

# Water-Supply Cyber-Physical Systems

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# Area of Interest

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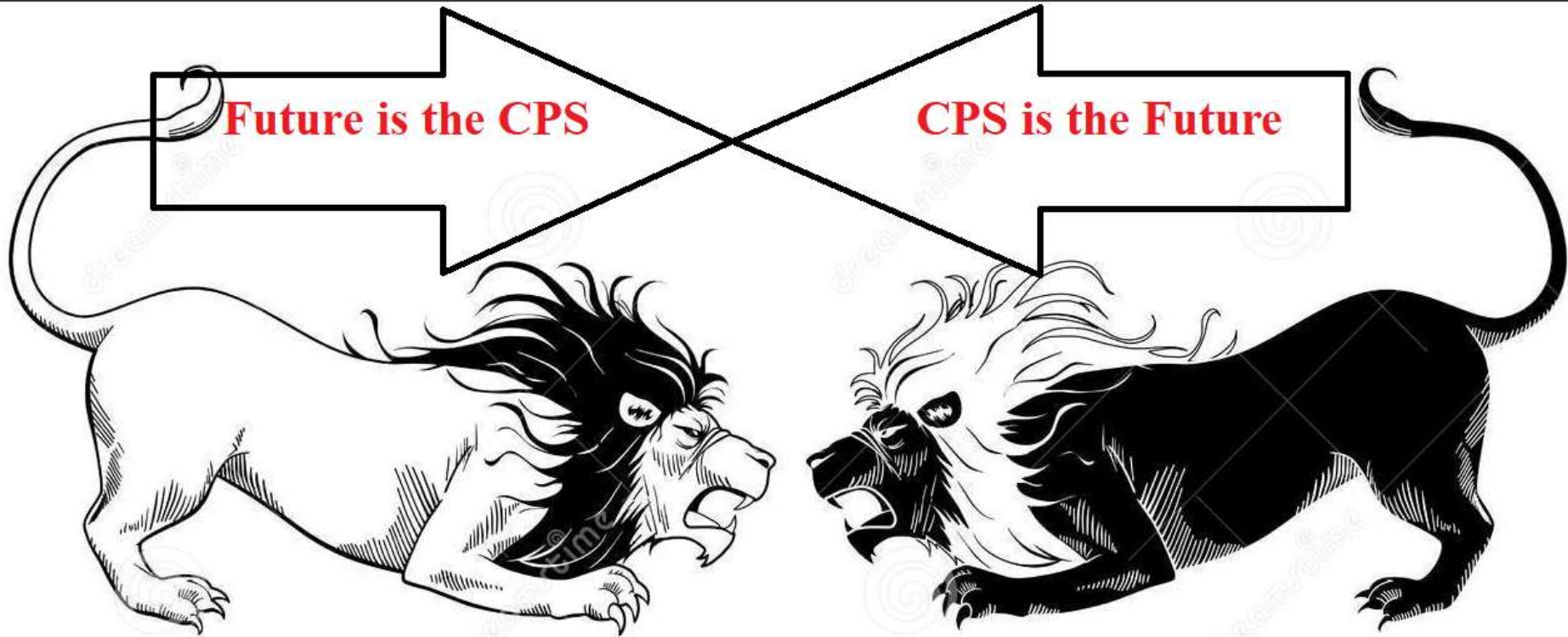
- **Cyber-Physical Systems (CPS)**
- **Cyber-Range (Hybrid Cyber-Range)**
- **Cyber-Security and Security of the Critical Infrastructures**

# Outline

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- **Cyber-Physical Systems**
- **Cyber-Range**
- **Italian System of Education**
- **Scholarship Opportunities for Masters/PhD**
- **Golden Proposal**
- **Conclusions**

# Cyber Physical System (CPS)



# Cyber Physical System (CPS)

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CYBER-PHYSICAL systems are the integration of **computation with physical processes.**



# Cyber Physical System (CPS)

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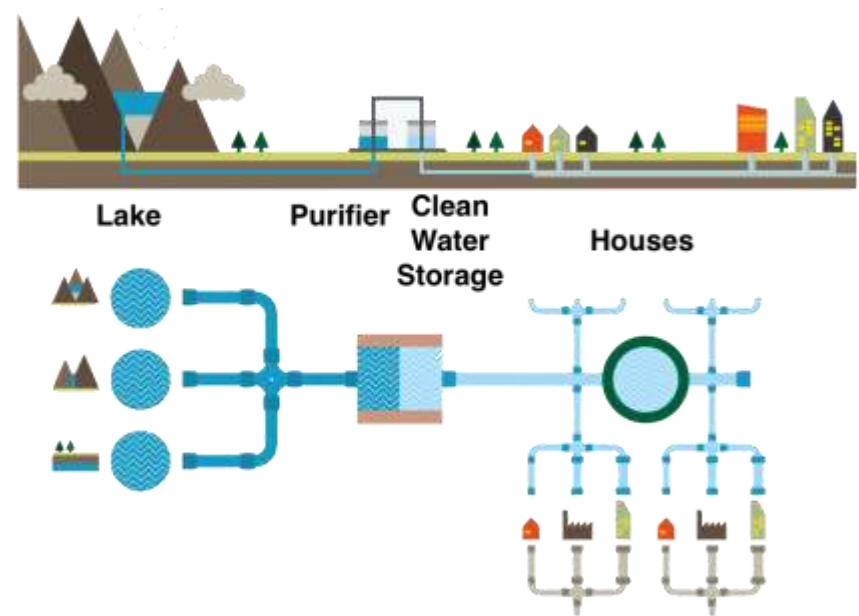
The term “cyber-physical systems” appeared in 2006 and become popular in 2010, first used by Helen Gill at the National Science Foundation in the US.

- *A CPS is a high-scale network system consisting of sensors, actuators, control processing units, and communication devices.*

# EVA – Emulator of Real Aqueduct

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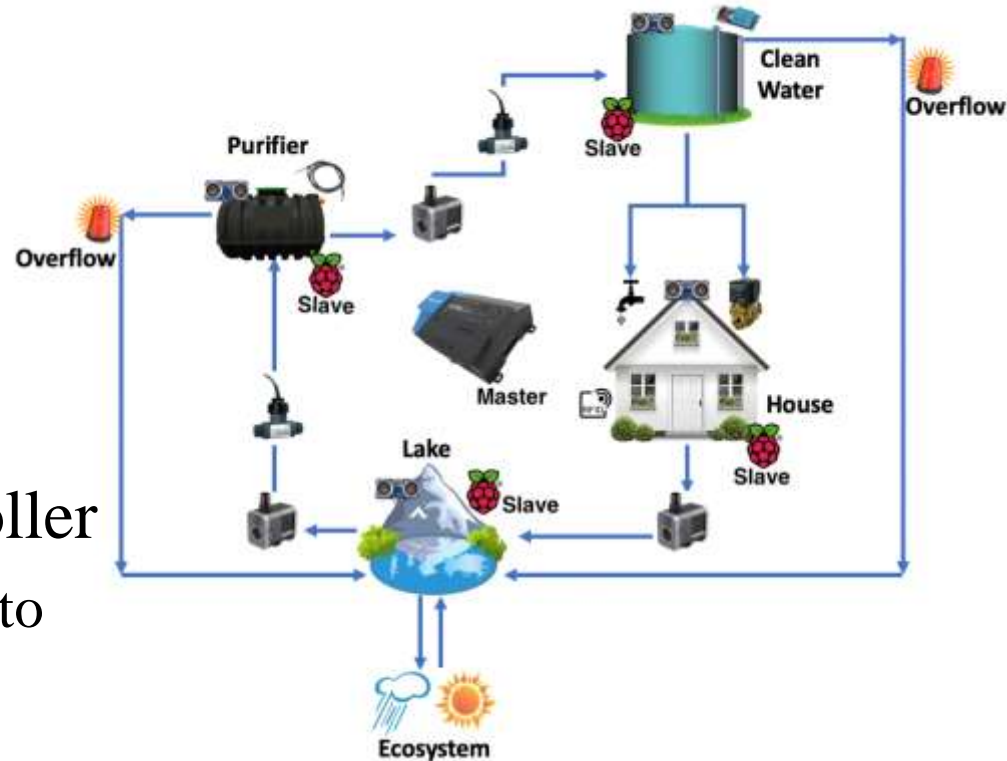
- **EVA** (*Emulatore di Vero Acquedotto* - Emulator of a Real Aqueduct) is a CPS representing a functioning model of a real Water Supply System (WSS).



# EVA - Implementation

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- Real SCADA controller
- Low cost components
  - Pumps
  - Sensors
  - Actuators
- Raspberry Pi as Slave Controller
  - Connects low cost components to SCADA using Modbus





# Cyber-Ranges

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- As in the flight simulator, Aircraft pilots and crew get trained to respond to complex situations in various flight scenarios without the risk to human life. Cyber Ranges provide a similar environment for students and security staff etc.



# Cyber-Ranges

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## ➤ **Why do we need Cyber-Ranges**

- Need to have a secure and isolated testbed for cybersecurity research;
- Training of cybersecurity experts;
- Design, development and testing of new cybersecurity tactics, techniques and procedures;
- Evaluation and Assessment of the defense capabilities of a system;

## ➤ **Types of Cyber-Ranges :**

- Virtual Cyber Ranges
- Physical Cyber Ranges
- **Hybrid Cyber-Ranges**

# Cyber-Ranges Teams Definition

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- **Red Team**
  - Attacks or compromise the simulated scenario
- **Blue Team**
  - Defend the simulated scenario
- **White Team**
  - Design and construct the scenario
- **Admin Team**
  - Supervise the entire cyber range, monitor the session and assign scores

# Italian Education System

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High School: 13 Years

Bachelors : 3 Years(180 ECTS)

Master : 2 years 120 ECTS

Doctorate/PhD: 3 or 4 years



# Enrollment in the university (Masters)

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Remember its very easy , you need only



A good Academic Record i.e. CGPA  
above (6/10) 60%.



Research Papers and IELTS, TOEFL is  
always a bonus.

# Tuition and Scholarships(Masters)

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## University Scholarship

- Merit-Based
- Amount varies from 500-700 per month
- less than 5 % of the students.

## Regional/state Scholarship

- Merit + Needy based
- Fee waiver
- Free Food twice in a day and Free-Place in Dormitory
- 200 euros per month

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# How to have and maintain Scholarships

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- **Duration of Scholarship : 2 years**
- **But But You need to pass at least half of the Courses of the first year i.e. at least 30 out of 60 credits should be acquired in the first year for having the benefits of the scholarship in the Second year**



# PhD/Doctorate Scholarships

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- **University scholarship**
- **Amount : 1100-1200 euros/month**
- **Number: 10-20 in every faculty**
- **Duration: 3 years**
- **Scholarship offered by Research Institutes**
- **Amount : 1200-1500 euros/month**
- **Number: 10-20 in every faculty**
- **Duration: 3-4 years**

# PhD/Doctorate Scholarships

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**Selection is based on your :**

- **Final marks of the Degree (CGPA) 50 %**
- **Research Activates , Research papers etc. 30-40 %**
- **0-10 % soft Skills**
- **GRE , IELTS and ToEFL is a huge bonus.**

# **Golden Proposal**

## **Competition of writing a research paper**

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➤ **Research Paper in the Domain of**  
**Cyber-physical Systems**

➤ **Awards for the best papers**

**1. First 200 euros**

**2. Second 100 euros**

**3. Third 50 euros**

**(AND summer internship in European universities)**

# Golden Proposal

## Competition of writing a research paper

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### Research Paper in any of the following Domains

- ❑ Cyber-physical Systems
- ❑ Modelling and Simulation of CPS
- ❑ Modelling Cyber-Attacks on the CPS
- ❑ Cyber-Ranges

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**Deadline : Sunday 11 October 2020.**

# Target Journal : First Prize

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- **IEEE Systems Journal: 4.463**
- **IEEE Transactions on Dependable and Secure Computing: 6.404**
- **IEEE Transactions on Information Forensics and Security: 6.211**
- **IEEE Transactions on Automatic Control: 6.2**

# Target Journal: 2<sup>nd</sup> Prize

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- **IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems: 1.203**
- **IEEE Access: 3.745**
- **Sciencedirect Journal: Computers & Security: 3.579**
- **Sciencedirect Journal: Journal of Information Security and Applications: 2.327**
- **IEEE Security & Privacy: 1.44**

# Target Conferences: 3<sup>rd</sup> Prize

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- **Euro-micro Conference on Real-Time Systems**
- **European Symposium On Research In Computer Security**
- **IEEE International Conference on Engineering of Complex Computer Systems**
- **Real Time Systems Symposium**





# Thank you for the attention!

