

M2DisCo Team

Multiresolution, Discrete and Combinatorial Models

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

The M2DisCo research team works on geometrical and topological analysis of 2D and 3D objects described by discrete and combinatorial structures: meshes, combinatorial maps, generalized maps, graphs, hypergraphs, regular grids, irregular structures, etc. These structures may be combined in hierarchical or multi-resolution models allowing to mix different levels of details.

The scientific core of the M2DisCo team is about the development of new tools and algorithms on these structures, and their analysis.

The team

Members

3 Professors

1 Senior researcher (CNRS)

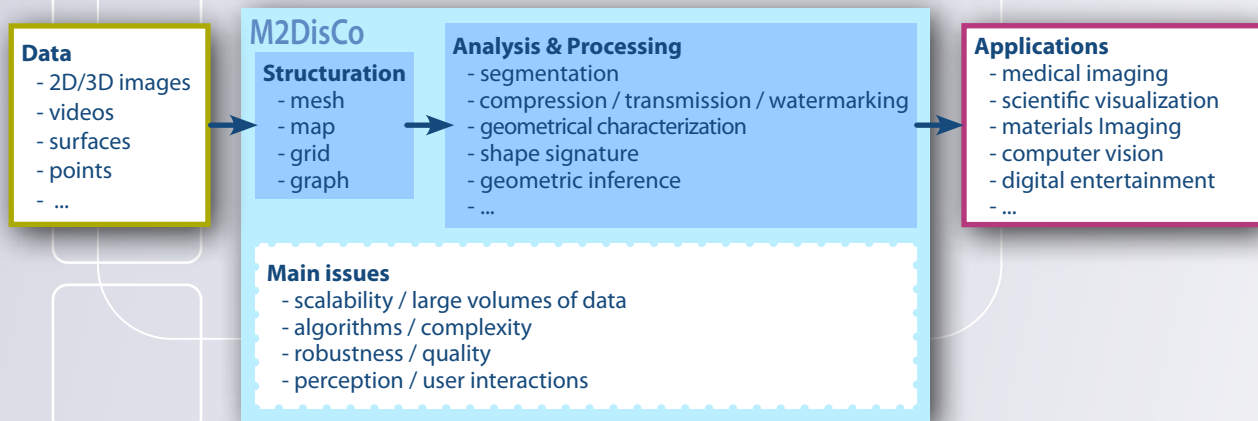
2 Researchers (CNRS, incl 1 half-time member)

6 Associate Professors

13 PhD students

Defended PhD Thesis

4 to 5 per year in average



Scientific skills and societal challenges

Scientific skills

- Mesh processing and analysis
- Discrete geometry
- Information theory
- Signal processing
- Image analysis
- Constraint programming
- Combinatorial optimization

Societal challenges

- Compression, exchange and protection of multimedia data: 3D collaborative visualization platform
- New methods for representation and processing of graphic objects: building modeling, videos, medical images ...
- Meteorology and materials science: geometric and topological analysis of microstructures for dynamic modeling of physical phenomena
- Optimisation of urban mobility

Highlights

- CNRS bronze medal 2009
- SIGGRAPH/ToG 2011, SIGGRAPH/ToG 2014 papers
- Incubation of the start-up «3DVOXEL»
- IBM Faculty Award 2013

Contacts

Coordinator

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Softwares and platforms

- Web platform for 3D compressed data streaming
- CGAL «Combinatorial maps» and «Linear cell complex» packages
- DGtal : Digital Geometry Tools and Algorithms
- MEPP : Toolbox for analysis, compression and watermarking of static and dynamic meshes
- LAD : Library for subgraph isomorphism problems solving
- AntCar, AntClique et AntSolver : ant colony optimization libraries
- SCOS & COLLAVIZ : open-source and generic platform for 3D collaborative visualization



Positioning

International context

- Head of the Technical Committee on Human Perception and Multimedia Computing, IEEE Systems, Man and Cybernetics
- Member of the editorial board of international journals: Journal on Advances in Signal Processing, Neural Computing and Applications, Pattern Recognition Letters, The visual Computer, Swarm Intelligence

National context

- GDR ISIS Information, Signal, Images et ViSion, 3D action
- GDR IGRV Informatique Géométrie et Graphique, Réalité Virtuelle et Visualisation
- Association Française pour la Programmation par Contraintes
- ANR projects: Crabex, COLLAVIZ, DigitalSnow, MADRAS, ReVeS, SATTIC, Solstice
- AMI of ADEME : Optimod' Lyon

Regional context

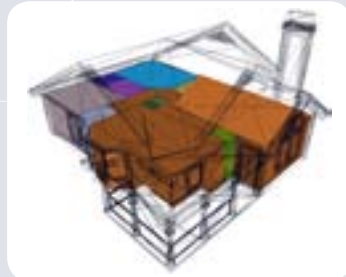
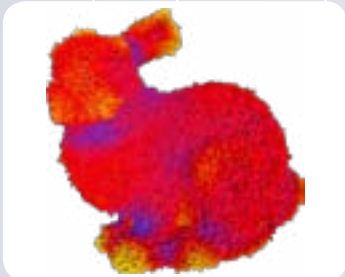
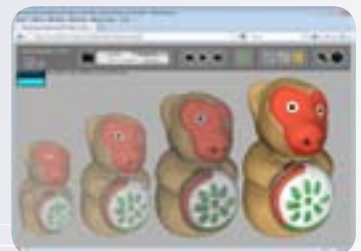
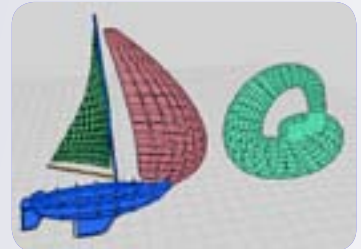
- Pole / Regional cluster Imaginove
- Web 3D Streaming project (Lyon Science Transfert)
- ARC 6 from the Rhône-Alpes Region
- Emerging project DigitalFoam of PALSE
- Vice-chair of Lyon Urban Data (LUD /TUBÀ)
- IMU and PRIMES LabEx

Industrial partnerships

- Orange Labs, IBM, Renault, EDF R&D Paris

International relationships

- USA, Germany, Netherlands, Belgium, Italy, Spain, Austria, Canada, Czech Republic, United Kingdom, Tunisia



International journals and conferences

- ACM Transactions on Graphics
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- Computer Graphics Forum
- Pattern Recognition
- Computer Vision and Image Understanding
- Artificial Intelligence
- International Conference on Computer Vision
- SIGGRAPH
- EUROGRAPHICS
- International Conference on Pattern Recognition
- International conference on Discrete Geometry for Computer Imagery
- Symposium on Geometry Processing