

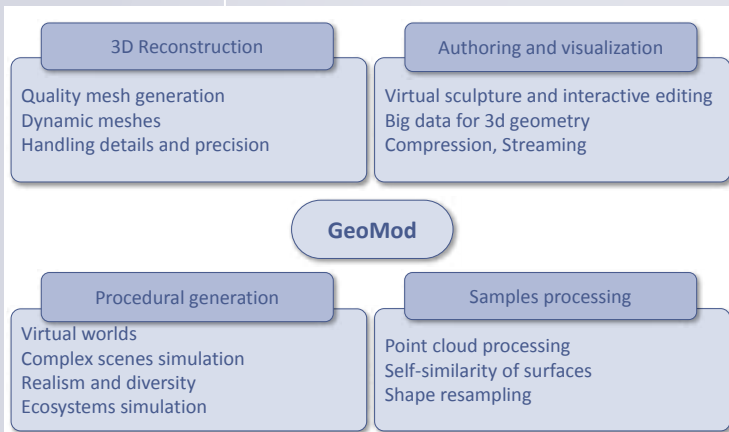
# GeoMod Team

*Geometric modeling, computational geometry, procedural generation*

## Laboratoire d'InfoRmatique en Image et Systèmes d'information

LIRIS UMR 5205 CNRS / INSA de Lyon / Université Claude Bernard Lyon 1 / Université Lumière Lyon 2 / Ecole Centrale de Lyon

Geomod is a research team specialized in the robust and intuitive geometric modeling of 3D shapes and scenes. Its originality lies in the diversity of the processed 3D data: indeed, the team does not focus only on reconstructing real world objects but is also interested in virtual or even hybrid objects. Real world objects are reconstructed digitally from digital laser scans, while virtual shapes can be designed interactively or procedurally, at a larger scale. Geomod also tackles the storage problem caused by large datasets with highly detailed geometric representations, as well as the simulation of different phenomena impacting the global aspect of a complex scene, in particular to improve its realism.



## Highlights

- Full paper at Siggraph 2013 dealing with terrain generation based on a hydrographic network
- Highlight of the industrial PhD with Worldline during the official launch of the Geoportail 3 (Institut Géographique National - October 2012)
- Project Mango with Ubisoft and CEA dealing with a new generation of video games
- Organization of the 8th Symposium on Geometry Processing (SGP 2010) at the international convention center of Lyon
- First award of the cover contest for the journal Computer Graphics Forum in 2010 with an image produced within the DNA project funded by the ANR

## The team

### Members

- 4 Professors
- 2 Researchers (CNRS, incl 1 half-time member)
- 3 Associate Professors
- 5 PhD students

### Defended PhD Thesis

- 1 to 3 per year in average

## Scientific skills and societal challenges

### Scientific skills

- Geometric modeling, computational geometry, point cloud processing, 3D reconstruction, quality mesh generation and editing
- Procedural generation, virtual sculpture, interactivity, complex scenes modeling, natural scenes ecosystem simulation
- Geometric algorithms, out of core and streaming algorithms, shape compression

### Societal challenges

- 3D modeling for cultural heritage, archeology, and industry
- Interactive modeling for digital entertainment, virtual authoring and architecture
- 3D laser scanner data processing
- Visualization on client-server architecture
- Geographic Information Systems
- Representation, generation, and manipulation of very large geometric data
- Geometric formats interoperability



## Contacts

### Coordinator

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### Website

[liris.cnrs.fr/geomod/](http://liris.cnrs.fr/geomod/)

## Softwares and platforms

- Arches platform: procedural generation of terrains, hydrographic networks, roads and buildings
- Hybrid-e platform and CHUMI viewer: 3D reconstruction, virtual sculpture, compression and interactive 3D visualization
- VirtualCity platform: city modeling from its construction to its visualization

## Positioning

### International context

- Program committee members (Eurographics, Siggraph Asia Sketches, Siggraph Asia Technical Briefs & Posters, Pacific Graphic, SMI, SPM, Digital Heritage, GMP, VRIPHYS, AFIG, WSCG,...) and organization committees (SGP2010, VRIPHYS2011, EGSR2014, HPG2014 and EG2017)
- Implication into the Open Geospatial Consortium (OGC) and the international consortium Khronos

### National context

- Commitment in GDR-IG, IM and ISIS, AFIG association, the Eurographics French chapter and the French Journées Géométrie Algorithmique
- Involvement in PhD and HDR defense juries and also in French recruiting committees
- Organization of the French GTMG 2014 and AFIG 2015

### Regional context

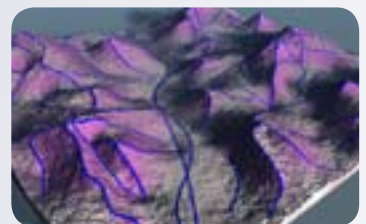
- Co-heading of LIMA and LIMA2 projects, involvement in Imaginove, in charge of the second axis of the ARC6 – Rhône-Alpes

### Industrial partnerships

- EDF R&D, WORLDLINE, TECHNICOLOR, UBISOFT, TECHNODIGIT, ADOBE (Sylvain Paris), DOLBY (Greg Ward)

### International relationships

- Purdue University (Bedrich Benes), Harvard (Hanspeter Pfister), UCLA, Victoria University (Brian Wyvill), Toronto University (Karan Singh), IMPA of Rio de Janeiro (Luiz Velho), Universidade Federal do Ceara, MPI (Bjoern Andres), CMLA/ENS-CACHAN (Jean-Michel Morel), LJK/INRIA (Marie-Paule Cani)



## International journals and conferences

- ACM Transactions on Graphics
- Computer Graphics Forum
- Computers & Graphics
- The Visual Computer
- Journal of Mathematical Imaging and Vision
- Fractals
- Computer Aided Design
- Topics in Shape Modeling
- ACM Transactions on Mathematical Software
- Computer Aided Design
- IEEE T-ASE
- Numerische Mathematik
- IEEE Computer Graphics and Applications
- International Journal of 3D Information Modeling
- Nuclear Engineering and Design
- ACM Siggraph
- Eurographics
- Pacific Graphics
- Graphics Interface
- Laser Scanning
- Eurographics Workshop on Urban Data Modelling and Visualisation
- IEEE International Workshop on Multimedia and Signal Processing
- Web3D
- 3D Object Retrieval
- Concurrent Engineering, Research and Applications