Institute colloquium

The Institute Colloquium: Fast visual simulation of complex multiscale phenomena

Ming C. Lin
University of North Carolina

Host:

From turbulent fluid flow to chaotic traffic patterns, many phenomena observed in nature and in society show complex emergent behavior on different scales. The modeling and simulation of such phenomena continues to intrigue scientists and researchers across different fields, from computational sciences, medicine, traffic engineering, urban planning, to social sciences. Understanding and reproducing the visual appearance and dynamic behavior of such complex phenomena through simulation is valuable for enhancing the realism of virtual scenes, for improving the efficiency of design evaluation, for planning of complex procedures, and for training of skilled personnel. This is also essential for interactive applications, where it is impossible to manually animate all the possible interactions and anticipate all responses beforehand. In this talk, I survey several recent advances that synthesize together macroscopic models of the large-scale flows and local representations of intricate behaviors to capture both the aggregate dynamics and fine-grained details of such phenomena with significantly accelerated performance on commodity hardware, as well as novel algorithms that integrate physics-based modeling and data-driven synthesis to solve challenging research problems. Some of the example dynamical systems that I will describe using these hybrid techniques include soft tissue modeling, turbulent fluid, granular flows, crowd simulation, traffic visualization, and sound synthesis. I conclude by discussing some possible future directions.

Monday, March 2, 2015 04:30pm - 05:30pm
Raiffeisen Lecture Hall, Central Building

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.
Please find a schedule of the ISTA Shuttle on our webpage:
https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.