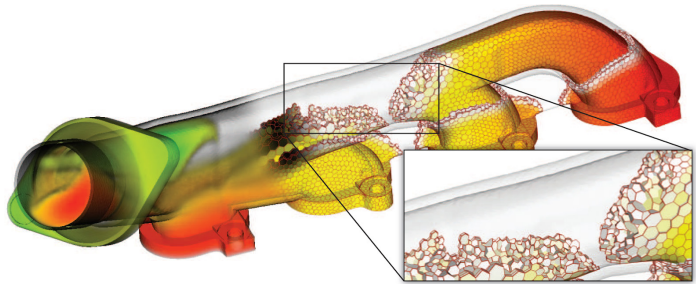


# Large-Scale Volumetric Mesh Visualization and Analysis

## Project Description

Very large volumetric meshes are of crucial importance in many areas such as large-scale computational fluid dynamics (CFD) simulations, whether for car engine design or for simulating oil and gas reservoirs. Recent computational advances have led to computational

grids of extreme size, such as trillion-cell reservoir simulations [1]. The size and complexity of such grids pose a tremendous challenge to interactive visualization and analysis, and require the development of novel data structures for visualization, e.g., polyhedral grid data structures [2], as well as data structures for efficient querying and analysis.



## Your Role in this Project

In this project, you will develop new prototype visualization tools, and design novel data structures and algorithms for extreme-scale volumetric meshes from trillion-cell simulations with many attribute channels that must be processed, queried, and analyzed in near real-time or real-time.

## Requirements

You need to have:

- prior experience in C++ programming
- prior experience in GPU computing (any of CUDA/OpenCL/OpenGL)
- fluent English language skills
- openness for a multicultural environment

## References

[1] <http://www.saudiaramco.com/en/home/news-media/news/saudi-aramco-scientists-achieve-new-world-record.html>

[2] Muigg et al., Interactive Volume Visualization of General Polyhedral Grids, IEEE TVCG 17(12), 2011

