EIT Education &
the EIT ICTLabs Master School

Prof. Fabrizio Granelli
Local Master School Coordinator, UNITN
Maurizio Marchese

Fabrizio Granelli

Vincenzo D’Andrea

Director of Education

Interface with EIT & TRise

Local MS coordinator

Member of the EIT MS committee

Local DTC contact

Member of the EIT DTC committee
The EIT ICTLabs Master School

The whole picture

Technical Specialization with thematic relevance

Thematically oriented and industry based thesis work

Internship

Centrally organized Summer Program with I&E and thematic focus

Exit point specialization + thesis

Mobility phase

First year in University X at Node A

Entry point

Second year in University Y at Node B

Kickoff

Technical Common Base

Basic I&E Course

Mentorship program

Business Development Lab

Electives
What makes the EIT ICT Labs Master School different?

1. First rate Technical majors at Top European Technical Universities -> Double Degrees complemented by an EIT certificate
UNITN Involvement

A.Y. 2012-13:
- entry/exit point: S&P (active, around 10 students)
- exit points: ITA, ES, SDE

A.Y. 2013-now:
- entry (and exit) points: S&P, ITA, SDE
- exit points: ES, DMT, HCI
What makes the EIT ICT Labs Master School different?

2. A business minor standardized across all universities

- Summer program
- Business Development Labs
- Basics of Innovation & Entrepreneurship

Minor thesis strongly linked to the technical thesis.
What makes the EIT ICT Labs Master School different?

3. Personal industrial relationships including Mentorship and Internships programs with EIT ICT Labs Industrial and Institute Partners
What makes the EIT ICT Labs Master School different?

4. Interdisciplinary inter node teambuilding activities

- Kickoff for everybody in October (Budapest)
- Summer schools across geographical boundaries
- Utilization of EIT ICT Labs Co-Location Center resources giving access to other EIT ICT Labs activities
I&E Implementation @ UNITN

- I&E Basics: Economics and Management (6 credits, first semester)
- Business Development Lab (9 credits, second semester)
- Summer School: incorporated into ICT Innovation Course (9 credits, second semester)
- I&E Minor Thesis (2nd year), connected with internship and M.Sc. thesis
Thanks!

Fabrizio Granelli
(granelli@disi.unitn.it)
Internet Technology and Architecture
Technical Major

Prof. Fabrizio Granelli
Local ITA Major Coordinator, UNITN
Partners

- University Pierre and Marie Curie - Paris 6 (UPMC), France
- Technische Universität Berlin (TU Berlin), Germany
- Royal Institute of Technology (KTH), Sweden
- University of Nice Sofia Antipolis (UNS), France
- University of Trento (UNITN), Italy
- Institute Telecom, France
## Consortium Competences

<table>
<thead>
<tr>
<th>Partner</th>
<th>Core competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPMC</td>
<td>Self-Organizing Networks</td>
</tr>
<tr>
<td>TU Berlin</td>
<td>Network Architectures</td>
</tr>
<tr>
<td>KTH</td>
<td>Internetworking</td>
</tr>
<tr>
<td>UNS</td>
<td>Heterogeneous Networking</td>
</tr>
<tr>
<td>UNITN</td>
<td>Wireless and Mobile Access Networks</td>
</tr>
<tr>
<td>IT</td>
<td>Internet-of-Things</td>
</tr>
</tbody>
</table>
The Program – First Year

- Technical Common Base (24 ECTS):
  - Foundations of Networking (6 ECTS)
  - Network Design and Modeling (6 ECTS)
  - Wireless and Mobile Computing (6 ECTS)
  - Advanced Next Generation Networks (6 ECTS)

- E&I Basics (5-8 ECTS)

- Electives (12-18 ECTS)

- E&I BD Lab (7-10 ECTS)

- Summer Programme (9 ECTS)
The Program – Second Year

- Technical specialization (24 ECTS)
- Technical Master Thesis (30 ECTS)
- I&E Thesis (6 ECTS)
First Year Implementation @ UNITN

- Integrated within the Telecommunications Engineering M.Sc. degree

First semester:
- Advanced Network Modeling and Design (9 ECTS)
- Economics and Management (6 ECTS)
- Design of Networks and Communication Systems (6 ECTS)
- Communication Systems (9 ECTS)

Second semester:
- Wireless Networks (6 ECTS)
- Mobile Communications (6 ECTS)
- Business Development Lab (9 ECTS)
- ICT Innovation (including summer school, 9 ECTS)
# First Year Schedule

**Corso di laurea magistrale in Ingegneria Elettronica e Telecomunicazioni - 1^ anno ICT**


<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>09,00-10,00</td>
<td>Design of Networks and Communication Systems Aula A204</td>
<td>GRANELLI F. - SACCHI C.</td>
<td>Design of Networks and Communication Systems Aula A204</td>
<td>GRANELLI F. - SACCHI C.</td>
<td></td>
</tr>
<tr>
<td>10,00-11,00</td>
<td>Design of Networks and Communication Systems Aula A204</td>
<td>GRANELLI F. - SACCHI C.</td>
<td>Design of Networks and Communication Systems Aula A204</td>
<td>GRANELLI F. - SACCHI C.</td>
<td></td>
</tr>
<tr>
<td>11,00-12,00</td>
<td>Communication systems Aula A222</td>
<td>SACCHI CLAUDIO</td>
<td>Economics and management Aula A222</td>
<td>BONIFACIO MATTEO SALVATORE</td>
<td></td>
</tr>
<tr>
<td>12,00-13,00</td>
<td>(Advanced) Network modeling and design Aula A203 GRANELLI FABRIZIO</td>
<td>(Advanced) Network modeling and design Aula A203 GRANELLI FABRIZIO</td>
<td>Economics and management Aula A222</td>
<td>BONIFACIO MATTEO SALVATORE</td>
<td></td>
</tr>
<tr>
<td>13,00-14,00</td>
<td>(Advanced) Network modeling and design Aula A203 GRANELLI FABRIZIO</td>
<td>(Advanced) Network modeling and design Aula A203 GRANELLI FABRIZIO</td>
<td>Economics and management Aula A222</td>
<td>BONIFACIO MATTEO SALVATORE</td>
<td></td>
</tr>
<tr>
<td>14,00-15,00</td>
<td>Economics and management Aula A107</td>
<td>BONIFACIO MATTEO SALVATORE</td>
<td>(Advanced) Network modeling and design Aula A107 GRANELLI FABRIZIO</td>
<td>Communication systems Aula A203</td>
<td>SACCHI CLAUDIO</td>
</tr>
<tr>
<td>15,00-16,00</td>
<td>Economics and management Aula A107</td>
<td>BONIFACIO MATTEO SALVATORE</td>
<td>(Advanced) Network modeling and design Aula A107 GRANELLI FABRIZIO</td>
<td>Communication systems Aula A203</td>
<td>SACCHI CLAUDIO</td>
</tr>
<tr>
<td>16,00-17,00</td>
<td>(Advanced) Network modeling and design Aula A107 GRANELLI FABRIZIO</td>
<td>(Advanced) Network modeling and design Aula A107 GRANELLI FABRIZIO</td>
<td>Communication systems Aula A203</td>
<td>SACCHI CLAUDIO</td>
<td></td>
</tr>
<tr>
<td>17,00-18,00</td>
<td>(Advanced) Network modeling and design Aula A107 GRANELLI FABRIZIO</td>
<td>(Advanced) Network modeling and design Aula A107 GRANELLI FABRIZIO</td>
<td>Communication systems Aula A203</td>
<td>SACCHI CLAUDIO</td>
<td></td>
</tr>
<tr>
<td>18,00-19,00</td>
<td>(Advanced) Network modeling and design Aula A107 GRANELLI FABRIZIO</td>
<td>(Advanced) Network modeling and design Aula A107 GRANELLI FABRIZIO</td>
<td>Communication systems Aula A203</td>
<td>SACCHI CLAUDIO</td>
<td></td>
</tr>
</tbody>
</table>
Second Year Implementation @ UNITN

- Integrated within the Telecommunications Engineering M.Sc. degree

First semester:
- Antennas for Wireless Communications (9 ECTS)
- Project course on Software for Mobile (3 ECTS)
- We’ll organize meeting with potential internship partners

Second semester:
- I&E Minor Thesis (6 ECTS)
- Master Thesis (including internship, 30 ECTS)

Elective courses: 12 ECTS
- Better in the first semester, to leave 2nd semester for internship + thesis
## Second Year Schedule

### Corso di laurea magistrale in Ingegneria Elettronica e Telecomunicazioni - 2\(^{\text{nd}}\) anno ICT

AY 2014-2015, 1 semester (September 15, 2014 - December 19, 2014)

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>09,00-10,00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10,00-11,00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 11,00-12,00   | Antennas for wireless communication  
                      Aula A212  
                      ROCCA PAOLO | Antennas for wireless communication  
                      Aula A212  
                      ROCCA PAOLO | Antennas for wireless communication  
                      Aula A212  
                      ROCCA PAOLO | Antennas for wireless communication  
                      Aula A212  
                      ROCCA PAOLO | Antennas for wireless communication  
                      Aula A212  
                      ROCCA PAOLO |
| 12,00-13,00   | Antennas for wireless communication  
                      Aula A212  
                      ROCCA PAOLO | Antennas for wireless communication  
                      Aula A212  
                      ROCCA PAOLO | Antennas for wireless communication  
                      Aula A212  
                      ROCCA PAOLO | Antennas for wireless communication  
                      Aula A212  
                      ROCCA PAOLO | Antennas for wireless communication  
                      Aula A212  
                      ROCCA PAOLO |
| 13,00-14,00   | Antennas for wireless communication  
                      Aula A212  
                      ROCCA PAOLO | Antennas for wireless communication  
                      Aula A212  
                      ROCCA PAOLO | Antennas for wireless communication  
                      Aula A212  
                      ROCCA PAOLO | Antennas for wireless communication  
                      Aula A212  
                      ROCCA PAOLO | Antennas for wireless communication  
                      Aula A212  
                      ROCCA PAOLO |
| 14,00-15,00   |                                  |                                  |                                    |                                   |                                  |
| 15,00-16,00   |                                  |                                  |                                    |                                   |                                  |
| 16,00-17,00   |                                  |                                  |                                    |                                   |                                  |
| 17,00-18,00   |                                  |                                  |                                    |                                   |                                  |
| 18,00-19,00   |                                  |                                  |                                    |                                   |                                  |
Some Proposed Elective Courses

- **First semester:**
  - Design of Networks and Communication Systems (6 ECTS)
  - Data Hiding (6 ECTS)
  - Computer Vision (6 ECTS)
  - Additional project courses (3 / 6 ECTS)

- **Second semester:**
  - Imaging and Inverse Problems (9 ECTS)
  - Wireless Networks (6 ECTS)
Thanks!

Fabrizio Granelli
(granelli@disi.unitn.it)
Teaching, International Programmes and Student Administration Division - Science and Technology Area

Trento, September 11th 2014
Students studying at the University of Trento receive guidance and administrative support at the following offices:

- **Teaching and Student Administration Office** (student office)
- **International Activities Staff**
  - Science and Technology Area

The Teaching and Student Administration Office is the first point of contact for all administrative tasks students have to undertake during their academic career at the University of Trento.

The International Activities Staff provides support and advice to international students.
EIT students must apply to the Teaching and Student Administration Office for the following administrative tasks:

- Enrollment at the University of Trento
- Submission of the study plan and how to make any changes
- Problems with the enrollment process
- Issuing of certificates and transcripts
- How to register for the exams and if problems come up during the registration procedures

PLEASE MENTION THAT YOU ARE AN EIT STUDENT ANYTIME YOU APPLY TO THE TEACHING AND STUDENT ADMINISTRATION OFFICE
Next deadlines:

- **15th September 2014 from 13.00:**
  Enrollment in Master’s degree programmes

- **December 2014:**
  Submission of your EIT study plan to the Teaching and Student Administration Office

All students enrolled at the University of Trento will be informed via e-mail about how to complete the **online** study plan.

**EIT students** must **not** take that email into consideration, since the Teaching and Student Administration Office will send another e-mail providing a specific form and instructions on how to submit the **EIT study plan**.
Opening times:

Teaching and Student Administration Office:
Monday and Friday from 10.00 to 12.00
Wednesday from 14.00 to 16.00
E-mail: supportostudentipovo@unitn.it

International Activities Staff:
Monday from 13.30 to 15.00
Wednesday from 10.00 to 12.00
E-mail: mobility-st@unitn.it

International Office DISI:
E-mail: int.disi@unitn.it
SDE: Trento Entry & Exit Point

Local Coordinator: Maurizio Marchese
maurizio.marchese@unitn.it
SDE Programme

Entry Points:
Trento, Eindhoven, Aalto

Exit points:
Trento  Service-Oriented Social Informatics
Eindhoven Service-oriented Business Process Mgm
Aalto  Mobile Services Systems
Budapest Distributed Service Systems
SDE Trento Entry Point programme

**1st semester**

Courses (24 ECTS)
- Economics of Management (6)
- Introduction to SDE (6)
- Human Computer Interaction (6)
- Security Engineering (6)

**2nd semester**

Courses (36 ECTS incl. Summer School)
- Business Development Lab (9)
- ICT Innovation (9) (which includes Summer School)

Three courses out of:
- Lab BPM and Web Integration (6)
- Big Data and Social Networks (6)
- Advanced Requirements Engineering (6)
- Organizational Information Systems (6)
- Computer Supported Collab. Work (6)
SDE Trento exit Point programme

1st semester

Courses (24 ECTS)

Four courses out of:
- Introduction to SDE
- Big Data and Social Networks
- Laboratory of SDE
- Human-Computer Interaction
- Laboratory of BPM
- Organizational Information Systems
- Requirements Engineering
- Computer Supported Co-operative working
- Privacy and Intellectual Property Rights

2nd semester

Courses (36 ECTS)

- I&E Minor Thesis
- Internships (6)
- Thesis (24)
SDE people involved
REAL-TIME EMBEDDED SYSTEMS

Coordinator:
Luigi Palopoli

palopoli@disi.unitn.it
Entries and Exits

1st Year (Entry):

- **KTH**
  - Stockholm
  - Sweden
  - (EE students)

- **TU Berlin**
  - Berlin
  - Germany
  - (CE students)

- **TU Eindhoven**
  - Eindhoven
  - The Netherlands
  - (CS students)

2nd Year (Exit):

- **Embedded Multicore Processing**
  - TU Berlin
  - Germany

- **Embedded Networking**
  - TU Eindhoven
  - The Netherlands

- **Embedded Platforms**
  - KTH, Stockholm
  - Sweden

- **Energy Efficient Computing**
  - TUCS, Turku
  - Finland

- **Mobile Cyber-Physical Systems**
  - Aalto, Helsinki
  - Finland

- **Real-Time Embedded Systems**
  - UNITN, Trento
  - Italy
A REAL-TIME system is one for which the time a computation is delivered is on the same level of importance as the result.

Safety critical, Hard real-time

Soft real-time
### The EIT ES in Trento

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab. of Applied Robotics</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Real—Time Operating systems</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Lab. of Wireless Sensor Networks</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Advanced Computing Architecture</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distributed Algorithms</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Network Security</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Laboratory of Nomadic Communications</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Formal Methods</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Simulation and performance evaluation</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Research Project</td>
<td>12</td>
<td>1-2</td>
</tr>
</tbody>
</table>

12/24 Credits between

0/12 Credits between
Key persons

Luigi Palopoli
Coordinator
Teacher of Laboratory of applied Robotics

Luca Abeni
Teacher of Real—time operating systems

Roberto Passerone
Teacher of Real—time operating systems

Gian Pietro Picco
Teacher of Lab of Sensor Networks

Roberto Sebastiani
Teacher of Formal Methods

Renato Lo Cigno
Teacher of Performance Evaluation
Security and Privacy Master

Introduction

Bruno Crispo
UniTN node

- **Entry (1st year) and Exit (2nd year) node**
- **Specialization: Applied Security**
  - identify the appropriate security technology that can be deployed.
  - develop appropriate solutions for the industry scenarios of cyber security and citizen’s security.
  - describe and justify the benefits for such choices based on empirical results
ENTRY: Technical Security Courses at UniTN

- **Security Engineering (Fall) – 6 credits – Massacci**
  - Security Management, Security Design and Engineering

- **Network Security (Spring) – 6 credits - Crispo**
  - Network and Web Security, Security Protocols, Malware

- **Cryptography (Fall) – 6 credits - Sala**
  - Cryptography, Public Key Cryptography

- **Security Testing (Spring) – 6 credits - Tonella**
  - Reverse engineering, Software testing, Security testing

- **Privacy and Intellectual Property Rights (Spring) – 6 credits – D’Andrea**
  - Privacy, IPR management, Digital right management
ENTRY: Innovation and Entrepreneurship Courses

• **Economics & Management (Fall) – 6 credits – Filippas**
  – Basic of economics and management, innovation models

• **Business Develop. Lab (Spring) – 9 credits - Bonifacio**
  – How to make a business plan
  – **ICT Innovation (Spring) – 9 Credits –** which includes I&E EIT Summer School
Additional Courses (Electives)

• **Data Hiding (Fall)** – 6 credits – Boato
  – Watermarking, digital image forensics, Digital right management

• **Formal Techniques for Cryptographic Protocol Analysis (Spring)** – 6 credits – Zunino
  – Cryptographic protocols modeling, model checking, protocol analysis
EXIT (2\textsuperscript{nd} Year)

- Project on Applied Security – 18 credits – Crispo/Massacci
  - Topic to be agreed with the professor of your choice
- Security Threat Identification and Testing – 3 credits –
  - Malware, exploit and attack, vulnerability assessment
- Data Hiding – 6 credits
- Formal Techniques for Cryptographic Protocol Analysis – 6 credits
- EIT Summer School – 4 credits
- I&E minor thesis or project – 6 credits
- Master Thesis – 30 credits
Project on Applied Security (18 or reduced to 6 ETCS)

- **2014-2015 focus on Offensive Technologies**
  - Red Pills vs Blue Pills in Javascript (finding whether a client is running a VM or not)
  - Arming Exploit Kits with new Exploits (e.g. for Firefox)
  - Server-side Javascript exploits

- **and on Malware detection and Vulnerability Analysis**
  - Mobile Malware analysis, mobile app analysis
  - Application Memory profiling
  - Security of cyber-physical systems
S&P Coordinator and Lecturers

09/09/2013

B. Crispo