



## Roberto Carbone

### WORK EXPERIENCE

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#### Head of the Security & Trust Research Unit

*Cybersecurity Research Center, Fondazione Bruno Kessler* [ 01/2021 – Current ]

City: Trento

Country: Italy

#### Researcher

*Fondazione Bruno Kessler* [ 11/2010 – Current ]

City: Trento

Country: Italy

#### Visiting Scholar

*Department of Computer Science at the University of Pittsburgh* [ 09/2017 – 12/2017 ]

City: Pennsylvania

Country: United States

Collaboration with Professor Adam J. Lee. The main research topic concerned the domain of cryptographically enforcing dynamic access control policies in the Cloud.

#### Researcher Associate

*Dipartimento di Informatica, Sistemistica e Telematica (DIST), University of Genova* [ 2009 – 2010 ]

City: Genova

Country: Italy

### EDUCATION AND TRAINING

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#### Ph.D. in Electronic and Computer Engineering and Telecommunications (Dottore di Ricerca in "Ingegneria Elettronica, Informatica e delle Telecomunicazioni")

*University of Genova* [ 04/2009 ]

Country: Italy

Field(s) of study: Information and Communication Technologies

Level in EQF: EQF level 8

#### Professional qualification in Engineering. (Esame di stato per l'abilitazione alla professione di Ingegnere.)

[ 2006 ]

Country: Italy

#### MSc in Computer Engineering

*Faculty of Engineering, University of Genova* [ 2005 ]

Country: Italy

Field(s) of study: Engineering | Information and Communication Technologies

## **PUBLICATIONS**

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### **Selection of recent journal publications:**

#### **[An Automated Multi-Layered Methodology to Assist the Secure and Risk-Aware Design of Multi-Factor Authentication Protocols](#)**

[2023]

M. Pernpruner, R. Carbone, G. Sciarretta and S. Ranise, *An Automated Multi-Layered Methodology to Assist the Secure and Risk-Aware Design of Multi-Factor Authentication Protocols*, in *IEEE Transactions on Dependable and Secure Computing*, doi: 10.1109/TDSC.2023.3296210

#### **[The eIDAS Regulation: A Survey of Technological Trends for European Electronic Identity Schemes](#)**

[2022]

A. Sharif, M. Ranzi, R. Carbone, G. Sciarretta, F. A. Marino, S. Ranise (2022). *The eIDAS Regulation: A Survey of Technological Trends for European Electronic Identity Schemes*. APPLIED SCIENCES, vol. 12, ISSN: 2076-3417, doi: 10.3390/app122412679

#### **[Formal Modelling and Automated Trade-off Analysis of Enforcement Architectures for Cryptographic Access Control in the Cloud](#)**

[2022]

S. Berlato, R. Carbone, A. J. Lee, S. Ranise. *Formal Modelling and Automated Trade-off Analysis of Enforcement Architectures for Cryptographic Access Control in the Cloud*. ACM Trans. Priv. Secur. 25(1): 2:1-2:37 (2022), doi: 10.1145/3474056.

#### **[Best current practices for OAuth/OIDC Native Apps: A study of their adoption in popular providers and top-ranked Android clients](#)**

[2022]

A. Sharif, R. Carbone, G. Sciarretta, S. Ranise (2022). *Best current practices for OAuth/OIDC Native Apps: A study of their adoption in popular providers and top-ranked Android clients*. JOURNAL OF INFORMATION SECURITY AND APPLICATIONS, vol. 65, ISSN: 2214-2126, doi: 10.1016/j.jisa.2021.103097

#### **[Safety-Related Cooperative, Connected, and Automated Mobility Services: Interplay Between Functional and Security Requirements](#)**

[2021]

M. Centenaro, S. Berlato, R. Carbone, G. Burzio, G. Faranda Cordella, R. Riggio, S. Ranise. *Safety-Related Cooperative, Connected, and Automated Mobility Services: Interplay Between Functional and Security Requirements*. IEEE Veh. Technol. Mag. 16(4): 78-88 (2021), doi: [10.1109/MVT.2021.3089144](https://doi.org/10.1109/MVT.2021.3089144).

#### **[A survey on multi-factor authentication for online banking in the wild](#)**

[2020]

F. Sinigaglia, R. Carbone, G. Costa, and N. Zannone. *A survey on multi-factor authentication for online banking in the wild*. In: *Comput. Secur.* 95 (2020), doi: 10.1016/j.cose.2020.101745.

#### **[Formal Analysis of Mobile Multi-Factor Authentication with Single Sign-On Login](#)**

[2020]

G. Sciarretta, R. Carbone, S. Ranise, L. Viganò. *Formal Analysis of Mobile Multi-Factor Authentication with Single Sign-On Login*. ACM Transactions on Privacy and Security (TOPS), 23(3): 2020, doi: [10.1145/3386685](https://doi.org/10.1145/3386685).

#### **[Micro-Id-Gym: Identity Management Workouts with Container-Based Microservices](#)**

[2019]

A. Bisegna, R. Carbone, I. Martini, V. Odorizzi, G. Pellizzari, and S. Ranise. *Micro-Id-Gym: Identity Management Workouts with Container-Based Microservices*. In: *International Journal of Information Security and Cybercrime* 8 (2019), pp. 45–50, doi: 10.19107/IJISC.2019.01.06.

## Proceedings of the 28th ACM Symposium on Access Control Models and Technologies, SACMAT 2023

[2023]

S. Ranise, R. Carbone, D. Takabi

*Proceedings of the 28th ACM Symposium on Access Control Models and Technologies, SACMAT 2023, Trento, Italy, June 7-9, 2023. ACM 2023, doi: 10.1145/3589608*

### Link to all publications

ORCID ID: <https://orcid.org/0000-0003-2853-4269>

## **PROJECTS**

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### **Some recent projects and collaborations:**

#### **SERICS – Security and Rights in CyberSpace**

[ 01/01/2023 – Current ]

The Foundation's main purpose is scientific and technological research and, in this perspective, it is established to be the implementing entity of the extended Partnership "SERICS - Security and Rights in CyberSpace" - *as part of the National Recovery and Resilience Plan, Mission 4 "Education and Research" - Component 2 "From Research to Enterprise" - Investment 1. 3, funded by the European Union - NextGenerationEU - Notice No. 341 of 15.3.2022 (hereinafter Public Notice). – Avviso nr. 341 del 15.3.2022*

Involved in 2 projects in SERICS:

- Securing Containers (SecCo) of spoke 4 (responsible of the Work Package 2 about the "Compliance Verification of Container Deployments")
- Secure and TRaceable Identities in Distributed Environments (STRIDE) of the spoke 5

<https://serics.eu/>

#### **POTENTIAL - PiLOTs for European digiTal Identity wALlet**

[ 01/04/2023 – Current ]

Co-lead by France and Germany, POTENTIAL is one of the four large-scale pilots selected by the Commission to experiment digital identity through Europe.

Co-funded by the European Union

<https://www.digital-identity-wallet.eu/>

Role: Technical Expert for FBK (beneficiary of the project).

#### **JuLIA - Justice, fundamentalL rIghts and Artificial intelligence**

[ 01/02/2023 – Current ]

Call: JUST-2021-JTRA (Call for proposals for action grants to support transnational projects on judicial training covering civil law, criminal law or fundamental rights)

Topic: JUST-2021-JTRA, Type of Action: JUST-PJG, Proposal number: 101046631, Proposal acronym: JuLIA

Type of Model Grant Agreement: JUST Action Grant Budget-Based

Role: responsible for FBK

<https://www.julia-project.eu/>

## **Futuro & Conoscenza Srl**

[ 2020 – 2023 ]

**Futuro & Conoscenza Srl:** a company jointly created by *Poligrafico e Zecca dello Stato Italiano* (IPZS - the Italian State Mint and Polygraphic Institute) and FBK with the purpose of setting up a partnership dedicated to research and innovation activities being developed according to an in-house organizational model, aimed at creating a center of permanent competence specializing in the field of identification and anti-counterfeiting related security technologies (both material and digital). The Cybersecurity Research Center of FBK is currently involved in a number of projects aiming at proposing innovative solutions based on the Italian digital identity (e.g., OpenID Connect, self-sovereign identity, e-wallet).

## **SPARTA (H2020, ID: 830892)**

[ 2021 ]

SPARTA (H2020, ID: 830892): Strategic programs for advanced research and technology in Europe aimed to create a long-lasting community capable of collaboration to define, develop, share, and evolve solutions that will help practitioners prevent cybercrime and enhance cybersecurity. FBK had been involved as an institution of CINI (partner of SPARTA) and contributed for the specification of the privacy aspects related to GDPR and as responsible for the e-government vertical.

## **5G CARMEN (H2020)**

[ 2021 ]

5G CARMEN: 5G for Connected and Automated Road Mobility in the European Union.

## **Joint Lab with IPZS**

[ 2017 – 2020 ]

In a Joint Lab with IPZS, FBK designed innovative national digital identity management solutions based on the Italian electronic identity card (CIE 3.0), allowing citizens to authenticate, with a high level of assurance, on the mobile phone or on a desktop computer. Some of these solutions had already been notified to the European Commission, according to the electronic IDentification Authentication and Signature (eIDAS) regulation.

## **Joint Lab with Poste Italiane**

[ 2017 ]

In a Joint Lab with Poste Italiane, FBK contributed to secure the SPID infrastructure offered by Poste Italiane as a SPID identity provider.

## **Teichos**

[ 2019 ]

Teichos: Technical Environment for Intelligent Cyber Operational Security (in the context of the EIT Digital activities 2019). I contributed by developing security analyses tools for the pentesting of web applications.

## **API Assistant 2**

[ 2019 ]

API Assistant 2: (in the context of the EIT Digital activities 2019). This is a follow-up of API Assistant, and I contributed with Amir Sharif by extending the Android Studio plugin for SSO solutions, and providing a tool to detect logical vulnerabilities in OAuth/OpenID Connect-based mobile native applications.

## **API Assistant**

[ 2018 ]

API Assistant: Automated Security Assessment of 3rd party apps for the API economy (in the context of the EIT Digital activities 2018). This activity created an assistant for mobile app developers capable of rising Cyber Security awareness and mitigating threats in API-based mobile apps by offering a toolkit for code hardening against known security problems and a managed security service for testing, analysis, and compliance.

Role: leader of the "Digital health Business case" task.

## SECENTIS

[ 03/2013 – 03/2017 ]

SECENTIS: a European Industrial Doctorate on Security and Trust of Next Generation Enterprise Information Systems. <http://www.secentis.eu/>

Role: Academic supervisor of Avinash Sudhodanan (Luca Compagna, SAP research, industrial supervisor)

<https://st.fbk.eu/projects/SECENTIS>

## HONOURS AND AWARDS

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**The PhD Thesis, titled “LTL Model-Checking for Security Protocols”, has been awarded the CLUSIT prize 2010**

CLUSIT, Italian Association for Information Security. [ 2010 ]

**Best paper: "SoK: A Survey on Technological Trends for (pre)Notified eIDAS Electronic Identity Schemes"**

[ 2022 ]

Authors: Amir Sharif, Matteo Ranzi, Roberto Carbone, Giada Sciarretta, and Silvio Ranise

at the “17th International Workshop on Frontiers in Availability, Reliability and Security (FARES 2022)

## PATENT

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**US Patent Filed, Invention Title: Dynamic Analysis Security Testing of Multi-Party Web Applications via Attack Patterns. Inventors: A. Armando, R. Carbone, L. Compagna, A. Sudhodanan.**

[ 2015 ]

Filing Information: Country: United States of America, Application No: 16 Oct 2015, Patent ID: 14/885,001, Reference No: 83111010, Status: 150880US01

## ACADEMIC ACTIVITY

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**(Co-)Supervision of 6 PhD students and more than 20 bachelor and master students.**

**Lecturer of the Doctoral Course "Digital identity: enrollment, authentication, and all that"**

[ 2021 – 2023 ]

(with G. Sciarretta and S. Ranise) at the University of Trento and Genova - July 2021 and April 2022

2023 Cryptography and Codes: enrollment, authentication, authorization, and all that

[https://st.fbk.eu/teaching/PhDCourse2023\\_IdM](https://st.fbk.eu/teaching/PhDCourse2023_IdM)

2022 "Digital identity: enrollment, authentication, and all that"

[https://st.fbk.eu/teaching/PhDCourse2022\\_IdM](https://st.fbk.eu/teaching/PhDCourse2022_IdM)

2021 "Digital identity: enrollment, authentication, and all that"

[https://st.fbk.eu/teaching/PhDCourse2021\\_IdM](https://st.fbk.eu/teaching/PhDCourse2021_IdM)

**Lecturer for the “Master Universitario di II livello” in Cyber Security and Data Protection / Critical Infrastructure Protection of the University of Genova**

[ 2015 – 2023 ]

<https://www.perform.unige.it/master/master-cyber-security>

**Teaching Activity: Corso ITS: "TECNICO SUPERIORE PER L'INDUSTRIA CYBER SECURITY - PADOVA"**

[ 2021 – 2022 ]

Docenza in UF 8-CYBERSECURITY- Defensive Security (7hrs).

## **Lecturer of the CyberChallenge.IT for the University of Trento**

[ 2020 – 2022 ]

## **Lecturer for the Doctoral Course on Security Threat Identification and Testing**

[ 2014 ]

in the context of the Doctoral School in Information and Communication Technology of the University of Trento, organized in collaboration with the Center for Information Technology of the Bruno Kessler Foundation (FBK) and EIT ICT Labs.

## **Invited talk on the SAT-based Model Checker SATMC, 13th International School on Foundations of Security Analysis and Design (FOSAD'13)**

[ 04/09/2013 ]

Bertinoro, Italy.

<http://www.sti.uniurb.it/events/fosad13/Programme.html>

## **Teaching Assistant for the Computer Security course**

[ 2005 – 2009 ]

Academic Years 2005/2006, 2006/2007, 2007/2008, and 2008/2009: Teaching Assistant for the

Computer Security course taught by Prof. A. Armando at the CS Engineering Faculty of the University of Genova.

Academic Year 2009/2010: Teaching Assistant for the Operating Systems and Computer Security course taught by Prof. A. Armando at the CS Engineering Faculty of the University of Genova.

2008: Teaching Assistant for the module "Sicurezza delle reti" of the Master Universitario Integrato di II livello Tecnologie Avanzate per Sistemi Intelligenti Integrati.

## **MEMBERSHIP**

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### **Program Co-Chair of the ACM Symposium on Access Control Models and Technologies (SACMAT) 2023**

[ 07/06/2023 – 09/06/2023 ]

**The ACM Symposium on Access Control Models and Technologies (SACMAT)** is the premier forum for the presentation of research results and experience reports on leading edge issues of access control, including models, systems, applications, and theory.

<https://sacmat2023.fbk.eu/officers.php>

### **Member of the Organizing Committee of the first International Workshop on Trends in Digital Identity (TDI 2023)**

[ 06/06/2023 ]

co-located with SACMAT 2023

<https://st.fbk.eu/events/TDI2023/committees>

### **Member of the board of the PhD program on Security, Risk and Vulnerability**

[ 2020 – Current ]

(Curriculum: Cybersecurity and Reliable Artificial Intelligence), University of Genova.

<https://sicurezza.unige.net/people/phd-board>

### **Member of the Editorial Board in "Frontiers in Computer Science"**

[ 2013 – Current ]

as a review editor (2014-2020) and as Associate Editor in Computer and Network Security (2020-2022).

<https://www.frontiersin.org/journals/computer-science/sections/computer-security>

**Member of the Technical Program committees of SECURWARE 2018-2021, SHPCS 2018, SHPCS 2019, SACMAT 2019, SACMAT 2020, SACMAT 2021, FedCSIS 2022, FedCSIS 2023, track on Security, Privacy, and Trust at TheWebConf 2023 (formerly known as WWW)**

[ 2017 - Current ]

**Member of the Demos track committee of the Italian Conference on Cybersecurity (ITASEC17, ITASEC18, ITASEC19)**

[ 2016 - 2019 ]

**Co-Chair of the third OAuth Security Workshop 2018**

[ 14/03/2018 - 16/03/2018 ]

<https://st.fbk.eu/events/OSW2018/index.html>

**Local organization chair of DBSec 2016**

[ 18/07/2016 - 20/07/2016 ]

the 30th Annual IFIP WG 11.3 Conference on Data and Applications Security and Privacy (DBSec 2016).

<https://web.archive.org/web/20160818161513/http://dbsec2016.fbk.eu/speaker>

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*According to law 679/2016 of the Regulation of the European Parliament of 27th April 2016, I hereby express my consent to process and use my data provided in this CV.*

Trento, 11/12/2023

Roberto Carbone