Berliner Colloquium für wissenschaftliche Visualisierung

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CGAL - The Computational Geometry Algorithms Library

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Zuse-Institut Berlin (ZIB), Takustraße 7, 14195 Berlin
Seminarraum (Rundbau, Erdgeschoss)

The CGAL C++ library, developed by the CGAL Open Source Project, offers geometric data structures and algorithms that are reliable, efficient, easy to use, and easy to integrate in existing software.

In this talk I will give an overview on what is currently available in CGAL, as well as what is under development. We will see algorithms from the areas *2D vector graphics* (e.g., Boolean operations on Bézier curves, offsets, polyline simplification, and geometry on the sphere), *point set processing* (e.g., normal estimation, denoising, shape detection, and surface reconstruction) *surface mesh processing* (e.g., Boolean operations, simplification, deformation, segmentation, and skeletonization), and *mesh generation* (e.g., surface and volume mesh generation from 3D images, implicit functions, or polyhedral surfaces, anisotropic mesh generation, and mesh generation in periodic spaces).

In the second half of the talk I will cover non-geometric topics: First, the *exact geometric computing* paradigm that makes CGAL reliable without sacrificing efficiency. Then, the *generic programming* paradigm that facilitates integration into existing software. Finally, organizational issues, such as how the CGAL project works internally, how students can get involved through our participation in the Google Summer of Code, and how research groups can become project partners.