



## III – LIDI

Instituto de Investigación en Informática LIDI

Its main goals are:

- +To research in Computer Science focusing on technological areas whose knowledge and development are meaningful for our country.
- +To contribute to the training, development and specialization of human resources in Computer Science.
- +To develop projects that generate concrete and meaningful knowledge transfers of technology from the University to the society.

# Human Resources



**24** Senior researchers.

**23** Junior researchers/Doctoral students/Postgraduate thesis students.

**10** Undergraduate students/ Thesis students.

**3** Support staff members

**21** Senior researchers from other Universities participate in the I+D+I projects of the Institute.

# Human Resources



## 60 Members

There are **35** University Professors.

**27** of them have a Postgraduate degree.

**13** of them have Ph.D from UNLP and overseas universities.

There are **8** reserachers that belong to National Scientific Organizations (CONICET, CIC)

**16** members are Ph.D students in Computer Science.

This staff constitutes one of the most relevant IT Research Institutes in Argentina.

# Research Projects



High Performance Computing: Hardware Architectures, Algorithms, Performance Metrics and Applications in HPC, Big Data, Robotics, Signals and Real Time



Methodologies, Techniques and Tools for Software Engineering in Hybrid Scenarios. Process improvement.



Intelligent Systems. Applications in Pattern Recognition, Data Mining and Big Data

# Research Projects



**Methodologies, Techniques and Tools for Software Engineering in Hybrid Scenarios. Process improvement**

Software Engineering for hybrid scenarios.

Digital Governance. Process improvement.

Methodologies and tools for the appropriation of digital technologies in hybrid educational scenarios.



**High Performance Computing: Hardware Architectures, Algorithms, Performance Metrics and Applications in HPC, Big Data, Robotics, Signals and Real Time**

Multiprocessor Architectures in High Performance Computing.

Parallel algorithms in High Performance Computing. Fundamentals, construction and evaluation of applications.

Processing for Real Time / Robotic problems.

Models and computational methods. Signal processing and pattern recognition.



**Intelligent Systems. Applications in Pattern Recognition, Data Mining and Big Data**

Design and implementation of predictive and descriptive models.

Text Mining: characterization and categorization of documents.

Techniques for mining large volumes of data.

Machine learning applied to pattern recognition.



## High Performance Computing: Hardware Architectures, Algorithms, Performance Metrics and Applications in HPC, Big Data, Robotics, Signals and Real Time

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Parallel algorithms in High Performance Computing. Fundamentals, construction and evaluation of applications.

Processing for Real Time / Robotics problems

Models and computational methods. Signal processing and pattern recognition.

- Characterization of multiprocessor architectures for HPC, analyzing techniques for code development.
- Multicore, many-core. GPU, FPGA, MIC, low cost processors (e.g. Raspberry Pi). Hybrid architectures.
- Scheduling for asymmetric processors.
- Power-performance analysis.
- Fault tolerance.
- Cloud robotics.



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Multiprocessor Architectures in High Performance Computing.

Parallel algorithms in High Performance Computing. Fundamentals, construction and evaluation of applications.

Processing for Real Time / Robotics problems

Models and computational methods. Signal processing and pattern recognition.

- Parallelization of multiprocessor solutions.
- Languages and techniques for parallel computing. Programming Cost of developing the solutions.
- Evaluation Metrics (performance, energy efficiency) on different platforms.
- Scientific applications, searches, simulations, bioinformatics, big data.
- Environments for teaching parallel computing.





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Processing for Real Time / Robotic problems

Models and computational methods. Signal processing and pattern recognition.

- Software for real-time systems.
- Real-time operating systems.
- Embedded systems. Microcontrollers Sensors.
- Robotics - IoT.



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Multiprocessor Architectures in High Performance Computing.

Parallel algorithms in High Performance Computing. Fundamentals, construction and evaluation of applications.

Processing for Real Time / Robotics problems

Models and computational methods. Signal processing and pattern recognition.

- Pattern Recognition.
- Supervised and unsupervised classification.
- Image Processing.
- Positioning, navigation and location systems.



## Methodologies, Techniques and Tools of Software Engineering in Hybrid Scenarios. Process improvement.

Software Engineering for  
hybrid scenarios.

Digital Governance. Process  
improvement.

Methodologies and tools for the  
appropriation of digital  
technologies in hybrid  
educational scenarios.

- Software Engineering to attend the development of systems on different environments.
- Systems for different devices and multi-devices.
- Ubiquitous systems.
- Web systems.



## Methodologies, Techniques and Tools of Software Engineering in Hybrid Scenarios. Process improvement.

Software Engineering for  
hybrid scenarios.

Digital Governance. Process  
improvement.

Methodologies and tools for the  
appropriation of digital  
technologies in hybrid  
educational scenarios.

- Information and knowledge society.
- Storage and processing of information.
- Digital city.
- Digital governance.
- Public services.
- Quality.



## Methodologies, Techniques and Tools of Software Engineering in Hybrid Scenarios. Process improvement.

Software Engineering for hybrid scenarios.

Digital Governance. Process improvement.

Methodologies and tools for the appropriation of digital technologies in hybrid educational scenarios.

- Design, development, configurations and practices in digital environments (3D virtual environments, simulated environments and laboratories, social networks).
- Design, production and evaluation of digital educational materials.
- Study of learning objects, frameworks for the design and development of them.
- Tools and methodologies for collaborative work mediated by ICTs (self-regulation and metacognitive abilities).
- Paradigms of person-computer interaction in educational scenarios (augmented reality, tangible interaction, virtual reality).
- Serious games as educational activities.



## Intelligent Systems. Applications in Pattern Recognition, Data Mining and Big Data

Design and implementation of predictive and descriptive models.

Text Mining. Characterization and categorization of documents.

Techniques for mining large volumes of data.

Machine learning applied to pattern recognition.

- Design and implementation of probabilistic clustering models.
- Adaptation of particle clusters for the extraction of classification rules.
- Processing of time series.
- Recommendation systems based on structured and unstructured information.
- Neural networks and optimization techniques.
- Convolutional neuronal networks. Deep learning



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Machine learning applied to pattern recognition.

- Structured and unstructured methods of document representation.
- Processing of natural language.
- Sentimental analysis and opinion mining.
- Automatic summary of documents.
- Extraction of causal sentences.



## Intelligent Systems. Applications in Pattern Recognition, Data Mining and Big Data

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- Algorithms for MapReduce and Spark frameworks.
- Treatment of data streams.
- Dynamic clustering.
- Solutions for imbalanced classification problems.





## Intelligent Systems. Applications in Pattern Recognition, Data Mining and Big Data

Design and implementation of predictive and descriptive models.

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- Computer vision.
- Object detection and classification in video.
- Convolutional neuronal networks.
- Representation and detection of dynamic gestures.
- Sign Language Recognition.
- Pedestrian detection.
- Face recognition.

# Postgraduate Relationship



The School of Computer Science offers **11 Postgraduate degrees**:  
1 Doctorate, 4 Masters and 6 Specializations, **7 of which are supervised by researchers of III-LIDI**:

Doctorate in  
Computer Science

Master in Application of  
Computer Technology in  
Education

Master in High  
Performance  
Computing

Master in Data  
Networks

Master in Software  
Engineering

Specialization in Data  
Intelligence oriented to  
Big Data

Specialization in  
Application of Computer  
Technology in Education

Specialization in  
Networking and Security

Specialization in Computer  
Graphics, Images and  
Computer Vision

Specialization in High  
Performance Computing  
and Grid Technology

Specialization in  
Software Engineering

# Postgraduate Relationship



8

Members and external Professors  
from III-LIDI take part in the Degrees  
Academic Committee



30

Postgraduate courses have  
members from III-LIDI as Professors



29

Members of III-LIDI are part of  
the teaching staff



# Graduate Relationship



III-LIDI members are part of the teaching staff in the undergraduate courses of study from the School of Computer Science.

- Licenciatura en Informática (5 years)  
28 professors from this course of study belong to III-LIDI.
- Licenciatura en Sistemas (5 years)  
The **Director and 28 professors** from this course of study belong to III-LIDI.
- Analista en Computación (3 years)  
The **Director and 24 professors** from this course of study belong to III-LIDI.
- Analista en TIC (3 years).  
The **Director and 24 professors** from this course of study belong to III-LIDI.
- Ingeniería en Computación (5 years).  
The **Director and 16 professors** from this course of study belong to III-LIDI.

# Technology Transfer

III-LIDI establishes agreements on technology transfer with private companies and the public sector for the analysis, design and implementation of software solutions.



One of its main goals is to take out patents and Registered Intellectual Property for technological products.

The emphasis is on projects that generate technological (or methodological) innovation in the public sector as much as in the private sector.

III-LIDI offers training and consultancy to companies and public sector.

# Technology Transfer

III-LIDI is connected to companies and Government agencies



RedUNCI



The III-LIDI participates in different national and international scientific events (congresses, conferences, lectures).



Since 2013, III-LIDI **annually organizes** the Conference on Cloud Computing and Big Data



# Students Projects



There are Development and Innovation Projects that are carried out by **Teams of Students** coordinated by **Professors/Researchers** from **III-LIDI**.

The resulting products from the Projects are presented each year at the **Science and Technology Exhibition** from the School of Computer Science.



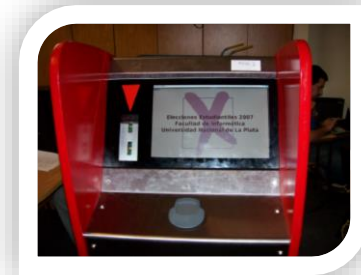


# Infrastructure. Equipment

III-LIDI is approximately **500 m<sup>2</sup>** long.



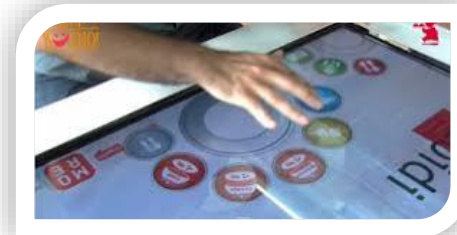
It has **Equipments** for the **different** research and development topics.



There are available **Equipments** due to **national and international** agreements.



It is **member of the SNCAD** ( National High-Performance Computing System)





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