

# LABEX IMU

## INTELLIGENCE OF URBAN WORLDS

Supported by the University of Lyon, the cluster of excellence IMU (or the LabEx Intelligence of Urban Worlds) won the first "Excellence Laboratory" call for projects, launched in 2010 by the French national government. It brings together almost 535 researchers (from 31 laboratories) as well as many communities and business partners.

The LabEx IMU contributes to making the Lyon Saint-Etienne metropolis one of the leading scientific clusters in France and Europe on issues related to cities and urban environments. It makes its resources available to political, economic and social players who are thinking about and designing the city of tomorrow.

The LabEx IMU is intensifying urban research by supporting scientific diversity and developing multidisciplinary methods and cultures, all across the Lyon Saint-Etienne metropolis.

The goal of the LabEx IMU is to develop and share knowledge. This cluster is based on interactions between all professions and disciplines that work on city and urban issues. Methodological, technical, organisational and social inventions as well as new concepts and new paradigms are expected to arise from these encounters.



### PARTNERSHIP RESEARCH CHAIR: «LIVING TOGETHER IN THE CITY OF TOMORROW»

The chair analyses the conditions for «Living Together in the City of Tomorrow» through a multidisciplinary approach in consultation with professionals working on cities and habitat.

4 areas of research:

- Policies for urban renewal in urban forms
- Living in tower blocks: production, representations, ways of life (France and the United Kingdom)
- The political regulation of social housing and population in cities: comparative perspectives
- Innovations/reinventions in participatory habitat in Europe



#### LABEX IMU AREAS OF INVESTIGATION

- ◇ NATURE IN THE CITY, HEALTH
- ◇ CITY AND MOBILITY
- ◇ GREEN BUILDING AND LIVING
- ◇ DIGITAL CITY, DATA
- ◇ URBAN RISKS AND ENVIRONMENT
- ◇ METROPOLITISATION, URBANISATION, TECHNICAL AND SOCIETY
- ◇ URBAN FORMS, DENSITY

#### LABEX IMU DISCIPLINES

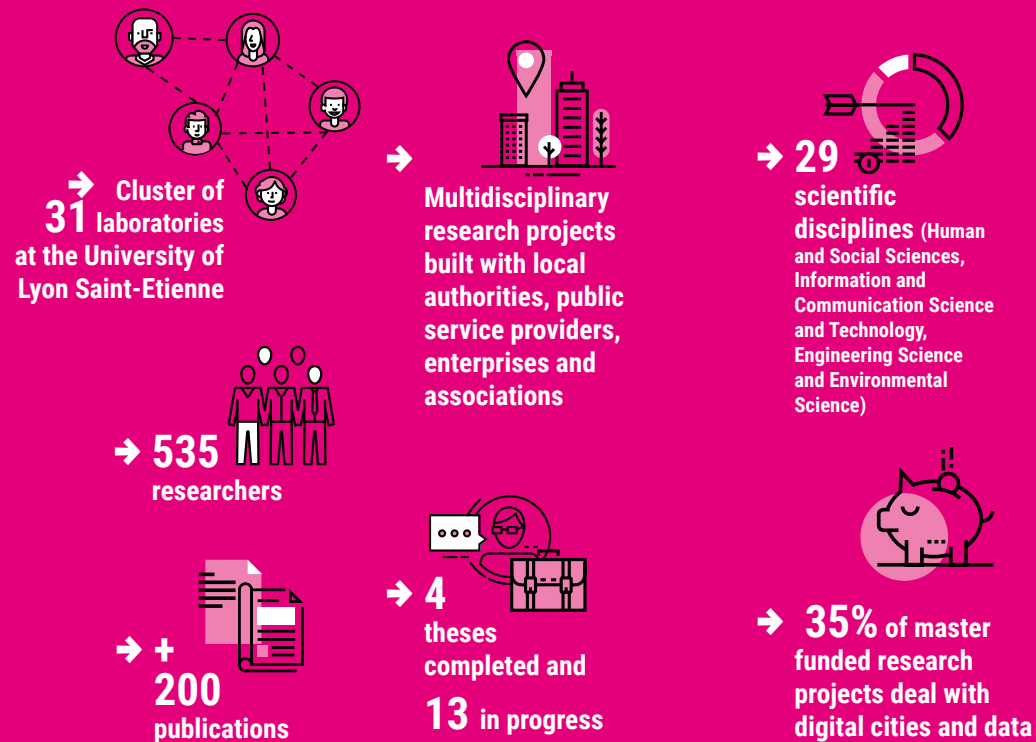
- ◇ ARCHAEOLOGY
- ◇ ARCHAEOLOGY
- ◇ ARCHITECTURE
- ◇ CIVIL ENGINEERING - CONSTRUCTION
- ◇ COMPUTER SCIENCES
- ◇ DESIGN
- ◇ ECOLOGY
- ◇ ECONOMICS
- ◇ ENERGY
- ◇ ENVIRONMENTAL ENGINEERING
- ◇ ENVIRONMENTAL SCIENCE
- ◇ GEOGRAPHY
- ◇ HISTORY
- ◇ IT
- ◇ LAW
- ◇ LIFE SCIENCES
- ◇ LITERATURE
- ◇ PHILOSOPHY
- ◇ POLITICAL SCIENCE
- ◇ INFORMATION AND COMMUNICATION SCIENCE
- ◇ ENGINEERING SCIENCE
- ◇ SOCIAL PSYCHOLOGY
- ◇ SOCIOLOGY
- ◇ SPATIAL PLANNING
- ◇ TELECOMMUNICATIONS
- ◇ THERMAL SCIENCE
- ◇ TRANSPORT
- ◇ URBAN HYDROLOGY
- ◇ URBAN PLANNING

#### LABEX IMU AREAS OF APPLICATION

- ◇ BUILDING, CONSTRUCTION
- ◇ ECOTECHNOLOGY
- ◇ DIGITAL CITY
- ◇ ECOTECHNOLOGY
- ◇ ENERGY
- ◇ ENVIRONMENT
- ◇ HABITAT
- ◇ MOBILITY
- ◇ NEW SERVICES AND USES
- ◇ SMART CITY
- ◇ SPATIAL PLANNING
- ◇ TRANSPORT
- ◇ URBAN POLICY
- ◇ URBAN RISKS
- ◇ ETC.

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#### SCIENTIFIC ACTORS AND ACTIVITIES



#### PROJECTS SUPPORTED AND FUNDED (2012-2017):

- 46 multidisciplinary projects
- 140 master internships
- 120 labelled events
- «Cities and Urban Environments» Masters program

# LABEX IMU INTELLIGENCE OF URBAN WORLDS

## Overcoming disciplinary boundaries to build the city of Tomorrow

A cluster of 31 laboratories in the Lyon-St Etienne Metropolis promoting interaction between all actors and disciplines working on cities and urban issues.

[imu.universite-lyon.fr](http://imu.universite-lyon.fr)



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## GREEN CITIES/ SMART RESOURCES

### ARMATURE

Spatial, temporal and ecological dynamics of the green band (armature verte) of the Lyon metropolis (2014)

*Disciplines:* Geography - Biology  
Urbanisation - Landscape - Biodiversity - Development - Green grids

### CANOPY

Exploration of the capacity for and experience of reusing urban rooftops in Lyon (2017)

*Disciplines:* Geography - Computer studies - Urban planning - Law - Architecture - Sociology  
Urban agriculture - Canopy - Assessment - Experience - Roofs - Vertical city

### RIVIERE

Re-naturing the city, a risk or a factor for social well-being in the eyes of residents and users? Contribution of landscape mediation (2013)

*Disciplines:* Geography - Computer sciences - Ecology  
Perception - Re-naturation - Risk - Quality - Oculometrics

→ IMU member of the Jury for the Trophées Incity awards for «Smart, sustainable city» initiatives (Lyon, 2016)

#### → IMU LABEL

**French-Colombian multidisciplinary colloquium:** The sustainable city as a project current challenges. Different view and perspectives (Lyon, 2017)

→ IMU scientific coordinator for the Smart Electric Lyon demonstrator concerning «smart grids» (2013-2017)

## SMART MOBILITY & LOGISTICS

### ASTRAL

Spatial-temporal analysis of traffic data for smart mobility (2014)

*Disciplines:* Information technology - Transport  
Smart mobility - Traffic conditions - Trajectories - Optimisation - Accessibility - Prediction

### MOBICAMPUS-UDL

Process data gathered from web surveys and mobile phone tracking to understand and manage the mobility of academics at the University of Lyon Campus (2016)

*Disciplines:* Economics - IT - Spatial planning - Sociology  
Campus - Higher education - Mobility - Observatory - Public universities - Transport - University of Lyon

### VÉLÉVAL

Assessment of the feasibility of cycling in urban spaces (2017)

*Disciplines:* Geography - Information and communication science and technology - Urban planning - Law - Architecture - Sociology  
Cyclability - Geomatics - GPS - Oculometry - Cyclist practices - Representations

#### → IMU LABEL

**International colloquium** on «Urban governance in a networked society: France, Thailand, Japan» (Lyon, 2017)

## PARTICIPATORY DEMOCRACY/ FABLAB

### FAB-PAT

Sharing the shaping of heritage - Approach and issues concerning the historical urban landscape (2016)

*Disciplines:* Sociology - Data and imaging science - Geography  
Atlas - Cross-sharing of knowledge - Participatory democracy - Heritage-building - Reconnecting the city

### REVEURS

Recognition and inventory of plants in urban environments - citizen science and social customs of a smartphone interface (2014)

*Disciplines:* Sociology - Geography - Information technology  
Recognition - Image - Tree - Citizen science - Naturalist inventories

### IDENUM

Digital urban identities (2016)

*Disciplines:* IT - Information and communication science - Geography  
Documentation - Urban identities - Digital modelling - Photography - Social networks - Spatial knowledge

→ «Smart cities and learning cities» course details for the Cities and Urban Environments Masters program

#### → IMU LABEL

**Theme school** on «Collective invention challenge» IMU-MAGIS (2016)

## RISKS/RESILIENCE

### PLURISQ

Risks and multidisciplinary - Building a global understanding of the potential dangers in the northeast area of the Lyon conurbation (2015)

*Disciplines:* Spatial planning - Ecology/ecotoxicology - Ethnology - Physical geography - Social geography - Contemporary history - Political science - Sociology  
Drinking water - Expertise - Rhône river - Flooding - The Ain plain - NaTech risk

### URPOLSENS

Wireless sensor networks for urban pollution monitoring (2015)

*Disciplines:* IT - Fluid mechanics - Sociology - Anthropology - Geography  
Exposure disparities - Optimisation - Atmospheric pollution - Urban pollution - Wireless sensor networks - Uses

### VIBIOM

The biomimetic city: theory, risks, applications (2014)

*Disciplines:* Philosophy - Urban hydrology - Energy and building - Solar energy  
Industrial Chair University of Lyon 3 - Research and Teaching Chair INSA Lyon

#### → IMU LABEL

**Workshop** «Future cities and spatial reconfiguration in East Asia: Practices and Representations, Risks and Opportunities» (Lyon, 2013)

#### → IMU LABEL

**NOVATECH 2016 international conference** «Water in the city»

## BIG DATA

### ELUD

Urban logistical efficiency of sustainable food (2017)

*Disciplines:* IT - Civil engineering  
Urban agriculture - Canopy - Assessment - Experience - Roofs - Vertical city

### PRIVA'MOV

Mobility and privacy: from data collection to analysis (2013)

*Disciplines:* Information technology - Economics  
Mobility records - Analysis of mobility habits - Mobile networks - Privacy

#### → IMU LABEL

**Colloquium** on «urban data: which practices and what knowledge? Multidisciplinary perspectives on digital traces» (2016)

## INFORMATION MODELLING

### IDEFFE

Estimated usages and aggregation of buildings' energy data via experimental identification of physical models (2013)

*Disciplines:* Thermal engineering - Information technology - Social sciences/Humanities  
Experimental identification - Energy performance guarantee - Energy monitoring

### UNIMAP

Integration of location-based services from several suppliers with a view to creating an unified data - Application to tourist points of interest (POI) (2012)

*Disciplines:* Information technology - Urban planning - Geography  
Databases - Integration of points of interest - Semiology of map keys - Cartography

### RESALI

Food systems and networks - Innovative and exploratory information systems for greater food justice in metropolises (2015)

*Disciplines:* IT - Geography - Spatial analysis - Modelling  
Spatial and temporal analysis - Big data - Data mining - Food justice - Urban food systems - VGI/Twitter

### VILO3D

Urban construction: from processes to 3D representations (2017)

*Disciplines:* Geography - IT - History  
Exploitation of 3D data - Urban construction - Modelling - Visualisation of geospatial data

### HIL

Artificial intelligence to facilitate real estate research - Recommendation system with spatial and non-spatial visualisation (2017)

*Disciplines:* Sociology - Informatics - Neighbourhood and offer modeling - Ontology - User profile - Real Estate research - Spatial relationships

#### → IMU LABEL

**Symposium** «Towards integrated modelling of urban systems» (Lyon, 2014)

#### → IMU LABEL

**Theme school of the Communication Networks cluster (Rescom)** of the GDR on «Networks, services and data for smart cities» (2015)

→ **Studio IMU IngenU3D:** multidisciplinary research-actions on the subject of 3D and augmented reality for the city

## CULTURAL HERITAGE

### ALARIC

From past to future: identifying mechanisms of incremental change (2013)

*Disciplines:* Development - Urban planning - Information technology  
Urban change - Industrial space - Modelling - Socio-technical change - Socio-spatial compromises

### HIREAU

How to reconstitute the history of sanitation and drinking water networks - Application to the Lyon metropolis (2016)

*Disciplines:* Geography - Civil engineering - IT  
Sanitation - Drinking water - History - Machine learning - Network - Urbanisation

### SOUNDCITYVE

Archeology of the sound landscape: a sensitive restoring of the Sounds of the past in the City of Lyon (2017)

*Disciplines:* IT - Architecture - History - Linguistics - Information and communication science  
Approach to the urban environment via the senses - Archeology of the sound landscape - Data and image mining - History or urban planning - Heterogenous substances

#### → IMU LABEL

**Seminar** on «Utopias and perceptions of the smart city» (Lyon, 2016)

#### → IMU LABEL

**ICHT 2016 International colloquium:** Perception: building and inhabiting the earth. «Smart» cities and urban poetry (Sao Paulo - Brazil, 2016)

#### → IMU LABEL

**European Heritage Days 2017** «Sharing the Shaping of Heritage»

#### → IMU LABEL

**BRETEZ project** (archeology of the sound landscape), a 3D and 5D reconstitution bringing to life the sounds of 18th century Paris

→ **Cities of yesterday, today and tomorrow in 3D** «at Pop' Sciences 2017, Lyon