

# Marco Guarnieri

Campus Montegancedo UPM, Pozuelo de Alarcón, 28223, Madrid, Spain

☎ (+34) 91-101-2202 ext 4320 | ✉ marco.guarnieri@imdea.org | 🌐 <https://mguarnieri.github.io>

## Summary

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**Academic career:** I am an Associate Research Professor at IMDEA Software (Spain), which I joined as a postdoctoral researcher in July 2018. Before that, I completed a PhD in the Information Security group at ETH Zurich (Switzerland).

**Research summary:** My research focuses on developing tools and techniques for designing systems with precise security guarantees. During my PhD, I focused on securing database systems. Since joining IMDEA Software, I have focused on building foundations and tools for reasoning about security at the hardware-software boundary and, in particular, on microarchitectural attacks and defenses.

**Awards:** For my research on formal models for microarchitectural leaks, I received a best paper award at the IEEE Symposium on Security and Privacy 2021, distinguished paper awards at the ACM Conference on Computer and Communication Security (editions 2022, 2023, and 2024), and an Intel Outstanding Researcher award (awarded by Intel to “leading worldwide academic researchers conducting Intel university-sponsored research”). I also received a “Ramon y Cajal” and a “Juan de la Cierva” fellowships, the two most prestigious fellowships for early-career researchers in Spain.

**Funding and projects:** Overall, I have attracted funding for more than 1M\$. I have been a PI in the HascoSec (2021-2024; 300K\$) and in the “Information Flow Tracking across the Hardware-Software Boundary” (2018-2021; 495K\$) projects funded by Intel Corp. I have also been involved as a researcher in several regional, national, and European projects.

**Scientific service (selection):** I have served/am serving on the program committee of top-tier security venues like the IEEE Symposium on Security and Privacy, the ACM Conference on Computer and Communication Security, the Usenix Security Symposium, and the IEEE Computer Security Foundations Symposium. I am serving as Program Vice Co-Chair for Usenix Security 2025. I also served as program chair for the Workshop on Principles of Secure Compilation and the Workshop on Programming Languages and Analysis for Security.

### Selected publications:

**Marco Guarnieri**, Boris Köpf, Jan Reineke, Pepe Vila

#### Hardware-Software Contracts for Secure Speculation

In: 42nd IEEE Symposium on Security and Privacy (S&P 2021), Best paper award

*Motivation:* The paper introduces *speculation contracts*: ISA-level formal specifications capturing a processor’s security guarantees in a simple, mechanism-independent manner. The paper precisely formalizes under which conditions a processor satisfies a speculation contract and it provides program-level properties formalizing how to leverage a contract’s hardware guarantees to achieve global, end-to-end security. The paper also presents the first rigorous proofs of security for a large class of state-of-the-art hardware-level mechanisms for secure speculation.

**Marco Guarnieri**, Boris Köpf, José F. Morales, Jan Reineke, Andrés Sánchez

#### SPECTECTOR: Principled Detection of Speculative Information Flows

In: 41st IEEE Symposium on Security and Privacy (S&P 2020)

*Motivation:* The paper introduces speculative non-interference, the first semantic characterization of security against speculative execution attacks. This notion, which compares program leakage under different program semantics (*with* and *without* speculative execution), has been adopted and extended by several follow-up works, and the paper is the most cited one on the topic of program analyses for speculative leaks. This paper also presents the first program analysis (implemented in the SPECTECTOR tool) for proving the absence of speculative leaks.

Zilong Wang, Gideon Mohr, Klaus von Gleissenthall, Jan Reineke, **Marco Guarnieri**

#### Specification and Verification of Side-channel Security for Open Source Processors via Leakage Contracts

In: 30th ACM Conference on Computer and Communications Security (CCS 2023), Distinguished paper award

*Motivation:* The paper presents the first approach for automatically verifying the soundness of timing leakage models against RTL processor designs. This resulted in the first automated proofs of soundness for timing leakage models and RTL processors, in particular for the Ibex processor (an in-order 3-stage RISC-V processor for embedded applications).

Xaver Fabian, **Marco Guarnieri**, Marco Patrignani

#### Automatic Detection of Speculative Execution Combinations

In: 29th ACM Conference on Computer and Communications Security (CCS 2022), Distinguished paper award

*Motivation:* The paper develops a framework for composing speculative semantics capturing speculation due to different mechanisms and implements it as part of the SPECTECTOR program analysis tool. The framework allows defining each speculative semantics independently (thus leading to simpler semantics) and deriving SPECTECTOR’s soundness w.r.t. the composed semantics from soundness w.r.t. each component (thus maximizing proof reuse).

# Education

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## ETH Zurich

PHD IN COMPUTER SCIENCE

Advisor: Prof. David Basin

Zurich, Switzerland

Oct. 2012 - Jan. 2018

## Università degli Studi di Bergamo

MASTER OF SCIENCE IN COMPUTER ENGINEERING

Advisor: Prof. Stefano Paraboschi

Bergamo, Italy

Sep. 2010 - Jul. 2012

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

Advisor: Prof. Stefano Paraboschi

Sep. 2007 - Sep. 2010

# Professional Experience

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## IMDEA Software Institute

ASSOCIATE RESEARCH PROFESSOR

Research Areas: Security & Privacy, Information-flow control, Microarchitectural security

Madrid, Spain

Nov. 2024 - PRESENT

ASSISTANT RESEARCH PROFESSOR

Research Areas: Security & Privacy, Information-flow control, Microarchitectural security

Jun. 2019 - Oct. 2024

RESEARCHER

Research Areas: Security & Privacy, Information-flow control, Microarchitectural security

Apr. 2019 - May 2019

POSTDOCTORAL RESEARCHER

Research Areas: Security & Privacy, Information-flow control, Microarchitectural security

Jul. 2018 - Apr. 2019

## ETH Zurich

POSTDOCTORAL RESEARCHER

Research Areas: Security & privacy, Database security, Information-flow control

Zurich, Switzerland

Feb. 2018 - May 2018

RESEARCH ASSISTANT

Research Areas: Computer security, Databases, Access control

Oct. 2012 - Jan. 2018

## Università degli Studi di Bergamo

RESEARCH ASSISTANT

Research Areas: Access control, Model-driven engineering

Bergamo, Italy

Aug. 2012 - Sep. 2012

## SAP Labs France

R&D INTERN

Research Areas: Security, Static analysis

Sophia Antipolis, France

Jun. 2010 - Sep. 2010

# Conference and Workshop Publications

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2025

[1] Xaver Fabian, Marco Patrignani, **Marco Guarnieri**, Michael Backes

**Do You Even Lift? Strengthening Compiler Security Guarantees Against Spectre Attacks**

In: 52nd ACM SIGPLAN Symposium on Principles of Programming Languages (POPL 2025)

[2] Bo Fu, Leo Tenenbaum, David Adler, Assaf Klein, Arpit Gogia, Alaa R. Alameldeen, **Marco Guarnieri**, Mark Silberstein, Oleksii Oleksenko, Gururaj Saileshwar

**AMuLeT: Automated Design-Time Testing of Secure Speculation Countermeasures**

In: 30th ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2025)

2024

[3] Gilles Barthe, Marcel Böhme, Sunjay Cauligi, Chitchanok Chuengsatiansup, Daniel Genkin, **Marco Guarnieri**, David Mateos Romero, Peter Schwabe, David Wu, Yuval Yarom

**Testing side-channel security of cryptographic implementations against future microarchitectures**

In: 31st ACM Conference on Computer and Communications Security (CCS 2024)

Distinguished paper award

[4] Gideon Mohr, **Marco Guarnieri**, Jan Reineke

**Synthesizing Hardware-Software Leakage Contracts for RISC-V Open-Source Processors**

In: 27th Design, Automation and Test in Europe Conference and Exhibition (DATE 2024)

Best paper award Nomination

2023

[5] Zilong Wang, Gideon Mohr, Klaus von Gleissenthall, Jan Reineke, **Marco Guarnieri**  
**Specification and Verification of Side-channel Security for Open Source Processors via Leakage Contracts**  
In: *30th ACM Conference on Computer and Communications Security (CCS 2023)*  
Distinguished paper award, Intel Hardware Security Academic Award Finalist, CSAW Finalist

[6] Oleksi Oleksenko, **Marco Guarnieri**, Boris Köpf, Mark Silberstein  
**Hide and Seek with Spectres: Efficient discovery of speculative vulnerabilities with random testing**  
In: *44th IEEE Symposium on Security and Privacy (S&P 2023)*

2022

[7] Xaver Fabian, **Marco Guarnieri**, Marco Patrignani  
**Automatic Detection of Speculative Execution Combinations**  
In: *29th ACM Conference on Computer and Communications Security (CCS 2022)*  
Distinguished paper award

[8] Sankha Narayan Guria, Niki Vazou, **Marco Guarnieri**, James Parker  
**ANOSY: Approximated Knowledge Synthesis with Refinement Types for Declassification**  
In: *43rd ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2022)*

2021

[9] **Marco Guarnieri**, Boris Köpf, Jan Reineke, Pepe Vila  
**Hardware-Software Contracts for Secure Speculation**  
In: *42nd IEEE Symposium on Security and Privacy (S&P 2021)*  
Best paper award

[10] Marco Patrignani, **Marco Guarnieri**  
**Exorcising Spectres with Secure Compilers**  
In: *28th ACM Conference on Computer and Communications Security (CCS 2021)*

[11] Enrico Baxis, Dario Facchinetti, **Marco Guarnieri**, Marco Rosa, Matthew Rossi, Stefano Paraboschi  
**I Told You Tomorrow: Practical Time-Locked Secrets using Smart Contracts**  
In: *16th International Conference on Availability, Reliability and Security (ARES 2021)*

2020

[12] **Marco Guarnieri**, Boris Köpf, José F. Morales, Jan Reineke, Andrés Sánchez  
**SPECTECTOR: Principled Detection of Speculative Information Flows**  
In: *41st IEEE Symposium on Security and Privacy (S&P 2020)*

[13] Pepe Vila, Pierre Ganty, **Marco Guarnieri**, Boris Köpf  
**CacheQuery: Learning Replacement Policies from Hardware Caches**  
In: *41st ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2020)*

2019

[14] **Marco Guarnieri**, Musard Balliu, Daniel Schoepe, David Basin, Andrei Sabelfeld  
**Information-Flow Control for Database-backed Applications**  
In: *4th IEEE European Symposium on Security and Privacy (EuroS&P 2019)*

2017

[15] **Marco Guarnieri**, Srdjan Marinovic, and David Basin  
**Securing Databases from Probabilistic Inference**  
In: *30th IEEE Computer Security Foundations Symposium (CSF 2017)*

[16] **Marco Guarnieri**, Petar Tsankov, Tristan Buchs, Mohammad Torabi Dashti, and David Basin  
**Test Execution Checkpointing for Web Applications**  
In: *26th ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2017)*

[17] Martin Kucera, Petar Tsankov, Timon Gehr, **Marco Guarnieri**, and Martin Vechev  
**Synthesis of Permissive Privacy Enforcement**  
In: *24th ACM Conference on Computer and Communications Security (CCS 2017)*

2016

[18] **Marco Guarnieri**, Srdjan Marinovic, and David Basin  
**Strong and Provably Secure Database Access Control**  
In: *1st IEEE European Symposium on Security and Privacy (EuroS&P 2016)*

2014

[19] **Marco Guarnieri** and David Basin  
**Optimal Security-Aware Query Processing**  
In: *40th International Conference on Very Large Data Bases (VLDB 2014)*

2013

[20] Mario Arrigoni Neri, **Marco Guarnieri**, Eros Magri, Simone Mutti, and Stefano Paraboschi

**A Model-Driven Approach for Securing Software Architectures**

In: *10th International Conference on Security and Cryptography - Position Paper (Secrypt 2013)*

[21] **Marco Guarnieri**, Mario Arrigoni Neri, Eros Magri, and Simone Mutti

**On the Notion of Redundancy in Access Control Policies**

In: *18th ACM Symposium on Access Control Models and Technologies (SACMAT 2013)*

[22] Angelo Gargantini, **Marco Guarnieri**, and Eros Magri

**AURORA: AUTomatic ROBustness coveRage Analysis Tool**

In: *6th IEEE International Conference on Software Testing, Verification and Validation - Testing Tools Track (ICST 2013)*

2012

[23] Mario Arrigoni Neri, **Marco Guarnieri**, Eros Magri, Simone Mutti, and Stefano Paraboschi

**Conflict Detection in Security Policies using Semantic Web Technology**

In: *1st International IEEE-AESS Conference in Europe about Space and Satellite Telecommunications - Security Track (ESTEL 2012)*

[24] **Marco Guarnieri**, Eros Magri, and Simone Mutti

**Automated Management and Analysis of Security Policies using Eclipse**

In: *7th Italian Workshop on Eclipse Technologies (Eclipse-IT 2012)*

[25] Angelo Gargantini, **Marco Guarnieri**, and Eros Magri

**Extending Coverage Criteria by Evaluating their Robustness to Code Structure Changes**

In: *24th International Conference on Testing Software and Systems (ICTSS 2012)*

[26] Francesco Bolis, Angelo Gargantini, **Marco Guarnieri**, Eros Magri, and Lorenzo Musto

**Model-Driven Testing for Web Applications using Abstract State Machine**

In: *8th International Workshop on Model-Driven and Agile Engineering for the Web - Short Paper (MDWE 2012)*

[27] Francesco Bolis, Angelo Gargantini, **Marco Guarnieri**, and Eros Magri

**Evolutionary Testing of PHP Web Applications with WETT**

In: *4th International Symposium on Search-Based Software Engineering - Graduate Student Track (SSBSE 2012)*

[28] Gabriel Serme, Anderson Santana De Oliveira, **Marco Guarnieri**, and Paul El Khoury

**Towards Assisted Remediation of Security Vulnerabilities**

In: *6th International Conference on Emerging Security Information, Systems and Technologies (Securware 2012)*

Best paper award

[29] **Marco Guarnieri**, Eros Magri, Davide Brugali, and Luca Gherardi

**A Domain Specific Language for Modeling Differential Constraints of Mobile Robots**

In: *12th International Conference on Autonomous Robot Systems and Competitions (Robotica 2012)*

2011

[30] Angelo Gargantini, **Marco Guarnieri**, and Eros Magri

**An Eclipse based environment for conformance testing by FSMs**

In: *6th Italian Workshop on Eclipse Technologies (Eclipse-IT 2011)*

[31] **Marco Guarnieri**, Paul el Khoury, and Gabriel Serme

**Security vulnerabilities detection and protection using Eclipse**

In: *6th Italian Workshop on Eclipse Technologies (Eclipse-IT 2011)*

## Other Publications

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2017

Marco Guarnieri

**Formal Foundations for Access and Inference Control in Databases**

Doctoral thesis, Advisor: Prof. David Basin

ETH Zurich, Switzerland

2012

Marco Guarnieri and Eros Magri

**Techniques for Conflict Detection and Minimization for Access Control Policies**

Master thesis, Advisor: Prof. Stefano Paraboschi

Università degli Studi di Bergamo, Italy

2010

Marco Guarnieri and Eros Magri

**Sviluppo di un'applicazione Web-based sicura per il data outsourcing**

(*Development of a secure data outsourcing web application*)

Bachelor thesis, Advisor: Prof. Stefano Paraboschi

Università degli Studi di Bergamo, Italy

## Grants and Fellowships

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2022

**Ayudas Ramon y Cajal** (RYC2021-032614-I)

Granted to: **Marco Guarnieri**

Duration: 2023 – 2027

Amount: 236.350 €

Funding agency: Ministerio de Ciencia y Innovación

2021

**HascoSec: Principled security verification of processors using hardware-software contracts**

Principal Investigators: **Marco Guarnieri**, Jan Reineke

Duration: 2021 – 2024

Amount: 300.000 \$

Funding agency: Intel Corporation

**InferViz: Weighted Inference and Visualization of Insecure Code Paths** (Facebook research award: 2021 Privacy Enhancing Technologies)

Principal Investigators: Musard Balliu, **Marco Guarnieri**

Duration: 2021 – 2023

Amount: 100.000 \$

Funding agency: Facebook

2019

**Ayudas Juan de la Cierva - formación** (FJC2018-036513-I)

Granted to: **Marco Guarnieri**

Duration: 2020 – 2022

Amount: 60.416 €

Funding agency: Ministerio de Ciencia y Innovación

2018

**Intel Strategic Research Alliance: Information Flow Tracking across the Hardware-Software Boundary**

Principal Investigators: **Marco Guarnieri**, Jan Reineke, Boris Köpf

Duration: 2018 – 2021

Amount: 495.000 \$

Funding agency: Intel Corporation

**Ayudas para la atracción de talento investigador - modalidad 2** (2018-T2/TIC-11732)

Granted to: **Marco Guarnieri**

Duration: 2019 – 2023

Amount: 80.000 €

Funding agency: Comunidad de Madrid

## Honors & Awards

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- 2024 **Distinguished paper award**, 31st ACM Conference on Computer and Communications Security (CCS 2024)
- 2024 **Distinguished reviewer award**, 31st ACM Conference on Computer and Communications Security (CCS 2024)
- 2024 **Finalist**, Intel Hardware Security Academic Award 2023
- 2024 **Finalist**, CSAW 2024
- 2024 **Best paper award nomination**, 27th Design Automation and Test in Europe Conference and Exhibition (DATE 2024)
- 2023 **Distinguished paper award**, 30th ACM Conference on Computer and Communications Security (CCS 2023)
- 2023 **Top reviewer award**, 30th ACM Conference on Computer and Communications Security (CCS 2023)
- 2023 **Noteworthy reviewer award**, 32nd Usenix Security Symposium (SEC 2023)
- 2022 **Distinguished paper award**, 29th ACM Conference on Computer and Communications Security (CCS 2022)
- 2022 **Intel Outstanding Researcher Award**
- 2021 **Best paper award**, 42nd IEEE Symposium on Security and Privacy (S&P 2021)
- 2012 **Scholarship of Università degli Studi di Bergamo (best engineering student)**

## Talks

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2024

University of British Columbia

**Leakage contracts: A foundation for microarchitectural security**, Nov. 2024

31st ACM Conference on Computer and Communications Security (CCS 2024)

**Testing side-channel security of cryptographic implementations against future microarchitectures**, Oct. 2024

KU Leuven

**Leakage contracts: A foundation for microarchitectural security**, Oct. 2024

Intel Scalable Assurance workshop

**HascoSec: Past, Present, and Future**, Sep. 2024

ETH Zurich

**Leakage contracts: A foundation for microarchitectural security**, Sep. 2024

NII Shonan meeting No.215, “Microarchitectural Attacks and Defenses”

**Leakage contracts: A foundation for microarchitectural security**, Jun. 2024

2023

Intel Scalable Assurance workshop

**An update on the HascoSec project – verification**, Sep. 2023

Intel Scalable Assurance workshop

**An update on the HascoSec project – post-silicon fuzzing**, Sep. 2023

Workshop of Foundations of Computer Security (invited keynote)

**Principled foundations for microarchitectural security**, Jul. 2023

Intel Scalable Assurance workshop

**Hide and Seek with Spectres: Efficient discovery of speculative vulnerabilities with random testing**, May 2023

2022

Intel Scalable Assurance workshop

**Automatic Detection of Speculative Execution Combinations**, Sep. 2022

Journées nationales du GDR Sécurité (invited talk)

**Principled foundations for microarchitectural security**, Jun. 2022

4th SILM workshop on the Security of Software/Hardware Interfaces (invited talk)

**Principled foundations for microarchitectural security**, Jun. 2022

HackOn – Ciberseguridad @ Universidad Rey Juan Carlos (invited talk)

**An overview of cache side-channel attacks**, Feb. 2022

2021

Universidad Complutense de Madrid

**Hardware-software security contracts - Principled foundations for building secure microarchitectures**, Dec. 2021

Dagstuhl Seminar 21481 - Secure Compilation

**Contract-aware secure compilation**, Dec. 2021

Dagstuhl Seminar 21442 - Ensuring the Reliability and Robustness of Database Management Systems

**Database security: Formalization, verification, and testing – Challenges and open questions**, Nov. 2021

Intel Side-channel Academic Program Workshop

**Hardware-Software Security Contracts - Principled Foundations for Building Secure Speculation Mechanisms**, Nov. 2021

Dagstuhl Seminar 21442 – Ensuring the Reliability and Robustness of Database Management Systems

**Database security: Formalization, verification, and testing – Challenges and open questions**, Nov. 2021

Intel Scalable Assurance Cluster Kickoff

**HascoSec: Principled security verification of processors using hardware-software contracts**, Oct. 2021

University of Illinois at Urbana Champaign, Hardware Security reading group

**Hardware-Software Contracts for Secure Speculation**, Jun. 2021

42nd IEEE Symposium on Security and Privacy (S&P 2021)

**Hardware-Software Contracts for Secure Speculation**, May 2021

Workshop on Principles of Secure Compilation (PriSC 2021)

**Contract-aware secure compilation** (short talk), Jan. 2021

2020

ETH Zurich, Invited lecture at Hardware Security course (D-ITET)

**SPECTECTOR: Principled detection of speculative information flows**, Nov. 2020

Intel Side-channel Academic Program Workshop

**Hardware-Software Contracts for Secure Speculation**, Sep. 2020

Intel Side-channel Academic Program Tech Talk

**Hardware-Software Contracts for Secure Speculation**, Jul. 2020

41st IEEE Symposium on Security and Privacy (S&P 2020)

**SPECTECTOR: Principled detection of speculative information flows**, May 2020

Microsoft Research Cambridge, Programming Language Seminar

**CacheQuery: Learning Replacement Policies from Hardware Caches**, Feb. 2020

Italian Conference on CyberSecurity (ITASEC 2020)

**SPECTECTOR: Principled detection of speculative information flows**, Feb. 2020

Workshop on Principles of Secure Compilation (PriSC 2020)

**Exorcising Spectres with Secure Compilers**, Jan. 2020

2019

Microsoft Research Cambridge, Programming Language Seminar

**SPECTECTOR: Principled detection of speculative information flows**, Nov. 2019

Workshop on Foundations of Computer Security 2019 (FCS 2019)

**SPECTECTOR: Principled detection of speculative information flows**, Jun. 2019

4th IEEE European Symposium on Security and Privacy (EuroS&P 2019)

**Information-Flow Control for Database-backed Applications**, Jun. 2019

2nd International workshop on the use of theorem provers for modelling and verification at the hardware-software interface (ENTROPY 2019)

**SPECTECTOR: Principled detection of speculative information flows**, Jun. 2019

Intel Side Channel Academic Program Workshop

**SPECTECTOR: Principled detection of speculative information flows**, Jun. 2019

Ruhr-Universität Bochum

**Principled detection of speculative information flows**, Mar. 2019

2018

CISPA – Helmholtz Center

**Formal foundations for access and inference control in databases**, May 2018

IMDEA Software Institute

**Formal foundations for access and inference control in databases**, Mar. 2018

ABB Corporate Research Center

**Securing databases from probabilistic inferences**, Jan. 2018

2017

Università degli Studi di Padova

**Securing Databases from Probabilistic Inference**, Sep. 2017

MIT, CSAIL seminar

**Securing Databases from Probabilistic Inference**, Sep. 2017

Harvard University, Programming language seminar

**Securing Databases from Probabilistic Inference**, Sep. 2017

Maryland University, Cybersecurity Center seminar,

**Securing Databases from Probabilistic Inference**, Sep. 2017

Stanford University, Formal methods seminar,

**Securing Databases from Probabilistic Inference**, Aug. 2017

30th IEEE Computer Security Foundations Symposium (CSF 2017)

**Securing Databases from Probabilistic Inference**, Aug. 2017

30th IEEE Computer Security Foundations Symposium (CSF 2017)

**Reconciling Database Access Control and Information-flow Control**, Aug. 2017

26th ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2017)

**Test Execution Checkpointing for Web Applications**, Jul. 2017

Darmstadt University, Modeling and Analysis of Information Systems Graduate seminar

**Securing Databases from Probabilistic Inference**, Jun. 2017

2016

1st IEEE European Symposium on Security and Privacy (EuroS&P 2016)

**Strong and Provably Secure Database Access Control**, Mar. 2016

2014

40th International Conference on Very Large Data Bases (VLDB 2014)  
**Optimal Security-Aware Query Processing**, Sep. 2014

2013

13th International School on Foundations of Security Analysis and Design (FOSAD)  
**ActionGUI**, Sep. 2013

18th ACM Symposium on Access Control Models and Technologies (SACMAT 2013)  
**On the Notion of Redundancy in Access Control Policies**, Jun. 2013

6th IEEE International Conference on Software Testing, Verification and Validation (ICST 2013)  
**AURORA: AUTomatic ROBustness coverAge Analysis Tool**, Mar. 2013

2012

7th Italian Workshop on Eclipse Technologies (Eclipse-IT 2012)  
**Automated Management and Analysis of Security Policies using Eclipse**, Sep. 2012.

University of Luxembourg, SnT/SRM Research Seminar  
**Extending Coverage Criteria by Evaluating their Robustness to Code Structure Changes**, Jul. 2012

ETH Zurich, Information Security group  
**Conflict Detection and Minimization Techniques for Access Control Policies**, Jun. 2012

2011

6th Italian Workshop on Eclipse Technologies (Eclipse-IT 2011)  
**Security vulnerabilities detection and protection using Eclipse**, Sep. 2011.

## Service

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2025

**Usenix Security Symposium (SEC 2025)**  
Program Vice Co-Chair

**Workshop on Principles of Secure Compilation (PriSC)**  
Steering Committee member (2022-now)

**Workshop on Programming Languages and Security (PLAS)**  
Steering Committee member, Steering Committee Chair (2023-now)

**IEEE Computer Security Foundations Symposium (CSF)**  
Steering Committee member, Publication Chair (2023-now)

**ACM Conference on Computer and Communications Security (CCS 2025) - Programming languages and formal methods track**  
Program Committee member

2024

**Usenix Security Symposium (SEC 2024)**  
Program Committee member

**ACM Conference on Computer and Communications Security (CCS 2024) - Programming languages and formal methods track**  
Program Committee member

**Workshop on Principles of Secure Compilation (PriSC)**  
Steering Committee member

**Workshop on Programming Languages and Security (PLAS)**  
Steering Committee member, Steering Committee Chair

**IEEE Computer Security Foundations Symposium (CSF)**  
Steering Committee member, Publication Chair

**Evaluation Committee for the SERICS (Security Rights in CyberSpace) project**  
Evaluator

**Evaluation Jury for Dutch Cyber Security Research Paper Award 2024**  
Evaluator

2023

**ACM Conference on Computer and Communications Security (CCS 2023) - Hardware security track**  
Program Committee member

**Usenix Security Symposium (SEC 2023)**  
Program Committee member

**IEEE Computer Security Foundations Symposium (CSF 2023)**

Program Committee member

**Workshop on Principles of Secure Compilation (PriSC 2023)**

Program Chair, Steering Committee member

**Dagstuhl seminar 23481 “MAD: Microarchitectural Attacks and Defenses”**

Organizer

**Programming Language Mentoring Workshop (PLMW@PLDI)**

Organizing committee member

**Workshop on Programming Languages and Security (PLAS)**

Steering Committee member, Steering Committee Chair

**IEEE Symposium on Security and Privacy (S&P 2023)**

External reviewer

**ERC Advanced Grant 2023 Call**

Remote referee

2022

**IEEE Symposium on Security and Privacy (S&P 2022)**

Program Committee member

**IEEE Computer Security Foundations Symposium (CSF 2022)**

Program Committee member

**Workshop on Principles of Secure Compilation (PriSC 2022)**

Program Chair, Steering Committee member

**IEEE European Symposium on Security and Privacy (EuroS&P 2022)**

Program Committee member

**SIG SIDAR Conference on Detection of Intrusions and Malware & Vulnerability Assessment (DIMVA 2022)**

Program Committee member

**Workshop on Programming Languages and Security (PLAS)**

Steering Committee member, Steering Committee Chair

**Computer & Security**

Reviewer

**ACM Transactions on Programming Languages**

Reviewer

**French National Research Agency 2022 generic call**

Scientific Expert

**German Research Foundation**

Reviewer

2021

**ACM Conference on Computer and Communications Security (CCS 2021) - Programming languages and formal methods track**

Program Committee member

**Workshop on Programming Languages and Security (PLAS 2021)**

Program Chair

**DARPA/ISAT workshop - DOPLR: Data-Oblivious Interdisciplinary Representation**

Invited member

**Dagstuhl Seminar 21481 - Secure Compilation**

Invited member

**Dagstuhl Seminar 21442 - Ensuring the Reliability and Robustness of Database Management Systems**

Invited member

**Frontiers in Compute Science/Frontier in ICT**

Member of the Editorial Board (Review Editor)

**Workshop on Principles of Secure Compilation (PriSC 2021)**

Program Committee member

**IEEE European Symposium on Security and Privacy (EuroS&P 2021)**

Program Committee member

**IEEE Symposium on Security and Privacy (S&P 2021)**

External reviewer

**Journal of Computer Security**

Reviewer

**Formal Methods in System Design**

Reviewer

**ERC Advanced Grant 2021 Call**

Remote referee

2020

**ACM SIGSAC Workshop on Programming Languages and Security (PLAS 2020)**

Program Committee member

**IEEE Computer Security Foundations Symposium (CSF 2020)**

Program Committee member

**IEEE European Symposium on Security and Privacy (EuroS&P 2020)**

Program Committee member

**Journal of Computer Security**

Reviewer

2019

**ACM SIGPLAN conference on Systems, Programming, Languages, and Applications: Software for Humanity – OOPSLA track (OOPSLA)**

External reviewer

**French National Research Agency 2019 generic call**

Scientific Expert

**ERC Advanced Grant 2019 Call**

Remote referee

**IEEE Transactions on Dependable and Secure Computing (TDSC)**

Reviewer

**49th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN)**

External reviewer

2018

**19th Privacy Enhancing Technologies Symposium (PETS)**

External reviewer

**IEEE Transactions on Information Forensics and Security (TIFS)**

Reviewer

2017

**ACM Conference on Computer and Communications Security (CCS)**

External reviewer

**VLDB Journal**

Reviewer

2016

**European Symposium on Research in Computer Security (ESORICS)**

External reviewer

**International Conference on Fundamental Approaches to Software Engineering (FASE)**

External reviewer

2013

**VLDB Journal**

Reviewer

## PhD thesis committees

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2024

**Hans Winderix**, *Efficient Enforcement Mechanisms for the Preservation of Control-Flow Confidentiality*

KU Leuven, 03/10/2024

**Flavien Solt**, *Software-inspired techniques for digital hardware security*

ETH Zurich, 06/05/2024

2023

**Pietro Frigo**, *Exploiting Hardware from Software: an attack-surface analysis*

Vrije Universiteit Amsterdam, 19/12/2023

**Andreas Lindner**, *Proving Safety and Security of Binary Programs*

KTH Royal Institute of Technology, School of Electrical Engineering and Computer Science, 02/03/2023

2020

**José Vila Bausili**, *Learning Secrets and Models from Execution Time*

Universidad Politécnica de Madrid, Escuela Técnica Superior de Ingenieros Informáticos, 30/03/2020 (pre-defense)

2019

**Samira Briongos Herrero**, *Analysis and design of microarchitectural side-channel attacks and countermeasures*

Universidad Politécnica de Madrid, Escuela Técnica Superior de Ingenieros de Telecomunicación, 29/11/2019

**Irfan Ul Haq**, *Lineage Inference of Packed Malware using Binary Code Similarity*

Universidad Politécnica de Madrid, Escuela Técnica Superior de Ingenieros Informáticos, 12/11/2019

## Teaching

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### Universidad Politécnica de Madrid

Madrid, Spain

#### LECTURER

Seguridad Informatica — Fall 2018–2023

### ETH Zurich

Zurich, Switzerland

#### TEACHING ASSISTANT

Security Engineering — Autumn 2013–2016

Information Security — Spring 2015, Spring 2018

Design of Digital Circuits — Spring 2017

Informatik für Mathematiker und Physiker — Autumn 2017

### Università degli Studi di Bergamo

Bergamo, Italy

#### TEACHING ASSISTANT

Object Oriented Programming – Spring 2011–2012

## Mentoring

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#### PHD STUDENTS

Zilong Wang, IMDEA Software, Fall 2020

Xaver Fabian, CISPA (unofficially co-supervised with Marco Patrignani), Fall 2021

Antonio Zegarelli, IMDEA Software, Spring 2023 (co-supervised with Niki Vazou)

Elvira Moreno, IMDEA Software, Fall 2023

Marco Abbadini, IMDEA Software, Fall 2024 (visiting PhD student from University of Bergamo)

#### MASTER STUDENTS

Panagiotis Penna, Side-channel attacks on Large Language Models, IMDEA Software Institute, Fall 2024 (co-supervised with Thaleia Dimitra Doudali)

Marco Negro, Microarchitectural fuzzing on RTL processors, IMDEA Software Institute, Fall 2024

Elvira Moreno, Microarchitectural fuzzing on Gem5 simulator, Master Thesis, IMDEA Software Institute, Fall 2022

Antonio Zegarelli, Dynamic policies for information-flow control, Master Thesis, IMDEA Software Institute (co-supervised with Niki Vazou), Fall 2022

Tristan Buchs, Checkpointing-Based Testing, Master Thesis, ETH Zurich, Fall 2015

Ernst Zachow, Improving the Efficiency of Fuzz Testing Using Checkpointing, Master Thesis, ETH Zurich, Fall 2014

Marco Lazzari, Systematic Testing of TOR, Master Thesis, ETH Zurich, Fall 2014

#### BACHELOR STUDENTS

Eric García, Fuzzing RISC-V Processors for Speculative Leaks, IMDEA Software Institute, Spring 2023

Andrés Sánchez, Detecting speculative information-flows in large code bases, Universidad Politécnica de Madrid (co-supervised with Manuel Carro), Spring 2019

Javier Lopez Alonso, Formal models for speculative execution, Universidad Politécnica de Madrid (co-supervised with Manuel Hermenegildo), Spring 2019

Mohammed Ajil, Strong and Secure Access Control for PostgreSQL, Bachelor Thesis, ETH Zurich, Spring 2016

#### RESEARCH INTERNS

David Mateos Romero, Software fuzzing for microarchitectural leaks, IMDEA Software Institute, Summer 2022

Hoang Nguyen, Automated synthesis of hardware-software contracts, IMDEA Software Institute, Spring 2022

Arpit Gogia, Contract-based fuzz testing of CPU simulators, IMDEA Software Institute, Spring 2022

Andrés Sánchez, Reasoning about speculative execution attacks, IMDEA Software Institute, Fall 2018

Mohamed Moanis Ali, Speculative execution attacks, IMDEA Software Institute, Fall 2019

Ashwin Nambiar, Side-channel attacks, IMDEA Software Institute, Summer 2020

Aarti Kashyap, Hardware-Software Contracts for Undo and Redo Spectre countermeasures, IMDEA Software Institute, Summer 2020