



UNIVERSITÀ DEGLI STUDI DI NAPOLI  
FEDERICO II

itee<sup>PhD</sup>  
information technology  
electrical engineering



# Vittorio Orbinato

## Next generation Cyber Range-as-a-service

Tutor: prof. Domenico Cotroneo

co-Tutor: prof. Roberto Natella

Cycle: XXXVI

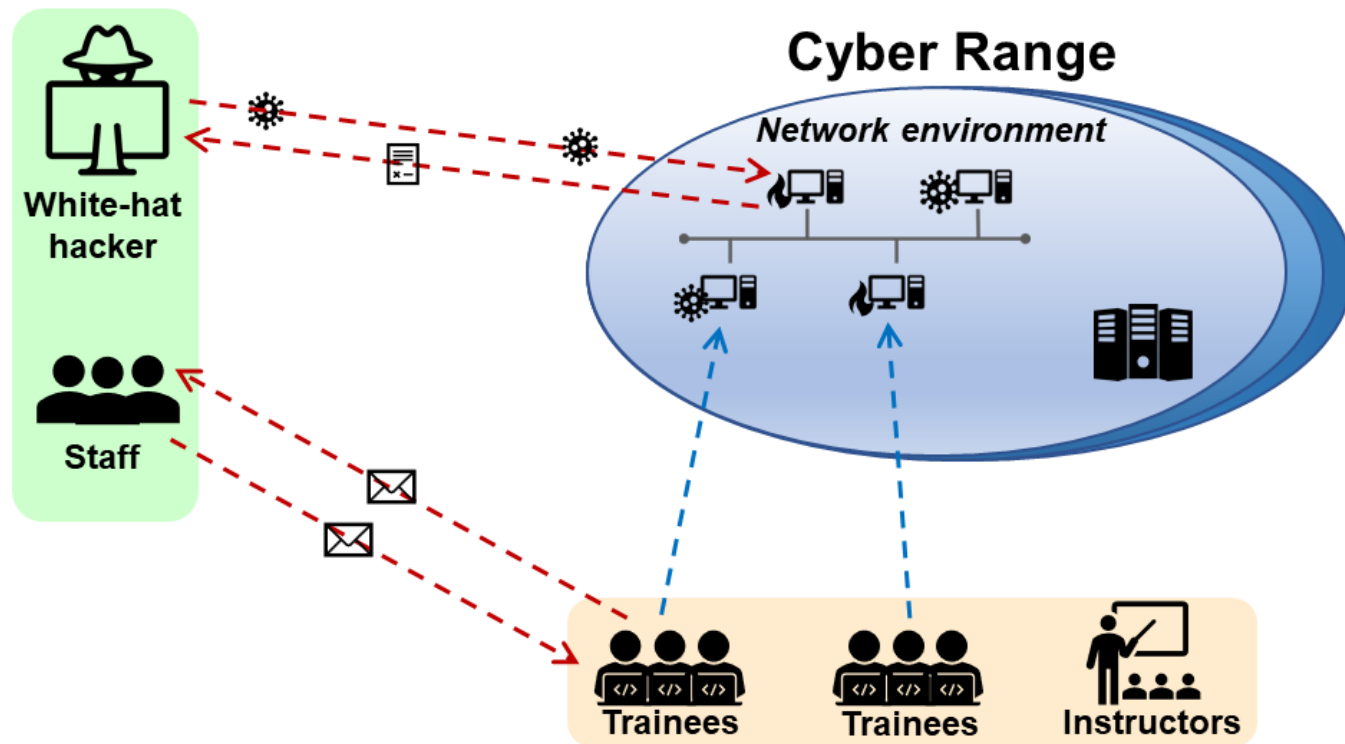
Year: First

# My background

- MSc degree in Computer Engineering (October 2020)
- Research group: DESSERT
- PhD start date: 01/11/2020
- Scholarship type: MUR (PON Ricerca e Innovazione 2014-2020 - “Dottorati innovativi con caratterizzazione industriale”)
- Partner company: System Management S.p.A

# Research field of interest

My research field concerns the **enhancement of training environments** for **cybersecurity professionals**, in particular **Cyber Ranges** which represent the most popular and widespread solution.



# Summary of study activities

- Ad hoc PhD courses/schools:
  - **5G International PhD School**
  - **Scientific programming and visualization with Python**
  - **Strategic Orientation for STEM Research & Writing**
- Courses borrowed from MSc curricula:
  - **Data Management**
  - **Intelligenza Artificiale**
- Conferences attended:
  - **32<sup>nd</sup> International Symposium on Software Reliability Engineering (ISSRE)**, Wuhan, China, October 25-28 2021 (virtual), *presenting author*

# Research activity: Overview (1/4)

- Problem

Nowadays, Cyber Ranges are characterized by high costs (time, money and resources) and low flexibility: they require a huge manual effort from the management staff to:

- Set up the infrastructure
- Configure the training environment
- Monitor and analyze the participants' activities
- Cover all the roles involved in a training exercise

# Research activity: Overview (2/4)

- Objective

The goal of my research is to define and develop new Cyber Range techniques which will be integrated into a next-generation platform. Such platform will allow to reduce all the related costs, simplify the setup and management and enhance the state-of-the-art Cyber Ranges.

This platform will simulate target infrastructures in a realistic way, provide highly detailed training scenarios, an automatic monitoring system and partially/fully automated training sessions.

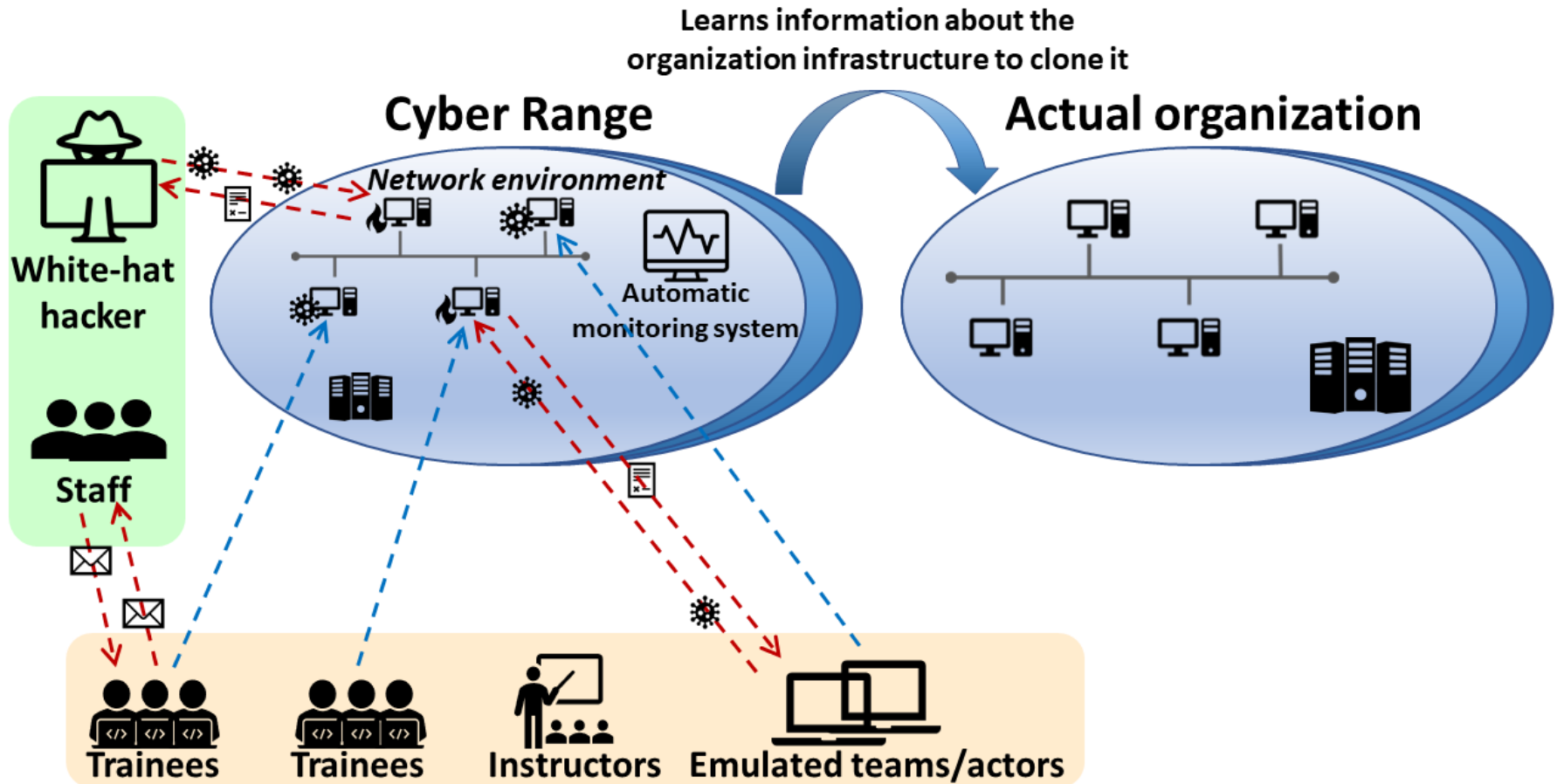
# Research activity: Overview (3/4)

- Methodology

The research activity will be organized in three phases:

- Definition and setup of a representative virtualized environment to replicate target infrastructures
- Development of a non-intrusive monitoring system, based on Virtual Machine Introspection (VMI) techniques
- Integration of AI techniques for actor simulation, to partially/fully automate the training exercises

# Research activity: Overview (4/4)





# Products

[C1]	Liguori, P.; Al-Hossami, E.; Orbinato, V.; Natella, R.; Shaikh, S.; Cotroneo, D.; Cukic, B. <i>“EVIL: Exploiting Software via Natural Language”</i> 32 <sup>nd</sup> International Symposium on Software Reliability Engineering, ISSRE 2021, 2021
[C2]	Orbinato, V. <i>“A next-generation platform for Cyber Range-as-a-Service”</i> 32 <sup>nd</sup> International Symposium on Software Reliability Engineering, ISSRE 2021, 2021

# Thank you for your attention

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