



Departament de Llenguatges  
i Sistemes Informàtics

UNIVERSITAT POLITÈCNICA DE CATALUNYA

# Technical University of Catalonia

Javier Larrosa  
*Software Department (LSI)*

05/03/2003

larrosa@lsi.upc.es

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# Universitat Politècnica de Catalunya (UPC)

- Largest technical university of Catalonia
- Founded on 1,971
- Scope: engineering, technical studies
- Dimension:
  - 27,700 undergraduate students
  - 2,400 graduate students
  - 2,400 professors
  - 1,200 administrative staff

## UPC - Research (year 2002)

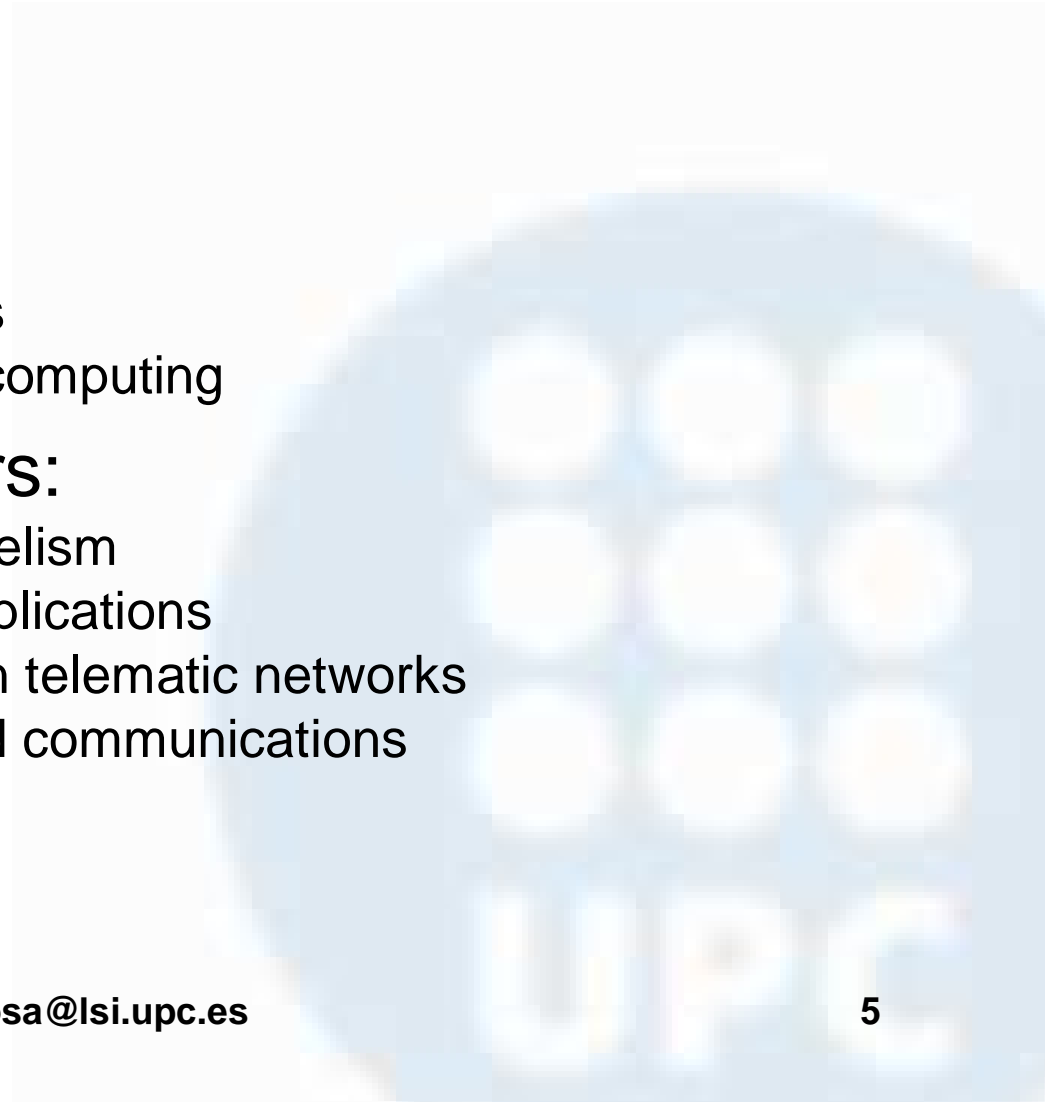
- 1,000 papers in journals
- 35 active patents
- 150 thesis
- 52 EU funded projects
- 108 government funded projects
- 516 contracts with industry
- Revenue: 39,000,000 Euro

# Mathematics and Computer Science

- Six departments (20% faculty)
- Hardware: 100 faculty
- Applied Mathematics (4 departments): 160 faculty
- Software: 123 faculty
- Some other related departments (i.e, Operations Research, control)

# Hardware department

- Research lines:
  - VLSI design
  - Networks
  - Distributed systems
  - High performance computing
- Research centers:
  - CEPBA-IBM: parallelism
  - cANET: internet applications
  - esCERT: security in telematic networks
  - CCABA: broadband communications



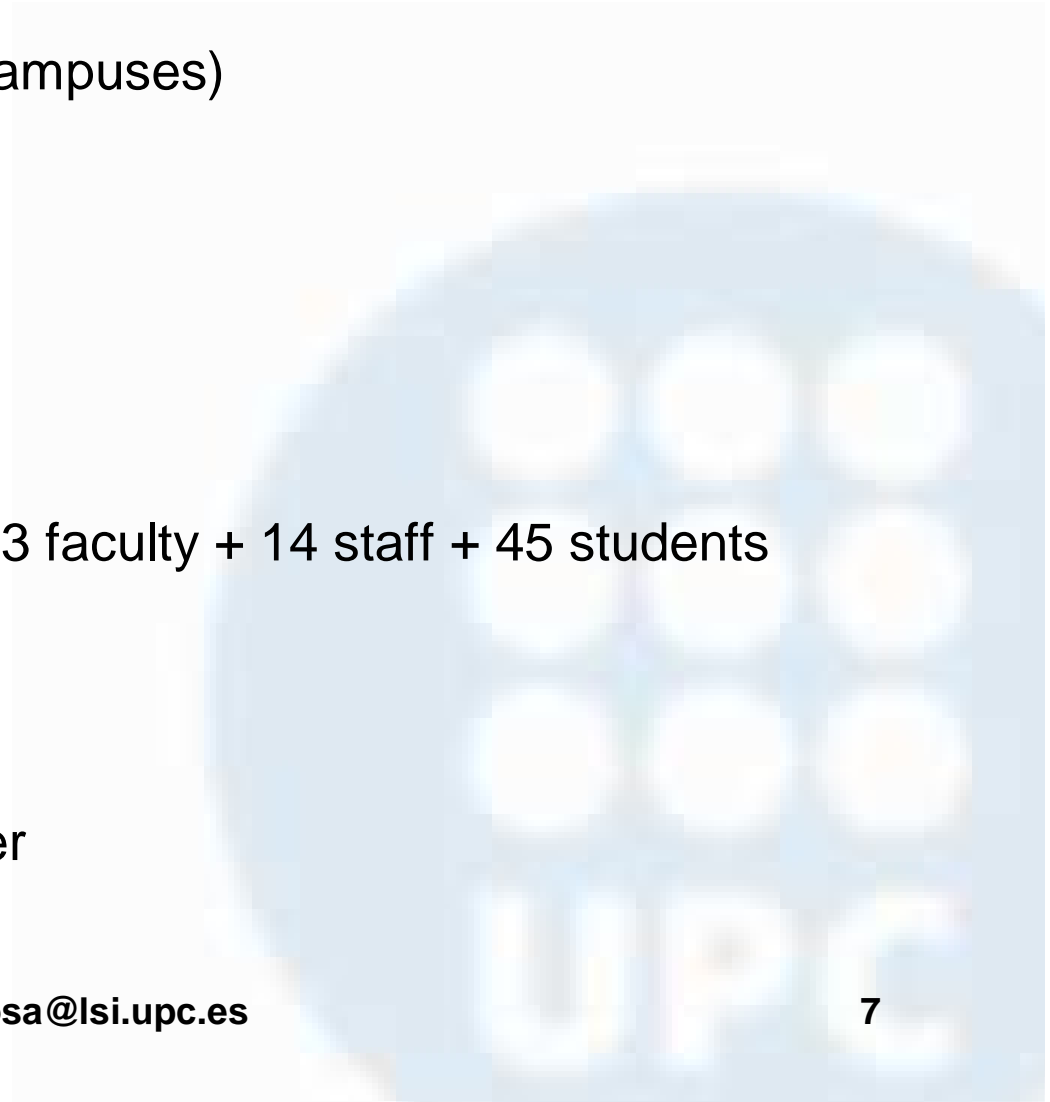
# Mathematics and Computer Science

- Research groups:
  - Algorithms and complexity
  - Graph theory
  - Combinatorics
  - Cryptography
  - Discrete Mathematics
- Member of DIMATIA



# Software Department: Description

- Location:
  - Barcelona (three campuses)
  - Vilanova
  - Terrassa
- Scope:
  - Software
- Size:
  - 182 members = 123 faculty + 14 staff + 45 students
- Activities:
  - Teaching
  - Research
  - Technology transfer



# Software Dept.: Teaching

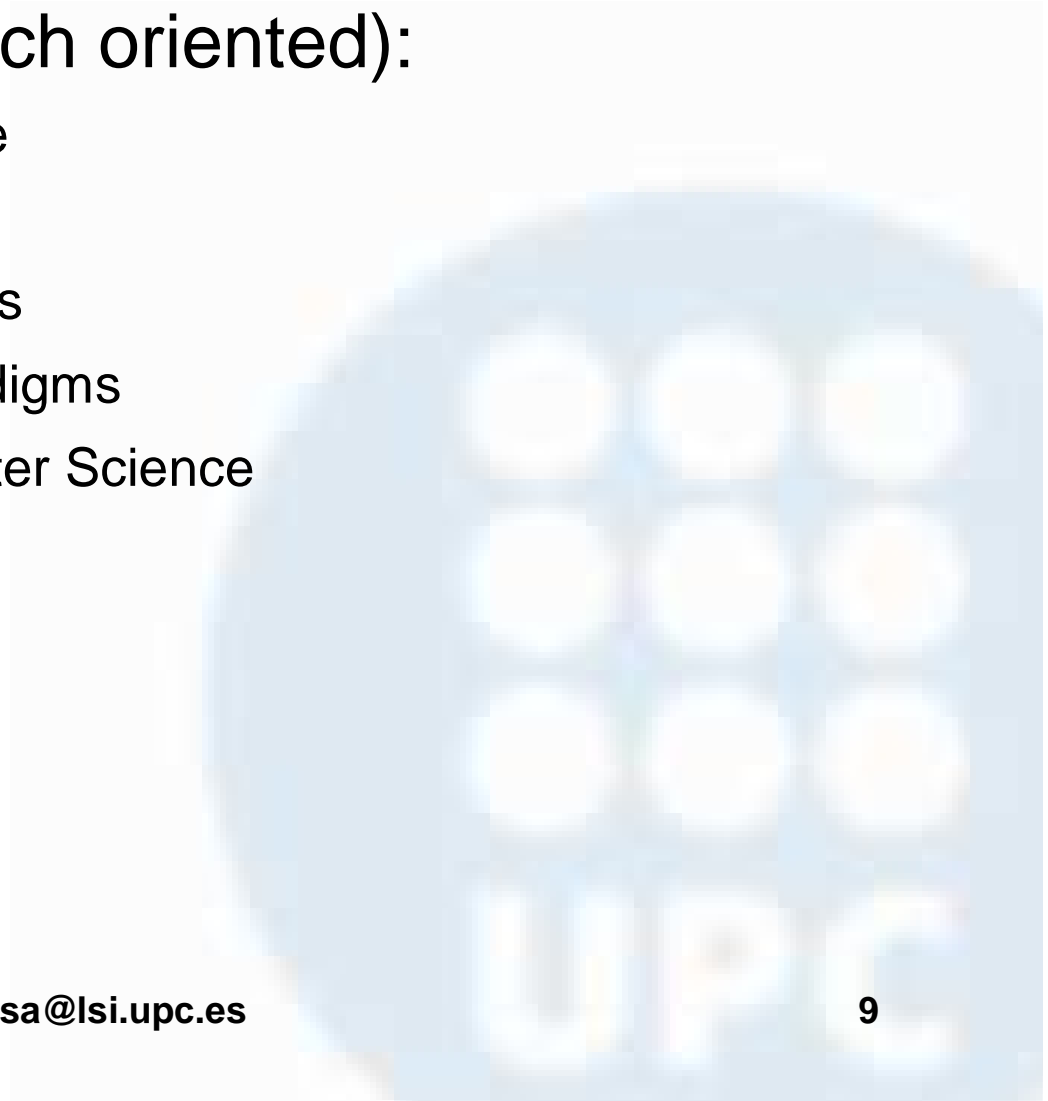
- Undergraduate
  - Computer Science
  - Civil Engineering
  - Mathematics and Statistics.
- Master
  - Software Engineering
  - European Ms. in language and speech
- Graduate
  - Software program
  - Artificial Intelligence program





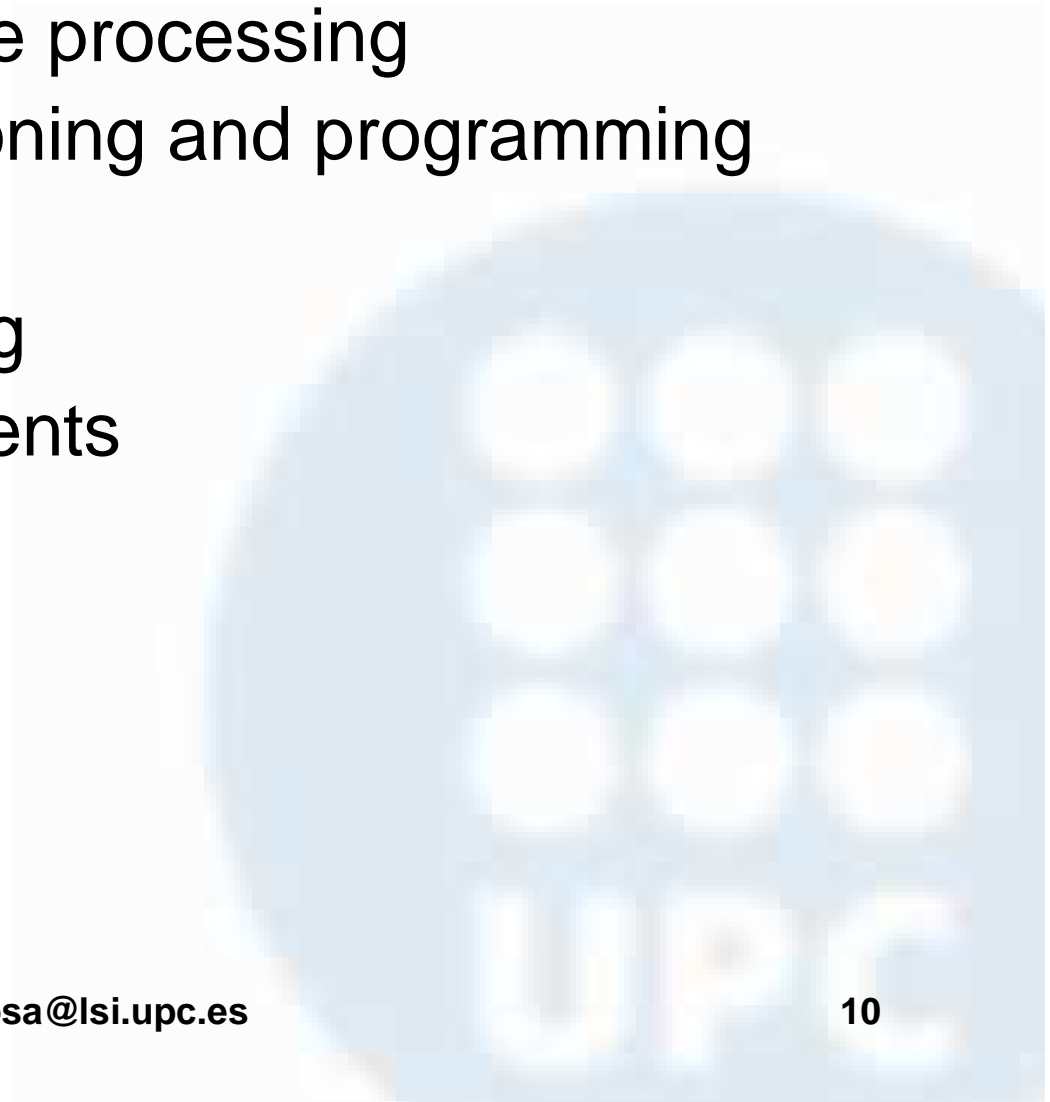
# Structure

- Sections (research oriented):
  - Artificial Intelligence
  - Computer Graphics
  - Information Systems
  - Programming paradigms
  - Theoretical Computer Science



# Artificial Intelligence

- Natural language processing
- Constraint reasoning and programming
- Soft computing
- Machine learning
- Autonomous agents
  
- *Agencities*



# Computer Graphics

- Geometric Modeling of Solids
- Computer Aided Geometric Design
- Volume Modeling and Visualization
- Geometric Modeling of Complex Systems and Assemblies

# Information Systems

- Federated Database Management Systems
- Conceptual Modeling of Information Systems
- Knowledge Base Management of Systems Requirements
- Engineering and Process Technology
- *Network of excellence on Data Bases*

# Programming

- Algebraic Foundations of system specification and design
- Logic for Programming and Deduction
- Synthesis and Verification of Concurrent Systems

# Theoretical Computer Science

- Learnability / Computational Learning Theory
- Design and Analysis of Algorithms
- Parallel Algorithms and Parallel Complexity
- Structural Complexity

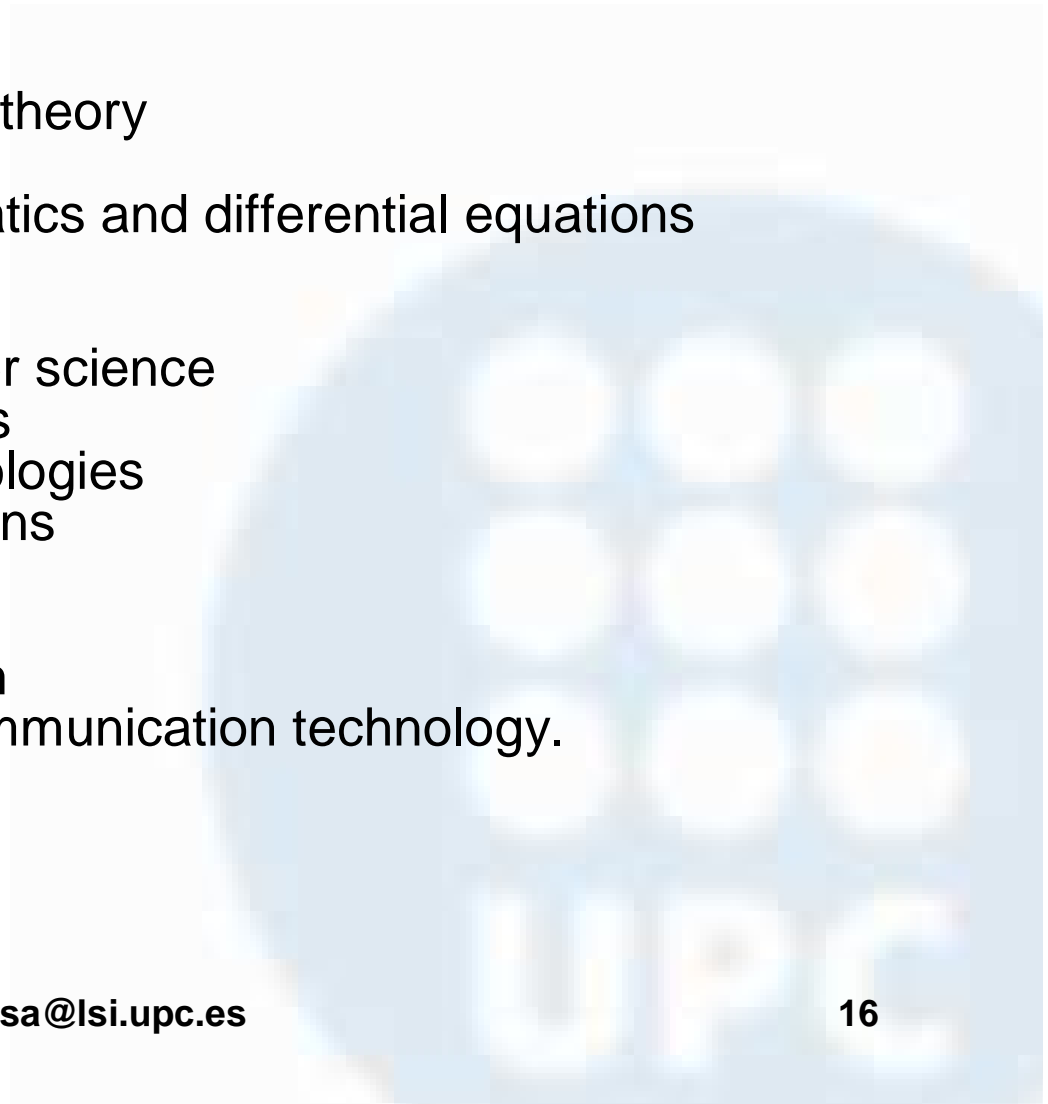
# Research

- Participation in 30 research projects
  - European: 12
  - Spanish: 18
- More than 150 refereed publications per year
- Technology transfer:
  - 30 contracts with industry



# ERCIM fields of competence

- algebra, analysis and geometry
- combinatorics
- number theory
- control and system theory
- stochastics
- numerical mathematics and differential equations
- hardware
- software
- theoretical computer science
- information systems
- computing methodologies
- computer applications
- fluid dynamics
- electromagnetism
- operations research
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# ERCIM working groups

- Applications of numerical mathematics in science
- Constraints
- Control and system theory
- E-Learning
- Dependable Software-intensive systems
- Environmental modeling
- Formal methods for industrial critical systems
- Health and information technology
- Image and video understanding
- Matrix computations and statistics
- Soft computing
- User interfaces for all
- Fluid mechanics
- Parallel processing network
- W4G WWW
- Computer graphics
- Programming language technologies
- Database research group
- Electronic commerce

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