UNIVERSITÉ SAVOIE MONT BLANC

LAMA

Laboratory of Mathematics

UMR 5127 - CNRS / USMB

Faculty: UFR Sciences and Mountain

PhD school: Mathematics, Information Sciences and Technologies, Computer studies (MST2I)

FIELDS OF TRANSVERSAL SKILLS

- Fundamental Science, Earth sciences and Environment
- Technologies: Mechatronics, Energy conservation-Civil Engineering, Digital technologies

KEY WORDS

EDP ▪ Probabilities ▪ Shape optimisation ▪ Modeling ▪ Real algebraic geometry ▪ Moderate real, non-Archimedean geometry ▪ Motivic Integration ▪ Finsler geometry ▪ Real singularities ▪ Sub Riemannian geometry and control theory ▪ Lambda-calculations ▪ Theory of demonstration ▪ Combinatorial geometry ▪ Discrete geometry

SECTORS

Engineering, research & development (computer centres, engineering departments, production management services) ▪ Services to businesses in mathematics and computer science ▪ Fundamental research

LAMA is made up of three teams doing research focused on mathematics, applied mathematics and mathematics and computer sciences. Our common denominator is the quality of the basic research, on the one hand, as well as a concern for its applications. These applications are in other sciences (geophysics, physics, biology, mechanics and computer sciences) or in other mathematical fields (geometry applied to control theory, discrete geometry) or in the field of teaching.

RESEARCH THEMES

LAMA's research work is focused on 3 research teams:

▪ Partial differential equations (EDPs2)

- Analysis of equations and their partial derivatives
- Stochastic analysis and applied probabilities
- Mathematics in interaction: applications in geophysics, biology-medecine, ecology, etc.

▪ Altered geometry

- Real algebraic geometry, tropical geometry
- Non archimedean real and altered o-minimal geometry
- Qualitative study of the trajectories of vector fields and gradient fields and their applications
- Real and complex singularities or on valued fields
- Sub-Riemannian and Finsler geometries

▪ Computer Logic and Discrete Mathematics (LIMD)

- Theory of types, computational content of mathematical demonstrations, certification of computer programmes
- Theory of programming languages, process calculations
- Homotopic algebra, k-theory, rewriting theory and algebra applications
- Study of discrete linear structures via discrete and algorithmic geometry
- Combinatory words, tiling, arithmetics and dynamic systems
- Convergence of discrete geometry toward Euclidean geometry, geomtric
- Processing of images and shapes, digital calculus in imagery

SPECIFIC EQUIPMENT AND EXPERTISE

- International calculation grid
- Proof assistant
- Visualisation methods for geometry and bio mathematics
- Library and open source tools of discrete geometry (DGtal)

The calculation methods can be applied to fluid mechanics, biology, medecine or physics.

PHD STUDENTS SKILLS

- Scientific rigour
- Formalising and modeling skills and ability to solve abstract or concrete problems
- Ability to write and enhance programme reliability in different languages (JAVA, C, C++, FORTRAN, Maple, MATLAB, Ocalm and Coq…)

NETWORKS / PARTNERSHIPS

LAMA is a member of the Rhône-Alpes-Auvergne mathematical research federation.

Researchers from our lab have been awarded the Research Prize, a nomination to the Institut Universitaire de France and the SGP software award (DGtal) for their work.

Collaborations industrielles

- EDF
- VETROTEX
- NEWCAMS
- CEA
- DGA
- ANR

INTERNATIONAL RELATIONS

Poland ▪ Romania ▪ Israel ▪ Italy ▪ Spain ▪ Germany ▪ Japan ▪ Australia ▪ United States ▪ Algeria ▪ Morocco ▪ Lebanon ▪ Hungary ▪ United Kingdom ▪ Chile ▪ Senegal ▪ Switzerland ▪ Canada

KEY DATA*

33 researchers and professors
2 administrative and technical staff
13 PhD students
* Academic year 2014-2015

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Laboratoire LAMA de Mathématiques

La Région Auvergne-Rhône-Alpes

MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR, DE LA RECHERCHE ET DE L'INNOVATION

CONSEIL SAVOIE MONT BLANC