TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA

CYBER 4.0
CYBERSECURITY
COMPETENCE
CENTER

Funded by the
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WIRELESS LAB (WLab)

Laboratorio Congiunto
Per Sistemi Wireless

Prof. Gaetano Marrocco
Ordinario di Campi Elettromagnetici
Università di Roma Tor Vergata

WIRELESS Health LAB

Laboratorio Congiunto per Sistemi Wireless

TECHNOLOGY + CYBER-PHYSICAL SECURITY + REGULATION + DATA INTELLIGENCE

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ECOSYSTEM & COLLABORATIONS

TOR VERGATA UNIVERSITÀ DEGLI STUDI DI ROMA | RADIO6ENSE The first meter of Physical AI | ... | Integrazione con nuovi partner

01 SMART MEDICAL DEVICES

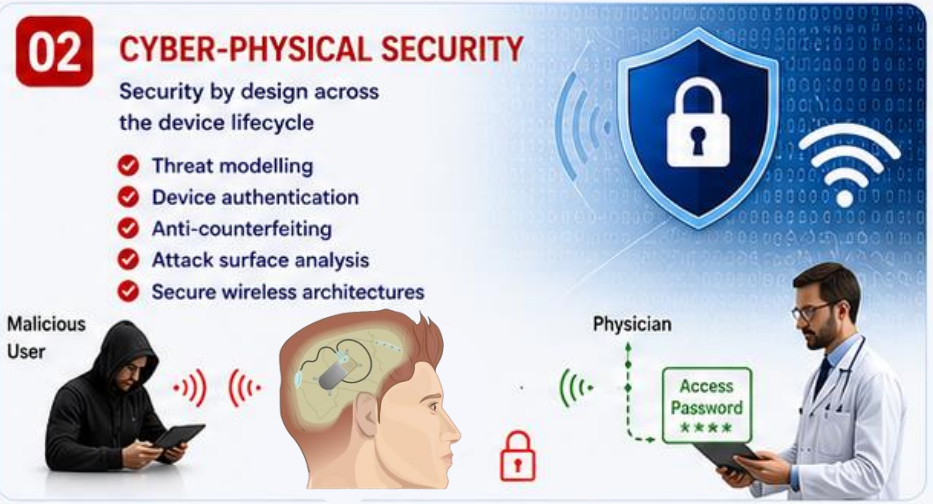
From passive devices to intelligent, connected systems

- Wearables & epidermal sensors
- Implantable smart devices
- Battery-free sensing
- Smart prostheses
- Digital biomarkers

02 CYBER-PHYSICAL SECURITY

Security by design across the device lifecycle

- Threat modelling
- Device authentication
- Anti-counterfeiting
- Attack surface analysis
- Secure wireless architectures



03 PHARMA & PRODUCT INTELLIGENCE

Wireless sensing for product integrity and quality assurance

- In-packaging sensing
- Stability monitoring
- Cold chain integrity
- Product-level telemetry

Temperature | Humidity | Light | Time

www.pervasive.ing.uniroma2.it

04 TRUST, PRIVACY & REGULATION

Bridging innovation and regulated deployment

- GDPR, MDR, CRA, NIS2
- Privacy by design
- Data governance
- Preclinical technical evidence generation

OUR IMPACT

SAFER DEVICES
Protecting patients and users

FASTER INNOVATION
From idea to validated prototype

REDUCED DEPLOYMENT RISK
Security and validation before market

REGULATORY READINESS
Robust evidence for compliance

TRUSTED HEALTH DATA
From sensing to secure actionable insights

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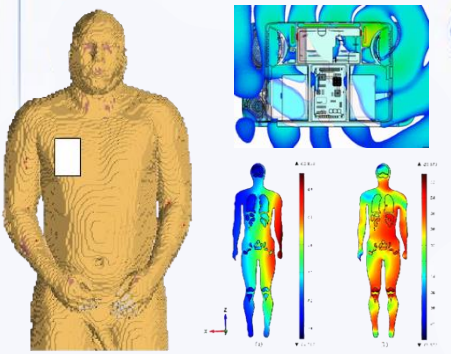
01 DIGITAL DESIGN & DOSIMETRY

From physics to digital twin

- Full-wave EM simulation
- Human/body-centric models
- RF link-budget and propagation
- Thermal and exposure modelling
- Device–body interaction analysis



TOOLS

FDTD, MoM, FEM

Numerical solvers and body phantoms

02 RAPID PROTOTYPING

From concept to functional demonstrator

- PCB milling
- Flexible electronics
- 3D printing
- RFID sensor prototyping
- Assembly and inspection

TOOLS & EQUIPMENT

CNC milling · 3D printer · Soldering station · Microscope · PCB laboratory

03 BODY PHANTHOMS

From generic demo to controlled biomedical scenario

- Tissue-equivalent liquids
- Solid phantoms and mock-ups
- Implant/device test fixtures
- Pharma packaging demonstrators
- Repeatable reference cases

TOOLS & ASSETS

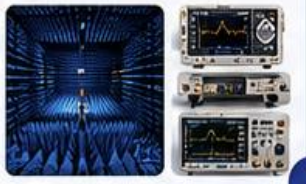
Body phantoms · Implant fixtures · Liquids & phantoms · Packaging mock-ups · Reference devices

04 MULTI-PHYSICS CHARACTERIZATION

From prototype to measured evidence

ELECTROMAGNETIC

- Semi-anechoic chamber
- VNA
- Spectrum analyzer
- Oscilloscope
- RF probes / antenna tests



RFID & WIRELESS SENSING

- Voyantic Tagformance
- Readers (UHF/HF)
- SDR platforms
- RF sensing protocols

THERMAL & ENVIRONMENTAL

- Climatic chamber
- Temperature & humidity control
- Thermal stress tests

INSTRUMENTATION

KEYSIGHT P9377B VNA · Anritsu MS2024A · Voyantic Tagformance · NI USRP-2901 · ThingMagic / Chainway · Binder MKF56

05 CYBER-PHYSICAL READINESS

From measured device to trusted deployment

- Cyber-physical vulnerability monitoring (Cyber4Health Observatory)
- Device authentication & integrity analysis
- Wireless attack-surface analysis
- Anti-counterfeiting validation
- Protocol security evaluation
- Technical evidence for preclinical phase
- Privacy-by-design verification support

https://cyber4health.uniroma2.it

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