Thematic CERN School of Computing on Security 2023

Sunday, 8 October 2023 - Saturday, 14 October 2023
MedILS, Split, Croatia

Book of Abstracts
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Exam

Announcements
Summary:

Announcements
Summary:

Announcements
Summary:

Announcements
Summary:
Opening Session

Corresponding Author: alberto.pace@cern.ch

Summary:

Closing Session

Corresponding Author: alberto.pace@cern.ch

Summary:

Student lightning talks

Authors: Björn Leder\textsuperscript{1}; Jack Henschel\textsuperscript{2}; Jeny Lucia Teheran Sierra\textsuperscript{none}; Brice Copy\textsuperscript{2}; Luca Giommi\textsuperscript{3}; Pau Cutrina Vilalta\textsuperscript{2}; Andrei Dumitru\textsuperscript{2}

\textsuperscript{1} Humboldt University Berlin, Physics Institute
\textsuperscript{2} CERN
\textsuperscript{3} Universita e INFN, Bologna (IT)

Corresponding Authors: leder@physik.hu-berlin.de, jack.henschel@cern.ch, jteheran@fnal.gov, brice.copy@cern.ch, luca.giommi@cern.ch, pau.cutrina@cern.ch, andrei.dumitru@cern.ch

Summary:

Guest lecture

Summary:

Special evening talk: Future of the Universe and of Humanity

Author: Ivica Puljak\textsuperscript{1}
Scientific and computing challenges in fundamental physics

Author: Ivica Puljak

In this introductory lecture we will review the big picture of modern science, with the emphasis on biggest questions and challenges in fundamental physics. Higgs physics, neutrino experiments, dark matter, dark energy, multi messenger astronomy, physics beyond the standard model, gravitational waves and other scientific wanders will be presented, connecting great theoretical ideas and modern experiments trying to test them. Computing is now established as the crucial part of any present and future experiments. We will review and discuss the biggest challenges in computing for the next decades, including traditional increase of data throughput, data volume and data complexity, but also other emerging concepts like quantum computing, machine learning and artificial intelligence.

Summary:

Self-presentation: 1 minute per person

Summary:

School photo

Summary:

Guest lecture: Why is Higgs still a star?

Author: Toni Sculac

Summary:
The discovery of the Higgs boson particle in 2012 was an astonishing triumph of high energy physics. In this talk I will try to convince you that precision measurements of the Higgs boson properties are a very exciting prospect. Not only it will lead to a better understanding of our Universe but it is also one of our best windows into the unknown.

Summary:

Welcome to the CERN School of Computing

Corresponding Author: alberto.pace@cern.ch

Announcements

Summary:

Photo contest

Author: Joelma Tolomeo

1 CERN

Corresponding Author: joelma.tolomeo@cern.ch

Summary:

Security in research and scientific computing

Corresponding Author: stefan.lueders@cern.ch

- computer security: past, present and future
- current risk landscape
- most common threats and attack vectors
- “why are we here?”

Summary:
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Security management

- security principles
- threat modeling, risk assessment, risk management
- security standards
- security policies
- the human factor, security culture

Summary:

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Security operations - lecture 1

Corresponding Author: sveng@nikhef.nl

- security operations: history, CERT vs. CSIRT
- CSIRT organisation and provided services
- preparations: asset management, security monitoring etc.
- incident response readiness
- lessons learned from past incidents

Summary:

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Security operations - lecture 2

Corresponding Author: sveng@nikhef.nl

- security operations: history, CERT vs. CSIRT
- CSIRT organisation and provided services
- preparations: asset management, security monitoring etc.
- incident response readiness
- lessons learned from past incidents

Summary:

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Identity, authentication, authorisation
Corresponding Author: tom.dack@cern.ch

- An introduction to the concepts of Identity, Authentication, and Authorization
- Authentication and authorisation for distributed research
- Methods for communicating authentication and authorization: Certificates, SAML, OAuth
- How these technologies fit within research infrastructures

Summary:

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Security architecture fundamentals

Security architecture fundamentals
- fundamental security principles
- develop skills to be a security architect
- how to design and provide secure computing infrastructure
- security standards and frameworks
- physical security
- network security: segmentation, firewalls, VPNs

Summary:

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Network design - exercise

Summary:

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Virtualisation and cloud security

Virtualisation and cloud security
- virtualisation security fundamentals
- cloud service models
- authentication and key management
- data security in the cloud
- DevSecOps
- security in private and public cloud
- common threats in the cloud
- security tools

Summary:

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Container security
Corresponding Author: kouril@ics.muni.cz

- key concepts of containers (namespaces, cgroups etc.) and Docker
- container security, threat landscape
- vulnerability and patch management

Summary:

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Container security - exercises

Corresponding Author: kouril@ics.muni.cz

Summary:

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Risk and vulnerability management

Corresponding Author: sveng@nikhef.nl

- risk analysis and risk mitigation
- vulnerability lifecycle, monitoring, scanning
- CVE, CVSS, CPE, CWE and related standards
- special cases: vulnerable hardware, EOL systems etc.

Summary:

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Introduction to web penetration testing

Corresponding Author: sebastian.lopienski@cern.ch

- web application security, typical web vulnerabilities
- ethical hacking
- introduction to pentesting

Summary:

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Penetration testing - exercises

Corresponding Author: sebastian.lopienski@cern.ch

Summary:

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Logging and traceability

Corresponding Author: david.crooks@cern.ch

- host-based logs (system and application level), network monitoring
- the importance of central logging
- tools and technologies
- data privacy, dealing with personal and sensitive data, log retention
- traceability challenges

Summary:

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Intrusion detection with SOC: threat intelligence, monitoring, integration and processes

Corresponding Author: david.crooks@cern.ch

- indicators of compromise (IoCs), threat intelligence sharing, TLP protocol
- tools and technologies: MISP, Zeek, OpenSearch etc.
- deploying a Security Operation Center
- security incidents: detecting and alerting

Summary:

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Intrusion detection with SOC: deployment and operation

Corresponding Author: david.crooks@cern.ch

- indicators of compromise (IoCs), threat intelligence sharing, TLP protocol
- tools and technologies: MISP, Zeek, OpenSearch etc.
- deploying a Security Operation Center
- security incidents: detecting and alerting
Summary:

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Intrusion detection with SOC and AAI - exercises

Corresponding Authors: tom.dack@cern.ch, david.crooks@cern.ch

- indicators of compromise, threat intelligence sharing, TLP protocol
- tools and technologies
- deploying a Security Operation Center
- detecting security incidents

Summary:

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Digital forensics: essentials and data acquisition

Corresponding Author: kouril@ics.muni.cz

digital evidence handling
data acquisition (live systems, storage etc.)
data analysis (OS, file system, network, executables etc.)
reporting

Summary:

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Digital forensics: data analysis

Corresponding Author: kouril@ics.muni.cz

Summary:

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Digital forensics - exercises

Corresponding Author: kouril@ics.muni.cz

Summary:

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Defensible security architecture: how to implement security principles

Author: Barbara Krašovec

1 IJS

- data security
- endpoint security: hardware, host, OS, BMC security, system hardening
- application security
- future security trends

Summary:

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Incident response management

Author: Barbara Krašovec

1 IJS

- incident management and coordination
- incident analysis and investigation
- communication with stakeholders
- containment and eradication
- recovery
- lessons learnt

Summary:

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Incident response - exercise

Corresponding Authors: romain.wartel@cern.ch, david.crooks@cern.ch, tom.dack@cern.ch, sebastian.lopienski@cern.ch

- incident management and coordination
- Sirtfi and trust frameworks
- communication with local users, external communities, and other stakeholders
- working with law enforcement
- privacy aspects

Summary:

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Penetration testing - exercise debriefing
Corresponding Author: sebastian.lopienski@cern.ch

Summary:

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Special evening talk: Ransomware - and much more! TBC

This is not about ransomware. It's about (double) extortion!

Summary:

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Introduction to forensics - exercises

Corresponding Author: daniel.kouril@cesnet.cz

Summary:

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Study time

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Study time and/or daily sports

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Study time and/or daily sports

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Study time and/or daily sports