

About ALaRI and its Educational Programs

Nano-Tera Workshop on Future
Embedded Systems Education

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Università
della
Svizzera
italiana

Faculty
of Informatics

Advanced
Learning
and Research
Institute
ALaRI



About ALaRI

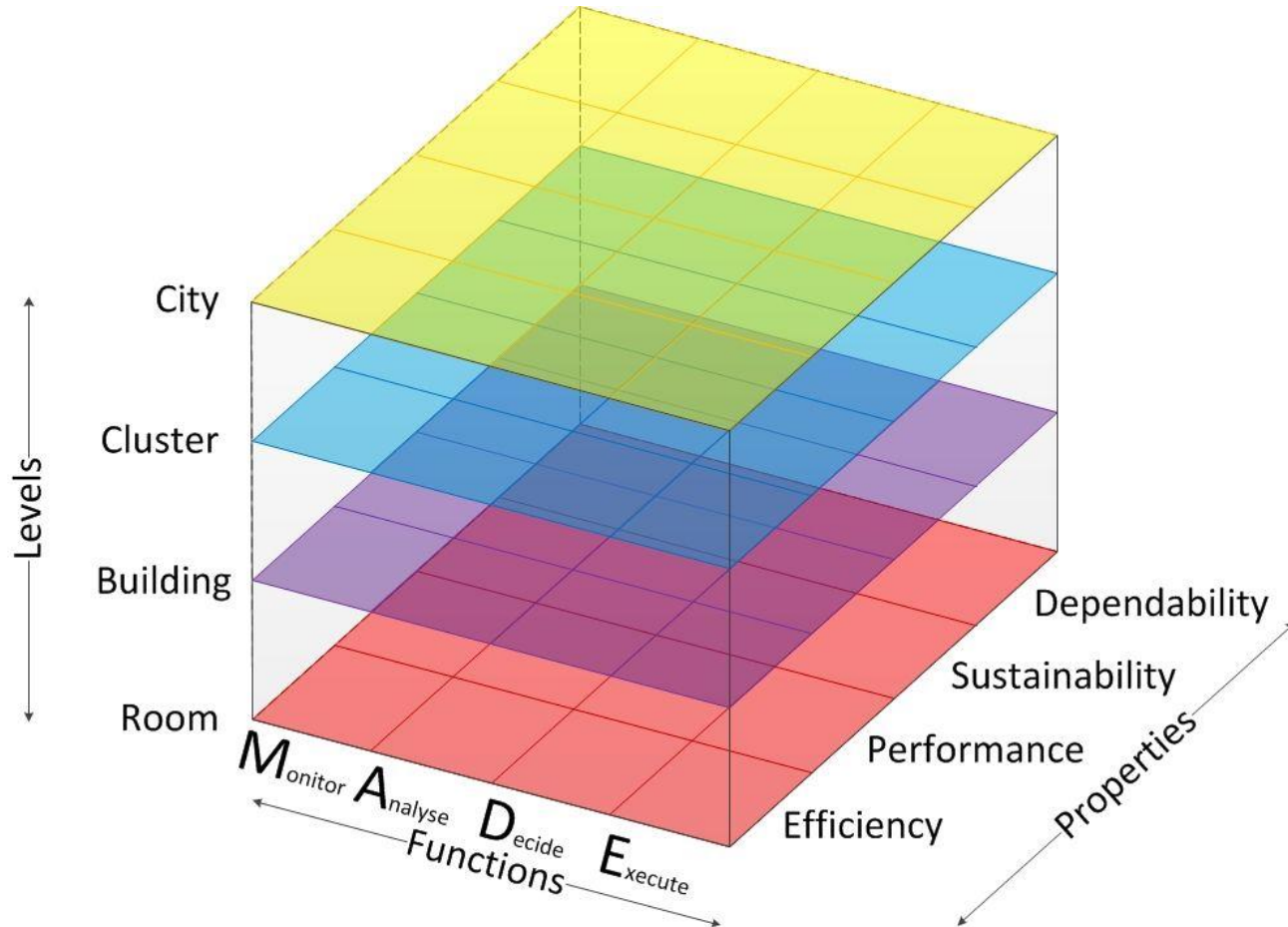
- The Advanced Learning and Research Institute (ALaRI), established in 1999 in Lugano, Switzerland, at the Università della Svizzera italiana is a part of the Swiss Higher Education System and recognized by the Swiss Federal Government (since 2004 a part of Faculty of Informatics)
- Founders: Professors Sami, Dadda and De Micheli
- Initial support by Intel, Hewlett-Packard and STMicroelectronics
- Collaborative relations with Politecnico di Milano and the Zurich Federal Institute of Technology

Furthermore, about ALaRI

- The EU supported our EDUCATIONAL program through FP5 project ANTITESYS (involving ST, Infineon, Mentor Graphics, TXT e-solutions, as well as Politecnico di Milano, EPFL, Universitat Politècnica de Catalunya)
- ALaRI's research programs (supported among others by European Community and by the Swiss Science Foundation)
- Research contributions in:
 - Network-on-Chip and System-on-Chip design
 - Hardware accelerators
 - Properties: dependability, security and real time
 - Cryptography
 - Failure/change prediction
 - Domain applications (energy, agriculture, medicine)

Example of an Application Area: Energy and Environment

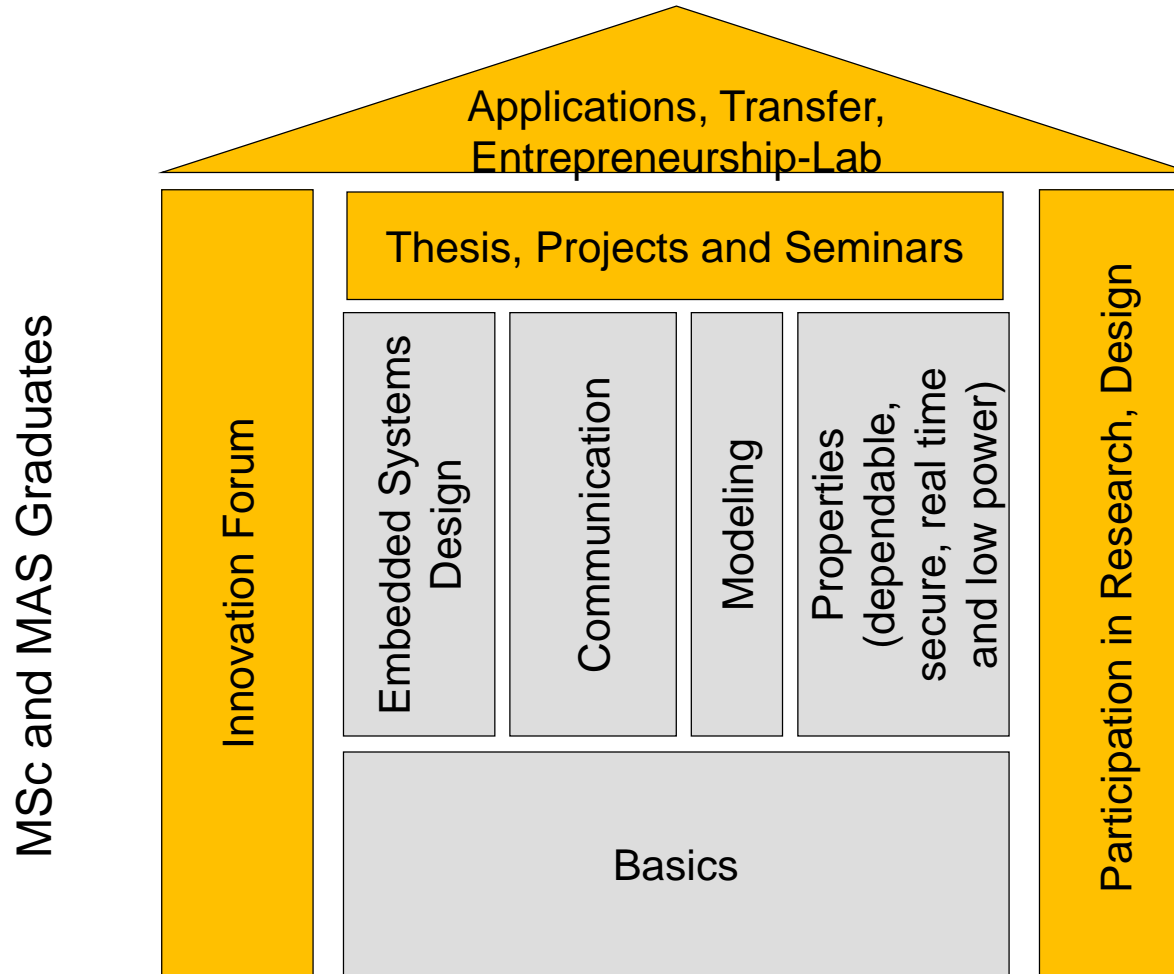
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Goals of ALaRI

- First class education
- High-impact research
- Nurturing innovation
- Starting companies

The Curriculum Leading to Innovation



Objectives and Content

Our Approach:

- ... provides students with strongly cross-disciplinary education, including courses related to hardware and software design, as well as to telecommunication and digital control aspects
- ...focuses on *system-level* aspects
- ...favors a project-oriented approach
- ...stresses academia-industry collaboration and innovation

Structure and organization

- Fundamental courses + elective courses
- The program involves an international faculty: about 25 professors and experts called to meet the curriculum requirements, based on their specific competences
- Master thesis may be co-advised by some of the external lecturers
- Internships at research centers as well as high-tech start-ups are available

Two Programs



- Master of Science in Embedded Systems Design (two-year program, 120 ECTS)
- Master of Advanced Studies in Embedded Systems Design (one-year program, 70 ECTS)

Admission requirements

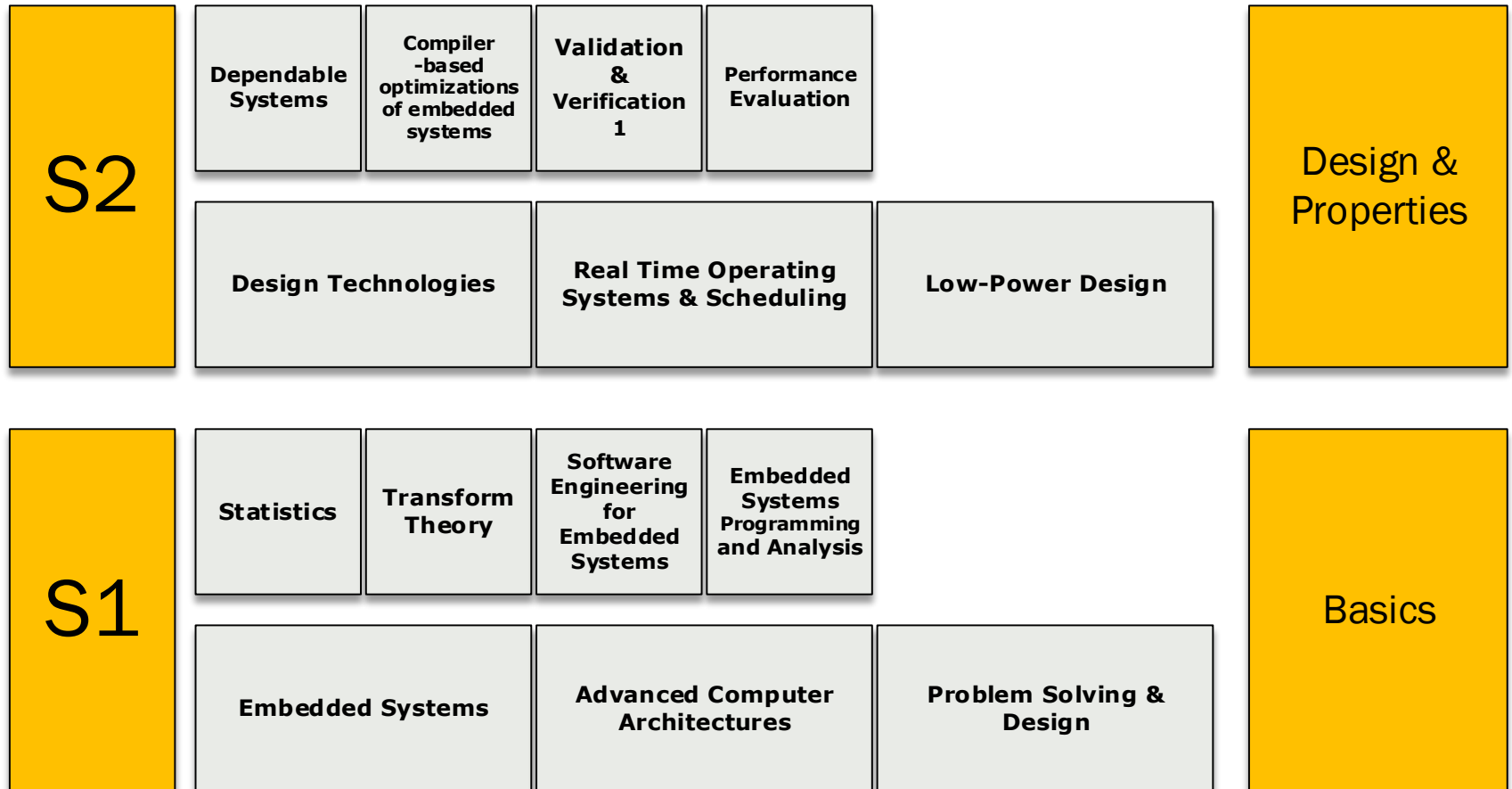
- Bachelor's degree granted by a recognised university in the field of Computer Science, Computer Engineering, Electrical Engineering, Computer Communication, Information Science or related disciplines.
- English requirement: B2/Upper intermediate level certificate

Master of Science in Embedded Systems Design (two-year program, 120 ECTS)

Additional Electives	Entrepreneurship	Pervasive Information Systems & Embedded DBs	Validation & Verification 2	Future Trends					
S4	HW/SW Co-Design	Cryptography	Network on Chip	Digital Signal Processing	MSc Thesis				Electives & Special Topics
S3	Algorithms for Wireless Communication	Micro-electronics	Sensors	Embedded Processor Design	Management	Specification Languages	Reprogrammable Systems	Implementation of Digital Controllers	
S2	Design Technologies	Real Time Operating Systems & Scheduling	Low-Power Design	Dependable Systems	Compiler-based optimizations of embedded systems	Validation & Verification 1	Performance Evaluation	Design & Properties	
S1	Embedded Systems	Advanced Computer Architectures	Problem Solving & Design	Statistics	Transform Theory	Software Engineering for Embedded Systems	Embedded Systems Programming and Analysis	Basics	

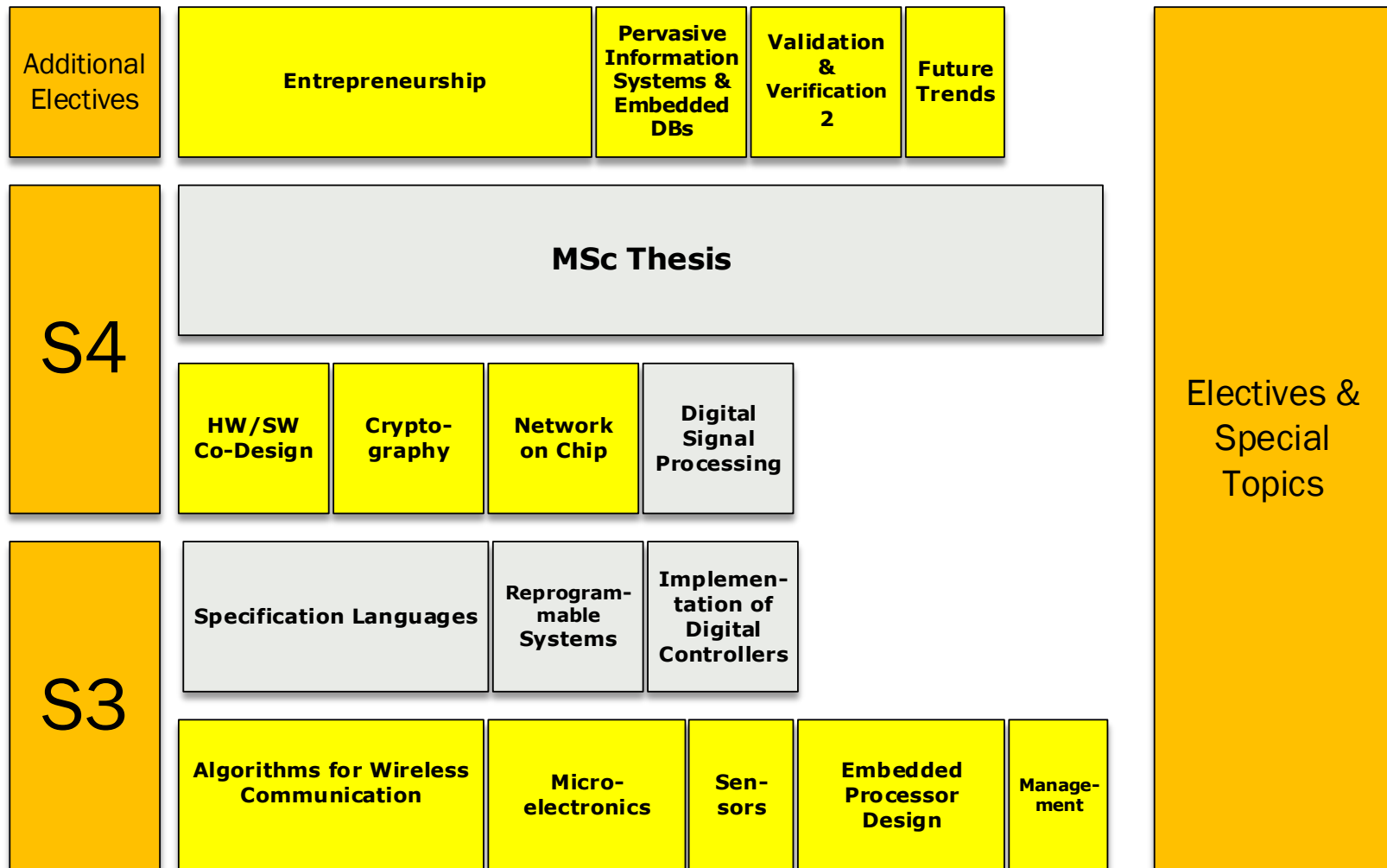
 Fundamental Courses/Thesis
 Electives

Master of Science in Embedded Systems Design (two-year program, 120 ECTS) – semester 1 and semester 2



Fundamental Courses/Thesis

Master of Science in Embedded Systems Design (two-year program, 120 ECTS) – semester 3 and semester 4



Fundamental Courses/Thesis
 Electives

Master of Advanced Studies in Embedded Systems Design (one-year program, 70 ECTS)

Additional Electives	HW/SW Co-Design	Validation & Verification 1	Validation & Verification 2	Pervasive Information Systems & Embedded DBs	Cryptography	Software Engineering for Embedded Systems	Problem Solving & Design	Statistics	Transform Theory
S1/S2	MAS Thesis					Algorithms for Wireless Communication	Embedded Processor Design	Future Trends	Digital Signal Processing
S2	Design Technologies	Real Time Operating Systems & Scheduling		Low-Power Design		Dependable Systems	Compiler-based optimizations of embedded systems	Network on Chip	Performance Evaluation
S1	Embedded Systems	Computer Architecture	Reprogrammable Systems	Specification Languages		Implementation of Digital Controllers	Micro-electronics	Sensors	Embedded Systems Programming and Analysis



Fundamental Courses/Thesis



Electives

Career Prospects

- Virtually any company, in any area...
- Past students have been hired by companies such as:
 - Intel, IBM Research Zurich, ARM, ABB, Kudelski (security solutions), ST Microelectronics,
 - but also... Toyota, Ferrari... public bodies...
- Or even created their own (successful!) start-ups (USA, Italy, India);
- And several are by now members of the Faculties at highly-ranked Universities

On the Nobility of Education and Research

- Education and research are **noble** activities but
- Research that finds an application might be **nobler**, and
- Education and research that serve our society, sustain our planet, improve quality of life and prepare the next generation might be the **noblest**,
and this is what **ALaRI** wants to be about