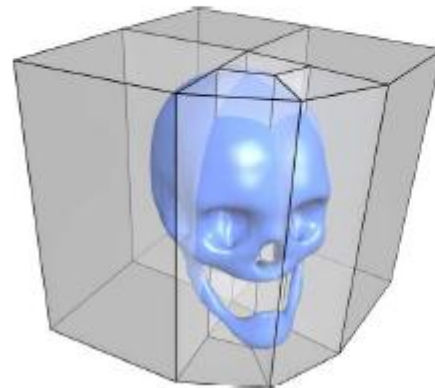
Course Project Topics

- Surface Modeling based on Partial Differential Equations (PDEs)
 - Applications:
 - Hole Filling, Surface Edit/Deformation,...
 - References:
 - A. Jacobson, E. Tosun, O. Sorkine, D. Zorin, “Mixed Finite Elements for Variational Surface Modeling”, 2010.



Course Project Topics

- 3D Volume Parameterizations
 - Applications:
 - Hex-remeshing, 3D Texture Mapping ...
 - References:
 - M.Nieser, U.Reitebuch, K.Polthier, “CUBECOVER-Parameterization of 3D Volumes”, 2011.



Course Project Topics

- Image Cloning
 - Application:
 - Image and video editing...
 - References:
 - Z.Farbman, G.Hoffer, Y. Lipman, D. Cohen-Or, D.Lischinski, “Coordinates for Instant Image Cloning”, 2009.



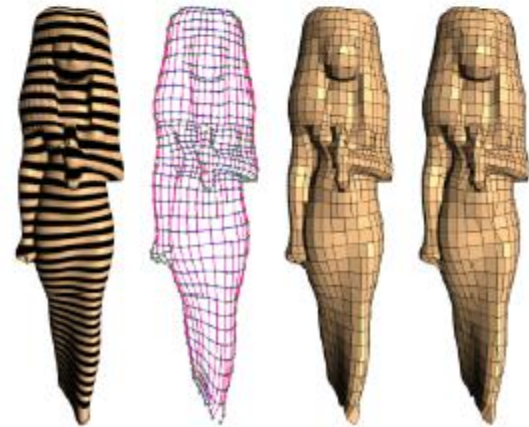
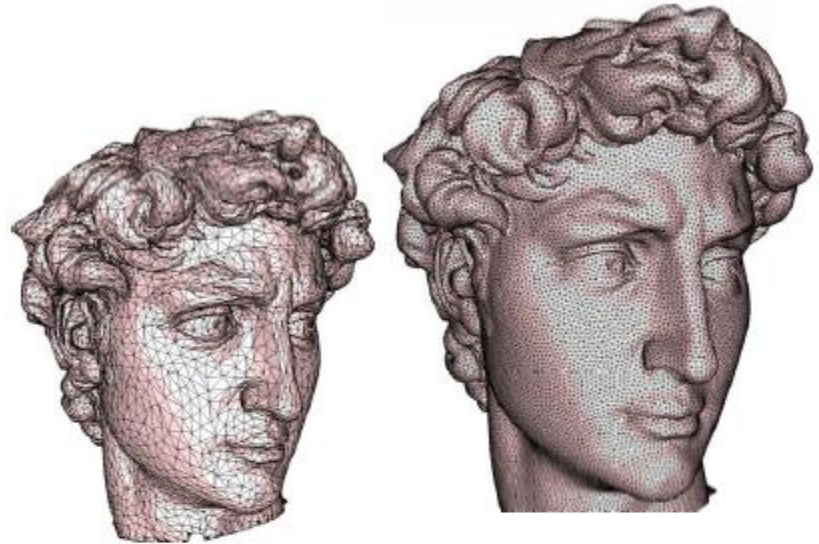
(d) Target image



(f) Mean-value cloning

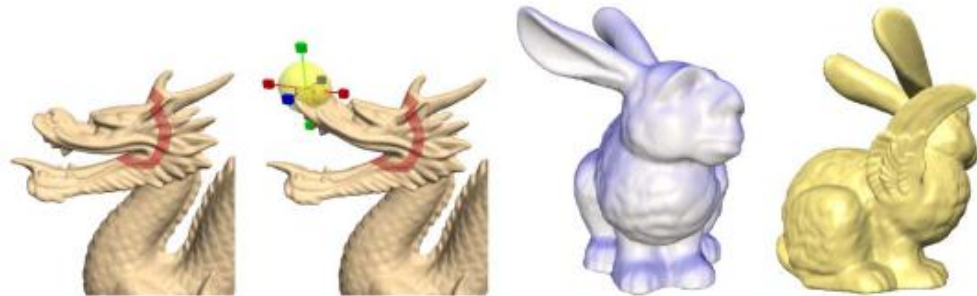
Course Project Topics

- Meshing:
 - Generating high quality discretization
 - 1) Isotropic triangular meshing
 - [P. Alliez, E. Verdiere, O. Devillers, and M. Isenberg, “Isotropic Surface Remeshing”, SMI03]
 - 2) Anisotropic **quad**-meshing
 - [S. Dong, S. Kircher, M. Garland, “Harmonic Functions for Quadrilateral Remeshing of Arbitrary Manifolds”, CAGD05]

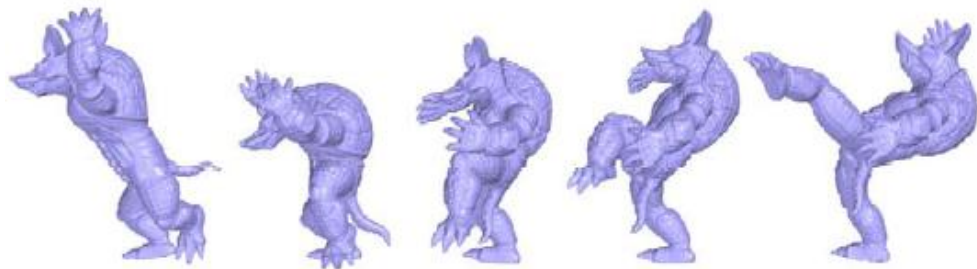


Course Project Topics

- Deformation/ Animation
 - 3D Surface Deformation
 - [Sorkine et. al, “Laplacian surface editing”, SGP04]



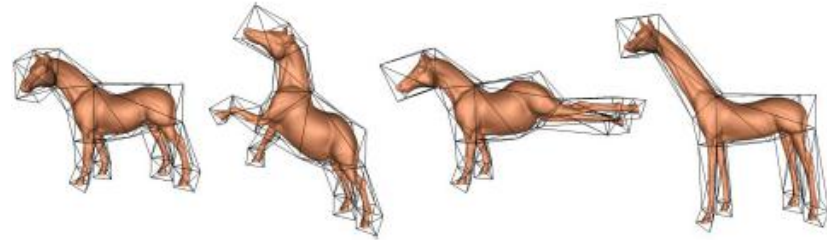
- Volumetric Deformation
 - [K. Zhou, J. Huang, J. Snyder, X. Liu, H. Bao, B. Guo, and H.-Y. Shum, ”Large Mesh Deformation using the Volumetric Graph Laplacian”, Siggraph 05]



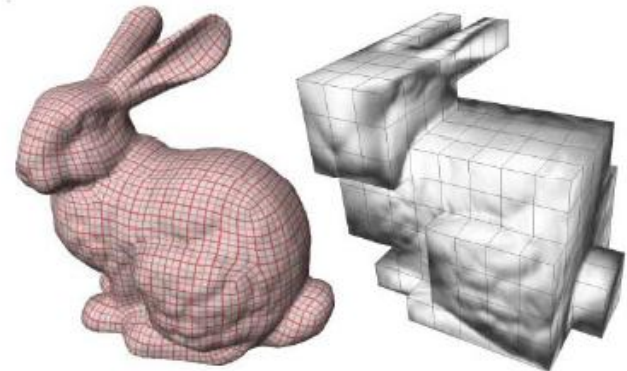
Course Project Topics

- Shape Parameterization:

1. [T. Ju, S. Schaefer, and J. Warren, “Mean Value Coordinates for Closed Triangular Meshes”, SIG05]



2. [M. Tarini, K. Hormann, P. Cignoni, and C. Montani, “Polycube Map”, SIG04]

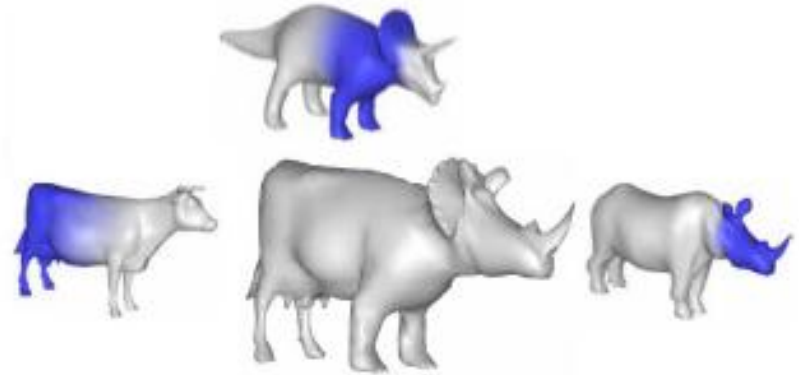


3. [G. Patane, M. Spagnuolo, and B. Falcidieno, “Para-Graph: Graph-Based Parameterization of Triangle Meshes with Arbitrary Genus”]



Course Project Topics

- Surface Mapping/Morphing:
 1. [J. Schreiner, A. Asirvatham, E. Praun, H. Hoppe, “Inter-Surface Mapping”, SIG04]
 2. [V. Kraevoy and A. Sheffer, “Cross Parameterization and Compatible Remeshing of 3D Models”, SIG04]
 3. [A. Lee, D. Dobkin, W. Sweldens, P. Schroder, “Multiresolution Mesh Morphing”, SIG99]



And other topics...

- Your own project or interest related to computer graphics and geometric modeling