ISTITUTO
DI TELECOMUNICAZIONI,
INFORMATICA
E FOTONICA

The TeCIP Institute

Sant'Anna
Scuola Universitaria Superiore Pisa

Giorgio Buttazzo
TeCIP Director
g.buttazzo@santannapisa.it

TeCIP Institute

Retis
Real-Time Systems Laboratory

Sant'Anna
Scuola Universitaria Superiore Pisa

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Ingegneria
Informatica

Retis
Real-Time Systems Laboratory

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The RETIS Lab

The **Real-Time Systems Laboratory** (***ReTiS Lab***) has been founded in 1993 and is one of the world's leading research teams in embedded real-time systems and time-critical software.

It currently includes 40 people:

- 7 Professors
- 6 Post Docs
- 9 Research fellows
- 18 PhD students

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RETIS mission

Investigating **fundamental methodologies** in order to provide **support** to complex **safety-critical systems**.

We focus on **fundamental methods** rather than **applications**.

Why?

- Developing applications is much easier, and most people can do it.
- Developing fundamental methods has much higher impact in the society and in the industry.
- You can publish higher quality scientific works.
- You receive higher recognition from the international community.
- However, applications are needed as a means to demonstrate the validity of your work and convince industry to finance a research.

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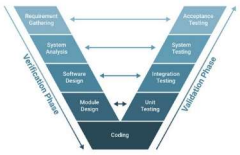
Research topics

Real-time software for **safety-critical systems**

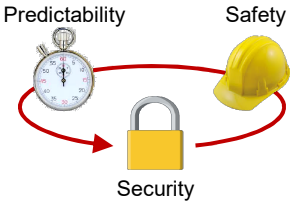
Methodologies

- Design of embedded systems
- Timing Analysis
- Real-Time Operating systems
- Cloud Computing and Big Data



Predictability, Safety & Security

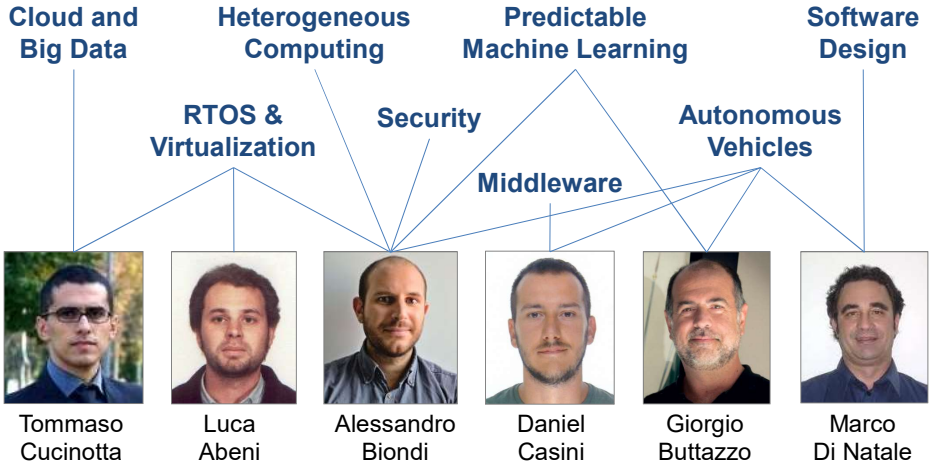
- Hypervisor technology
- Control-flow integrity, Intrusion detection
- Trusted Execution Environments



Trustworthy & Predictable AI

- Architecture support for deep learning
- Adversarial defense methods
- Provable properties for deep networks

Contacts



Email: nome.cognome@santannapisa.it

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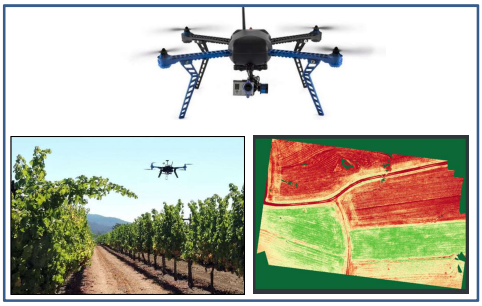
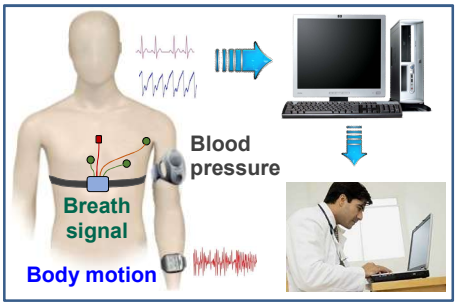
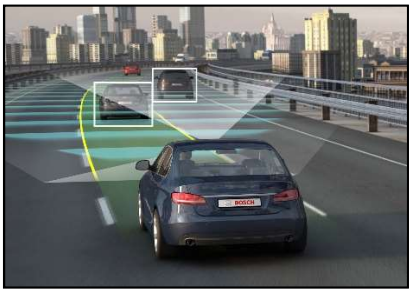
Application domains







Robust AI-based perception
Self-driving functions
Localization

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Major world-wide achievements

ERIKA ENTERPRISE

http://erika.tuxfamily.org

Open Source **RTOS** certified OSEK/VDX for automotive systems

Released in 2002

Retis Real-Time Systems Laboratory — EVIDENCE

SCHED_DEADLINE

https://en.wikipedia.org/wiki/SCHED_DEADLINE

Deadline-based scheduling in mainstream **Linux** distributions

Since March 2014

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Major world-wide achievements

CLARE Hypervisor

Released on 2019

CLARE hypervisor used on Alfa Giulia for evaluating new automotive algorithms

MAGNETI MARELLI

RFI-OS

Released on 2021

Real-Time Operating System for RFI written to be certified SIL4

RFI

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Industrial Collaborations

RTOS and Hypervisors

Security (all)

AI (all)

Design methods

Cloud & Big Data

RT-Linux

Hitachi Rail STS

RFI

HUAWEI

THALES

BOSCH

MAGNETI MARELLI

LEONARDO

THALES

MathWorks

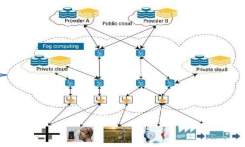
vodafone

ERICSSON

TELECOM ITALIA

ARM

Red Hat



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Research Collaborations

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Research Collaborations

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Spin-off companies

EVIDENCE	http://www.evidence.eu.com/	Multi-core kernels Real-Time Linux OSEK kernels **RTOSes** **Embedded Linux**
AMARULA SOLUTIONS	http://www.amarulasolutions.com/	ANDROID Linux
biocare provider		ICT solutions for Healthcare
Wriggle Solutions		Solutions for smart tires
NGS srl New Generation Sensors		New Generation Sensors, IoT
accelerat		Virtualization technology Predictable AI AI hardware acceleration

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Opportunities

The ReTiS Lab is regularly opening positions for:

- **Graduate Scholarships** — 3/6/12-month contract to work on a specific research project.
- **PhD Scholarships** — 3-year contract, at least 6 months to be spent abroad.
- **Post-doctoral Researchers** — 1-year contract, renewable.

- All opportunities are funded by a company or involve close collaboration with the industry.
- Our students and researchers often travel to conferences all over the world.

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