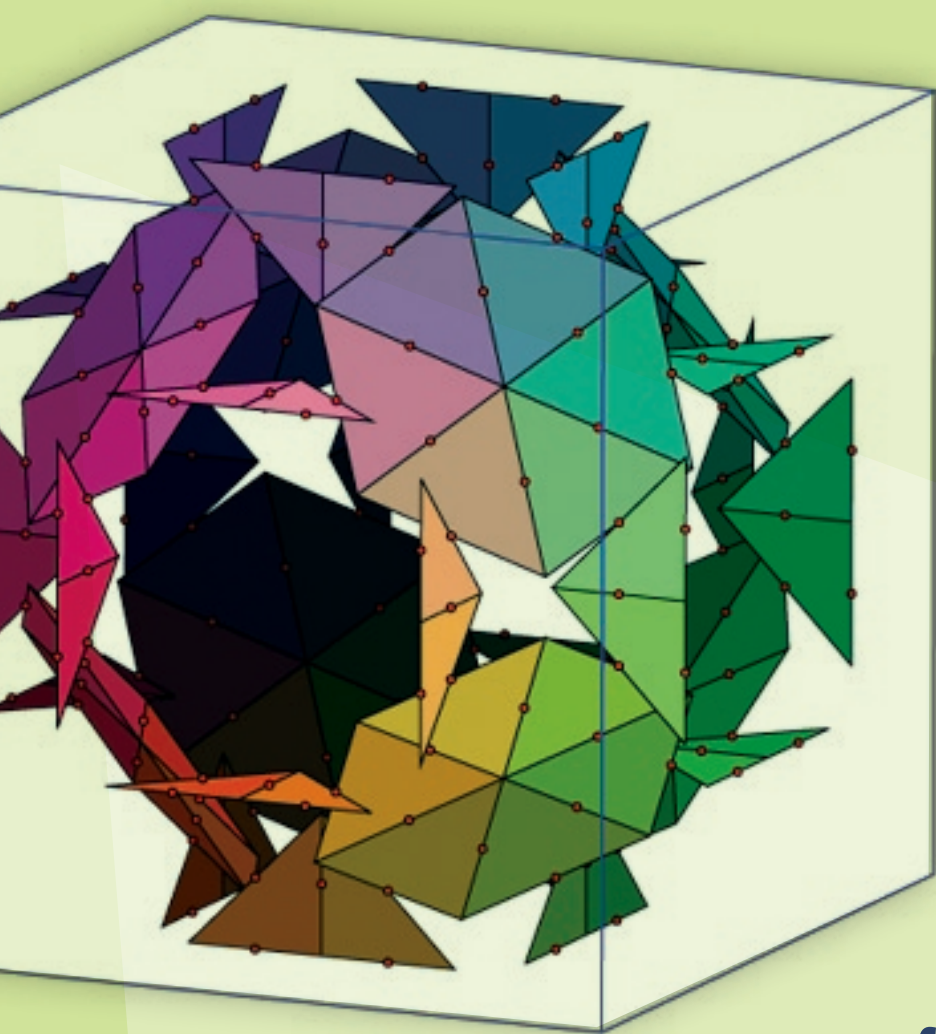


Association pour la Création de la Cité des Géométries  
Université de Valenciennes et du Hainaut-Cambrésis

# UNIVERSITÉ D'ÉTÉ II

MATHEMATIC VISUALIZATION



20<sup>TH</sup> TO 23<sup>RD</sup> JUNE 05

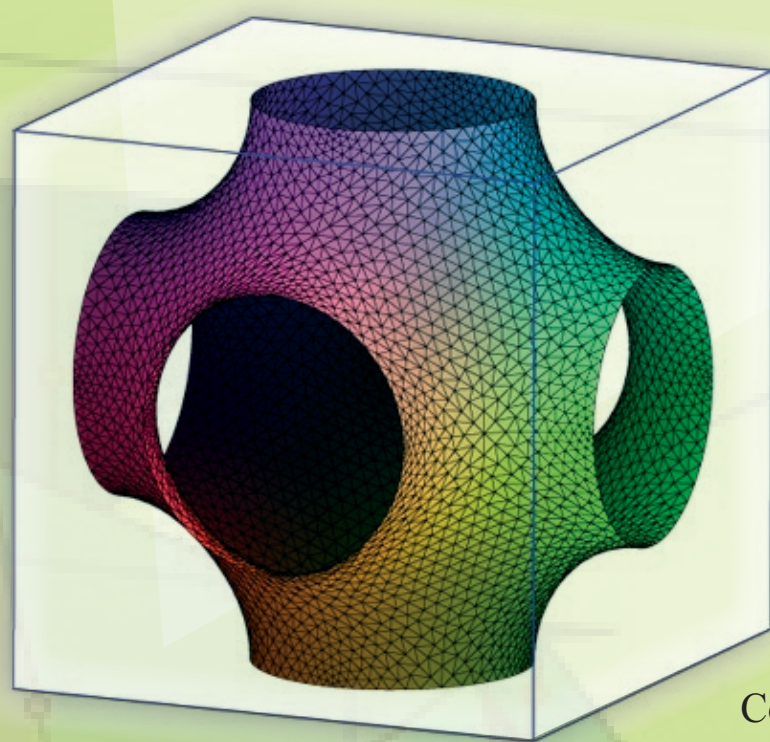
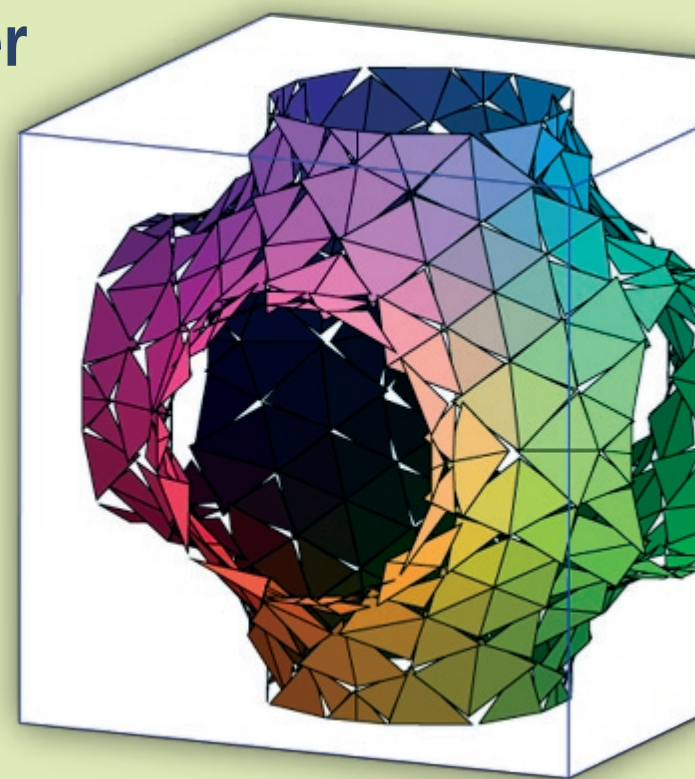
MAUBEUGE

FRANCE

The  
Summer  
School offers a concise  
initiation to the mathematical

fundamentals of visualization techniques

in various scientific fields. It is a continuation of the Summer School held in June 2004. Theoretical courses will deal with fundamental subjects playing an essential role in the study of polyhedral shapes such as differential and discrete geometry. Modern visualization algorithms will be presented and applied during experiments as planned in the practical courses. Courses and workshops will be taught in English. They are designed for computer science and mathematics students, as well as students specialising in other scientific matters (physics, chemistry, biology, medicine) and professionals using visualization techniques. Numerous applications will be shown to give, for information purposes, an overview of current visualization techniques.



**G. Albrecht**  
(Université de  
Valenciennes et du  
Hainaut-Cambrésis)

Courses will consist in an introduction to basic mathematical methods used in CAD software. They will thus deal with Bézier-de Casteljau and B-splines techniques and algorithms for curve and surface representation. The acquired theoretical notions will be illustrated with CAD software during workshops co-directed by Y. Mineur (Université de Valenciennes).

**J.-D. Boissonnat** (INRIA, Nice)

Courses will focus on an introduction to Voronoi and Laguerre diagrams, dual complexes, meshing and surface reconstruction. They will also deal with the various combinatorial and algorithmic issues these techniques entail.

**H.C. Hege** (Zuse  
Institute Berlin)

After a brief introduction to computer science and its basic objects, an overview of the field of Scientific Visualisation will be presented. Then the notion of scalar, vector and tensor fields will be addressed, as well as the problem of geometry reconstruction from image data and the use of statistical shape models. Lectures will be illustrated by applications of visualisation techniques used in various scientific areas, namely the biomedical sector.

**K. Polthier** (Zuse Institute Berlin)

Courses will provide an introduction to discrete differential geometry and its applications in various algorithms in computer graphics. The mathematics will be introduced from scratch while some background in the field of computer graphics or differential geometry is assumed.

**L. Vrancken** (Université de Valenciennes  
et du Hainaut-Cambrésis)

Courses will focus on the notion of curvature, which is essential in differential geometry. They will cover, in great detail and with numerous significant examples, curves and surfaces embedded into Euclidian space.

#### ORGANISATION :

- A. El Kacimi, scientific coordinator (UVHC)
- F. Goichot & C. Rousseau (UVHC)
- F. Trincaretto (President of the City of Geometries)

#### INFORMATION AND REGISTRATION :

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