Dipartimento di Informatica
Scienza e Ingegneria

Computer Science and Engineering

Antonio Corradi
Bologna, January 2018
1. disi@DISI
2. research@DISI
3. studying@DISI
Two areas in Computer …what?

Academic Computer Science:

- Italy: Science vs Engineering
- Most countries abroad: a single field “Computer Science and Engineering”
  - (in Science or Engineering, never in both)

Recently:

- Some Italian Departments merged (eg, Trento and others)
- Consolidated collaboration within the Consorzio Interuniversitario Nazionale per l’Informatica, CINI
DISI locations

Headquarters - Bologna

Two main sites in Bo:
Management
Administrative offices
Teaching/student services
Professor offices and research labs
Classrooms
Laboratories
Museum of Informatics

Department unit – Cesena UOS
Teaching/student services
Professor offices and research labs
Classrooms
Laboratories

http://www.cse.unibo.it/en/department
DISI people

• Professors and researchers: 84

<table>
<thead>
<tr>
<th>Category</th>
<th>INF/01 (Computer Science)</th>
<th>ING-INF/05 (information processing system)</th>
<th>SECS-P/07 (business economics)</th>
<th>tot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full professor</td>
<td>15</td>
<td>11</td>
<td>1</td>
<td>27</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>13</td>
<td>13</td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>10</td>
<td>13</td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>RTD</td>
<td>3</td>
<td>5</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>PhD student</td>
<td></td>
<td>5</td>
<td></td>
<td>44</td>
</tr>
<tr>
<td>Research fellow</td>
<td></td>
<td></td>
<td></td>
<td>41</td>
</tr>
</tbody>
</table>

• Staff (administration and engineers): 18

Permanents: 102  Non permanents: ~85
1. disi@DISI
2. research@DISI
3. studying@DISI
One of the largest Italian Departments in the field.

Expertise includes almost all fields: basic and foundational, technology driven, experimental, applicative aspects in computer science and engineering.
Research areas at DISI

Applied and basic research in several fields

- Computational Biology
- Bio-informatics
- Biometrics
- Informations systems
- Semantic Web
- Software engineering
- Programming languages
- Formal methods
- Computer systems
- Artificial Intelligence
- Complex systems
- Network
- Middleware
- Distributed systems
- Mobile systems
- Distributed systems
- Mobile systems
Research areas at DISI(1)

**Computational Biology, Bio-Informatics, Biometrics**
In this research area computational models and computer science techniques are exploited to address challenging problems in biology; meanwhile, new effective computational frameworks are designed by trying to mimic the extraordinary aptitude of biological organisms in solving perceptive-cognitive problems and in learning/self-organizing.

**Software Engineering, Programming Languages and Formal Methods**
Research on programming languages and formal methods exploits mathematical techniques for designing, realizing and verifying complex software systems. It covers a wide range of activities, from theoretical studies on basic properties of computability and interaction, to the design of new programming languages, to the development of engineering techniques for the production of large industrial softwares.

**Artificial Intelligence, Autonomic and Complex Systems**
The research activity at the Department of Computer Science and Engineering is very active in the Artificial Intelligence, autonomous and complex systems areas. It covers topic as knowledge representation and automatic reasoning in agent and multi-agent systems to topics of modeling and simulation of complex systems and networks.
Research areas at DISI (2)

**Networks, Middleware, Distributed and Mobile Systems**
Several research groups in the department are active in the large area of middleware and software supports for advanced distributed and mobile systems. The availability of ubiquitous and anytime connectivity is pushing towards novel services and applications, which at the same time pose tremendously challenging technical issues.

**Systems**
Research on Systems covers a wide range of topics related to systems engineering and management, which are characterized by the integration of computer science and engineering solution with other varieties of both technical and non-technical components and processes.

**Information Systems and Semantic Web**
Research on Information Systems deals with the efficient and effective storage and retrieval of large amounts of data with an heterogeneous and unstructured nature. Research activity in this area carried on at DISI includes the design of data warehouses, mining of knowledge from large data collections, efficient and effective management of multimedia and uncertain data and in the semantic web, self-organization of distributed information systems, and management of temporal aspects in databases.
Research grants

During the last 5 years DISI people have gained grants for:

- 21 EU/international projects (€5.174.000)
- 26 national projects (€2.131.000)
- 42 projects funded by private and public authorities (€3.160.000)

Annual budget for research €1.500.000
H2020@DISI

DISI is strongly involved in research lines of Horizon2020

- Enabling and industrial Technologies
  - Components and Systems
  - Next Generation Computing
  - Future Internet
  - Content and Information Management

- Societal Challenges
  - Health, demographic change and wellbeing
  - Secure, clean and efficient energy
  - Smart, green and integrated transport
  - Climate action, resource efficiency and raw materials
  - Inclusive, innovative and secure societies
Technology Transfer

• Joint projects with companies, public authorities and local and international industries.

• Local level: projects sponsored by **CIRI-ICT** (Centro Interdipartimentale di Ricerca Industriale sulle Tecnologie dell'Informazione e della Comunicazione) and also other CIRIs
  – CIRI-MAM Automation Robotics and Mechatronics
  – CIRI - Life Science and Health Technology
1. disi@DISI
2. research@DISI
3. studying@DISI
Teaching

DISI is the single reference point for Computer Science and Engineering education at the University of Bologna.

We offer 7 degree programs:

4 First cycle degree/bachelor - 180 ects, 3 years
- Computer Science
- Information Science for Management
- Computer Engineering
- Computer Science and Engineering (Cesena)

3 Second cycle degree/master- 120 ects, 2 years
- Computer Science
- Computer Engineering
- Computer Science and Engineering (Cesena)

http://www.cse.unibo.it/en/degree-programs
First cycle degrees

Computer Science

Information Science for Management

Computer Science and Engineering

Computer Engineering

Curriculum Computer Science and Technology

Curriculum Computer Engineering

Informatics
Math and Physics
Law and Economy
Other engineering courses
Teaching

3 Second cycle degree/master- 120 ects, 2 years

General computer science/engineer education
- Computer Science
  (double degree with Master Intelligente Systeme Bielefeld)
- Computer Engineering
- Computer Science and Engineering (Cesena)

http://www.cse.unibo.it/en/degree-programs
Given in English:

DISTRIBUTED SYSTEMS
SOFTWARE ARCHITECTURES
WIRELESS SYSTEMS AND NETWORKS
MULTIMEDIA AND INTERACTIVE TECHNOLOGIES
ADVANCED ARTIFICIAL INTELLIGENCE
Master in Computer Engineering

Given in English:

COMPUTER VISION AND IMAGE PROCESSING
INFRASTRUCTURE FOR CLOUD COMPUTING AND BIG DATA
INTELLIGENT SYSTEMS
MOBILE SYSTEMS
MULTIMEDIA DATA MANAGEMENT

DATA MINING
OPTIMIZATION ALGORITHMS
PROTOCOL AND APPLICATIONS FOR SPACE MULTIMEDIA
DISI  PhDs

Main PhD in
Computer Science and Engineering

PhD in
Data Science and Computation

PhD in
Structural and Environmental Health Monitoring and Management
PhD in Computer Science and Engineering

- three years
- broad-spectrum preparation covering all computing aspects.

- first year: courses
- two more years: research, including a stay abroad and must lead to the creation of an original thesis.

5-6 full scholarships on university budget
1-3 full scholarships on research projects