

# Security and Embedded Laboratory

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# Outline



- 1 The Research Group
- 2 Research Activities
- 3 Research Projects
- 4 Partners

# The Embedded Research Group



- The Department of Electrical Engineering and Information Technologies has more than 120 full time academics and more than 50 researchers, including post-docs and Ph.D. students.
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Mazzeo



prof. Nicola  
Mazzocca

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prof. Valeria  
Vittorini



Prof. Alessandro  
Cilaro



prof. Valentina  
Casola

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Dr. Flora Amato

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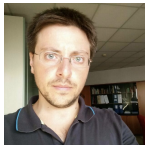
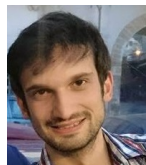
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  - Four Ph.D. Students;
  - Other collaborators;



# Teaching



- The group manages five courses for the computer engineering Master Degree:
  - **Architettura dei Sistemi di Elaborazione** (~100 students);
  - **Calcolatori Elettronici II** (~100 students);
  - Secure System Design (~30 students);
  - Advanced Computer Architecture and GPU Programming (~30 students);
  - Sistemi Embedded (~30 students);

# Current Main Research Activities



- The research activities of the Security and Embedded Laboratory group focus on:
  - Security of digital system:
    - hardware security and trust;
    - cyber-physical security;
  - High performance computing:
    - heterogeneous architectures;
    - post-Moore technologies;
    - critical-systems;
  - Formal verification and modeling of systems:
    - model-based analysis and assessment;

# MANGO

Exploring manycore architectures for next-generation HPC systems



## Performance/power efficiency

- High performance computing is dealing with the gap between the applications' requirements and the availability of underlying computing architecture;
- Need for customization of architectures to meet applications' demand and reach better performance/power-efficiency.

## Infos

- EU's H2020-FETHPC-2014;
- Duration: 36 months;
- EU contribution: ~ 5M

## Local Key members

- Prof. Alessandro Cilardo;
- Dr. Edoardo Fusella;

# RECIPE

REliable power and time-Constraint-aware Predictive management of heterogeneous Exascale system



## Performance/power scaling

- The project will exploit the MANGO prototype by integrating it in a real-world HPC setting;
- Development a resource management infrastructure for time-critical and throughput-oriented Exascale applications.

## Infos

- EU's H2020-FETHPC-02-2017;
- Duration: 36 months;
- EU contribution: ~ 3M

## Local Key members

- Prof. Alessandro Cilardo;

# spyGLASS

## GALILEO-BASED PASSIVE RADAR SYSTEM FOR MARITIME SURVEILLANCE



### Geo-localization technology for passive radar

- Design and development of an Innovative Passive Coherent Location;
- Implementation technology exploration for implementing a processing techniques for maritime moving target detection and localization by means of PCL systems.

### Infos

- EU's FP7-ICT-2013;
- Duration: 36 months (ended);
- Budget: ~4.5

### Local Key members

- Prof. Antonino Mazzeo;
- Dr. Mario Barbareschi;

# MUSA

Multi-cloud secure applications



DIE  
TI •  
UNI  
NA

## Security-intelligent lifecycle management

- Performance and the security management of the cloud-provisioned resources influence the security of multi-cloud applications;
- MUSA presents a framework able to support security-aware multi-cloud application lifecycle management.

### Infos

- EU's H2020-ICT-07;
- Duration: 36 months;
- EU contribution: ~ 3M

### Local Key members

- Prof. Valentina Casola;
- Dr. Alessandra De Benedictis;

# SPECS

Secure Provisioning of Cloud Services based on SLA Management



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NA

## Security-as-a-Service

- User-centric negotiation of security parameters in Cloud SLA;
- Monitoring the fulfillment of SLAs agreed with one or more CSP;
  - SPECS monitoring services also enable notifying both users and CSPs, when a SLAs not being fulfilled (e.g., due to a cyber-attack).

## Infos

- EU's FP7-ICT-2013;
- Duration: 36 months (ended);
- Budget: ~4.5

## Local Key members

- Prof. Valentina Casola (vice-coordinator);
- Dr. Alessandra De Benedictis;



# CRYSTAL

Critical system engineering acceleration



## Model Engineering for safety critical applications

- Engineering methods on industrially relevant use cases (railway);
- Framework for interoperability;
- Support SME integration into the embedded systems engineering ecosystem;

## Infos

- EU's ARTEMIS-ICT-2013;
- Duration: 36 months (ended);
- Budget: 82M;

## Local Key members

- Prof. Valeria Vittorini;
- Dr. Roberto Nardone;

# Academic Relationships



- The Security and Embedded Group is involved in several research projects, most of them funded by European Commission, Italian government and Campania Region;
- These activities are carried out in collaboration with many national and international working group, including:
  - University of Montpellier, University of Valencia, Imperial College London, Fraunhofer-Gesellschaft, Politecnico di Torino, University of Campania Luigi Vanvitelli, Italian Aerospace Research Center, and many others.

# Industrial Relationships



- The research group has also several partnerships ongoing with private companies and organization in the area of design, security and dependability of embedded systems:
  - Technalia, CA, Lufthansa, Hitachi Railway Systems (Ansaldo STS), ST Microelectronics, Micron, Distretto Trasporti Dattilo, IVM, Bit4ID, Gematica, Montimage.

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