

# ITMATI

Instituto Tecnológico  
de Matemática Industrial

## INNOVATIVE INDUSTRIAL SOLUTIONS WITH MATHEMATICAL TECHNOLOGY: ENHANCING CROSS-SECTORAL INNOVATIONS FOR APPLICATIONS IN EUROPEAN INDUSTRY, AND THEIR CONTRIBUTIONS TO A SMART, SUSTAINABLE AND INCLUSIVE GROWTH

Authors:

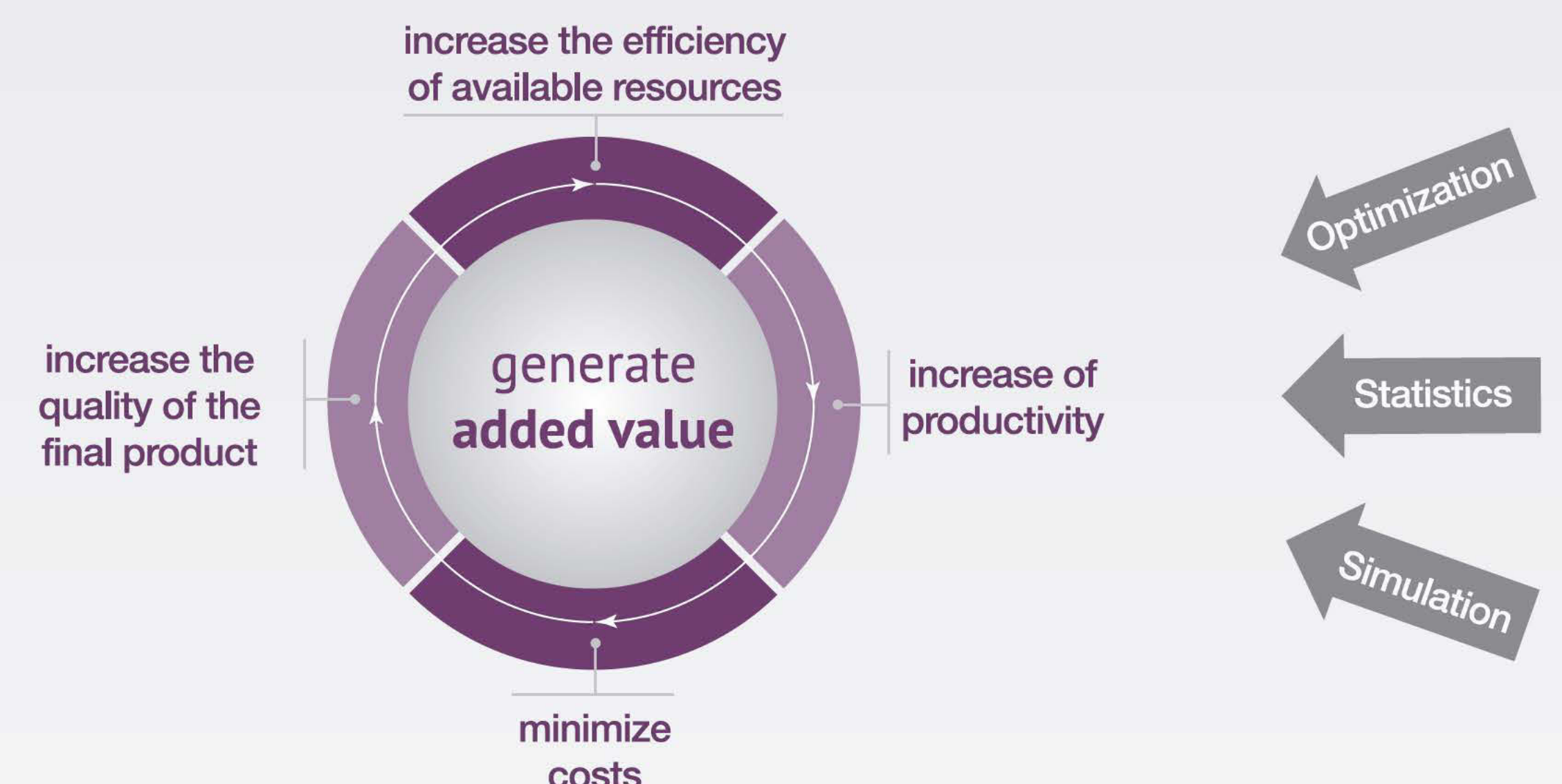
Rubén Gayoso Taboada\* | *Executive Manager* | ruben.gayoso@itmati.com

Alejandro L. Rodríguez González\* | *Technological Transfer Manager* | transferencia.simulacion@itmati.com

### ITMATI: MATHEMATICAL SOLUTIONS FOR INNOVATIVE BUSINESS

Innovation+Technology+Mathematics+Industry

**Our goal is** to increase the competitiveness of industrial enterprises across mathematical technology transfer.



#### TRANSFER AREAS % of activity

##### Numerical Simulation 48%

- Analysis, simulation and prediction of devices and processes.
- Reduced costs and development times for new products.
- Useful in many applications and technologies, such as mechanical, structural, thermal, electromagnetic, fluid dynamics, acoustic or environmental.

##### Statistics and Big Data 25.5%

- Quality control.
- Financial analysis.
- Products and market studies.
- Internal information analysis: Data Mining.

##### Optimization 26.5%

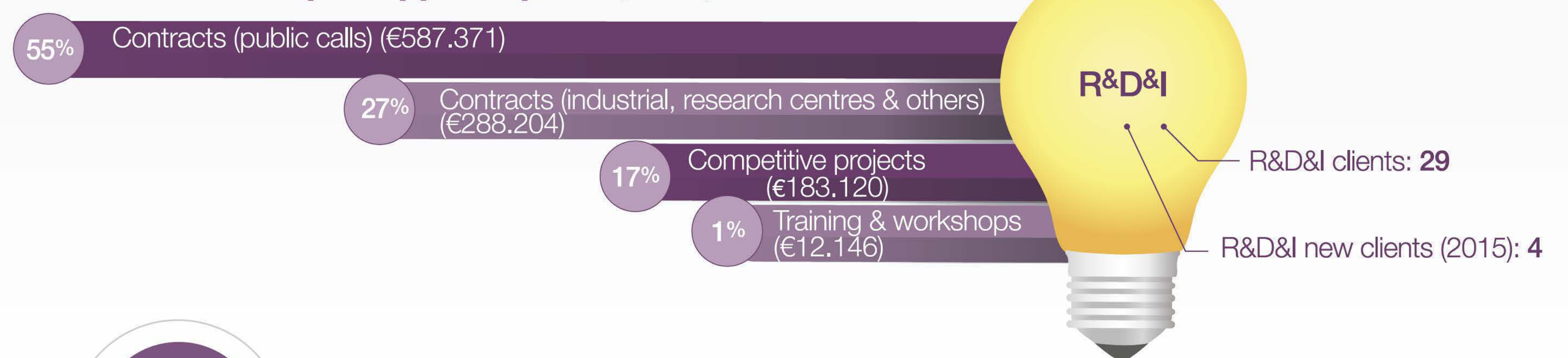
- Production and stocks optimization.
- Companies and industrial processes optimization.
- Strategy, logistics and planning.
- Support for decision-making.

#### CAPACITIES

##### Mathematical technology for all industrial sectors

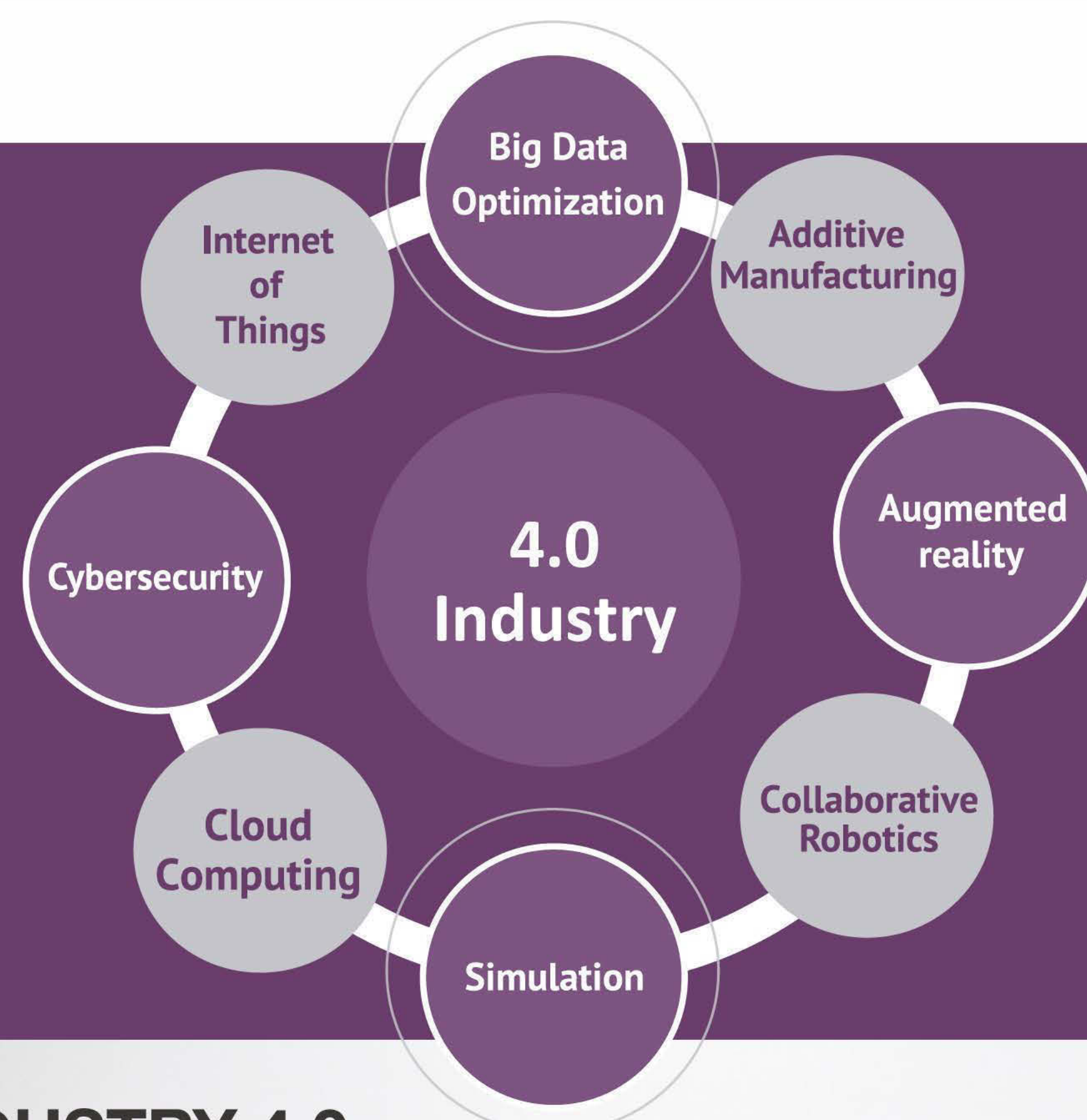
- Product and solutions development.
- Technology consulting.
- High level scientific advisory.
- R&D&i collaborative projects.
- Customized software development.
- Training courses on demand.

#### TURNOVER (R&D)(2015): € 1,071,112



### ITMATI EXPERIENCE IN INDUSTRY 4.0

Industrial Mathematics 4.0:  
Useful for all companies in order to introduce innovation and optimization in their industrial processes and products.



#### Number of 2015 ITMATI projects per industrial sector



### ITMATI SUCCESS CASES IN INDUSTRY 4.0

#### JOINT RESEARCH UNIT



##### Research lines covering the unit:

- Process plants with uncertainties optimization.
- Storage systems recharge design optimization.
- Inverse reaction and image problems optimization.
- Non-conventional hardware optimization.

##### Results:

- Production plans and decision process improvement.
- Storage systems for electric vehicles optimization.
- Rigorous mathematical models for physical and chemical phenomena development -> Proved through experimentation in real plants.

**Company testimony (Repsol):** "The competitive advantages that Repsol have from this collaboration are the optimization of their industrial processes, a better product design and the development of decision-aid software. These investigations provide us lower cost production and lower development times."

#### GANESO: SIMULATION AND OPTIMIZATION OF GAS NETWORKS

##### Results:

Interactive software:

- Optimal flows distribution.
- Tariff calculation.
- Transients simulation.
- Network extensions planning.

#### LUMES: ADVANCED TECHNOLOGIES FOR BIG FOREST FIRES EXTINGUISHING

##### Results:

- New advanced technologies and tools in order to reduce big forest fire risk.
- Expert system for fire extinguishing resources monitoring and management.
- Decision-making support.

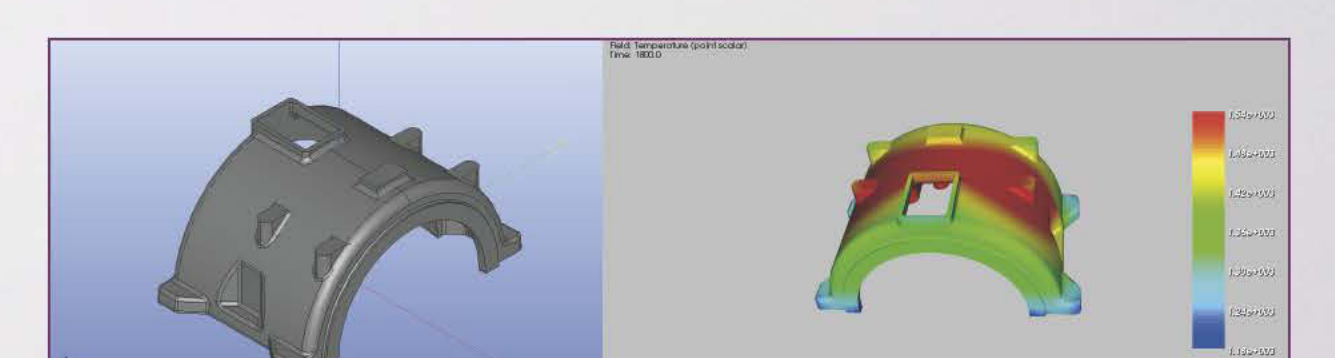
**Company testimony (Coremain):** "Project LUMES, through new technologies development and statistics approaches, supposes great advantage for administrations and fire management organisms, both in the economic and in the environmental level."

#### METAL SOLIDIFICATION PROCESS

##### Results:

- Heat transfer simulation and modelling.
- Thermic and metallurgic treatment during metal solidification within a mould.

**Company testimony (Fundiciones Rey):** "Numerical simulation has great advantages respect to experimental tests. It reduces material and energy costs and it leads to a high final product quality".



\*Instituto Investigaciones Tecnológicas, planta -1.  
Rúa de Constantino Candeira s/n. Campus Vida.  
Santiago de Compostela (A Coruña) Spain. CP. 15782  
Teléfonos: +34 881 813 357 / +34 881 816 026/ +34 881 816 025  
Correo-e: itmati@itmati.com | www.itmati.com

