CENTER FOR COMPUTATION & TECHNOLOGY
Interdisciplinary | Innovative | Inventive

LOUISIANA STATE UNIVERSITY

Search

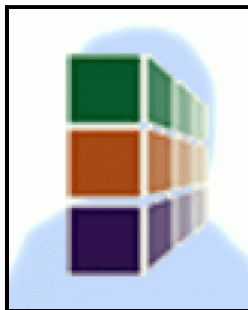| Home | About ▼ | Focus Areas ▼ | Research ▼ | Divisions ▼ | Programs ▼ | News ▼ | Events ▼ | Computing Resources ▼ | Jobs | Contact Us | Log In | LSU ▼ |

Events

Current Events
Lectures▼
Events Archive▼

Special Guest Lectures

Shape Mapping Framework for Graphics and Visual Computing

Xin Li, State University of New York at Stony Brook

Ph.D. Candidate in the Department of Computer Science

Electrical Engineering Building 117
April 03, 2008 - 10:30 am

Abstract:
With the rapid advancement of 3D surface scanning technologies and medical modalities, high-fidelity surface models and volumetric datasets of huge size have been routinely acquired through hardware devices. This talk concentrates on the challenging research issue of how to build the best possible (surface and volume) mapping between different objects of arbitrarily complicated topological types. Inter-shape mapping, or more specifically, finding a meaningful correspondence between two given objects is an enabling tool for various applications in digital entertainment, modeling and simulation, shape analysis and retrieval, material synthesis, visualization, etc. My dissertation research seeks accurate and efficient solutions to this fundamental and important problem. In particular, we have articulated and developed a general and powerful shape mapping paradigm for objects in different dimensions with arbitrary topologies: in the 1D curve case, we devise the conformal invariants as curve signatures; in the 2D surface case, we exploit techniques of topological decomposition and conformal mapping; and in the 3D volumetric case, we focus on harmonic map based on Green function theory. Consequently, compared with all the existing surface and volumetric mapping techniques, our work offers a better and integrated solution to the inter-object mapping problem. The great potential of our shape mapping framework will be highlighted through many valuable applications such as shape analysis, deformation editing, animation morphing, information transfer, re-meshing, texture synthesis, and physics-based modeling. Furthermore, we envision broader application scopes including computer vision, shape database and content-driven information retrieval, digital medicine, virtual environments, etc.