



SISMA

Séminaire Informatique Scientifique & Mathématiques Appliquées

Volume rendering for interactive visualization - from performance to visual quality

Jonathan Sarton (Université de Strasbourg)

Visualization is essential at every stage of the scientific workflow, and many fields commonly manipulate volumetric data representations obtained from acquisition devices or numerical simulations on 3D domains. Continuous advances in instruments and sensors make it possible to achieve increasingly higher resolutions, while the growing power of supercomputers enables increasingly large and complex simulations, producing volumetric datasets of great variety and complexity. In this context, the ability to efficiently visualize complex volumetric data has become crucial. Volume rendering is a central approach for the interactive exploration of such acquired or simulated volumetric data. Modern approaches mainly rely on GPU-based ray-casting techniques, enabling interactive high-resolution rendering.

This presentation discusses the evolution of volume rendering methods for scientific visualization, with a particular focus on modern hardware-accelerated techniques. It highlights the challenges related to both performance and rendering quality, drawing on research conducted more specifically within the IGG team at the ICube laboratory in Strasbourg.