

# Mathematics Colloquium at IUB

LARS LINSEN

(IUB)

will speak on

*A Framework for Real-time Volume Visualization  
of Streaming Scattered Data*

**Date:** Monday, October 16, 2006

**Time:** 17:15

**Place:** Lecture Hall Research II, IUB

**Abstract:**

Scattered data reconstruction algorithms are often computationally expensive and difficult to implement. In order to visualize streaming scattered data, efficient approaches to scattered data reconstruction are required. We present a general framework for scattered data interpolation operating on discrete domains. The key idea for speeding up the reconstruction over an underlying grid is a re-factorization of the algorithm. The re-factorized version is designed such that it easily maps to graphics hardware architectures exploiting their performance and parallelism. Moreover, it naturally extends to applications for streaming data. As a proof of concept, we have implemented inverse-distance-weighted interpolation, natural neighbor interpolation, and radial Hermite interpolation using our general framework. We apply the framework to two kinds of streaming data: progressive scattered data and real-time sensor data with moving sensors delivering asynchronous measurements. To account for the scattered spatial and temporal distribution of streaming sensor data, we use a four-dimensional extension of our framework, which elegantly handles representation of time-varying data and leads to reconstructions that are smooth in both space and time.

**Colloquium Tea** at ca. 16:45 in the Tea Room of Research II, close to the lecture hall. Everybody is welcome!

M. STOLL