# Marco Patrignani, Ph.D.


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| Homepage : | `https://squera.github.io` |
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| Address: | Room 124, Disi, Polo 2. Via sommarive 9 I-38123 Povo (TN) Italy |
| Date of Birth: | December 2nd, 1986. |


## Working Experience

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| 2022/3/1 to ... | Assistant Professor (RTD-B) at University of Trento (IT) |
| 2018/9/1 to 2022/2/28 | Research group leader at CISPA Helmholz Center for Information Security (DE) |
| 2021/2/1 to 2021/06/30 | Visiting lecturer at Stanford University (USA) |
| 2018/9/1 to 2021/01/31 | Visiting assistant professor at Stanford University (USA) |
| 2017/9/1 to 2018/8/31 | PostDoc researcher at CISPA (DE) (with Michael Backes) |
| 2015/10/1 to 2017/8/31 | PostDoc researcher at MPI SWS Saarbrücken (DE) (with Deepak Garg). |
| 2010/11/1 to 2015/09/30 | Ph.D. student at KU Leuven (BE) (with Dave Clarke and Frank Piessens). |

## Education

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|---|---|
| 2010/11 to 2015/09 | ***Ph.D.* in Computer Science** (2015/05/27) at *KU Leuven* (BE). |
| 2008/9 to 2010/7 | ***Master degree (Laurea specialistica)* in Computer Science** at the *University of Bologna* (IT), (110/110 cum laude). (First graduate from the class). |
| 2005/9 to 2008/10 | ***Bachelor degree (Laurea)* in Computer Science**. *University of Bologna* (IT), (107/110). |

## Achievements & Awards

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| **2022 Distinguished Paper Award at CCS** | For: *Automatic Detection of Speculative Execution Combinations*. (link) |
| **2019 Distinguished Paper Award at CSF** | For: *Journey beyond full abstraction*. (link) |
| **2023 Mysten Labs (20K€)** | Funding for assistants to work on the Move language. |
| **2021 Rita Levi Montalcini (IT) (220K€)** | Tenure-track funding at the University of Trento. |
| **2021 Novi/Facebook Grant (50K$)** | To support our work on robust safety for the Move language. |
| **2017 Cispa-Stanford (DE)** | Funding for PostDoc, Assistant professor and Research group leader (6 years total) between CISPA and Stanford. |
| **2011 FWO grant (BE)** | Scholarship for a Ph.D. at KU Leuven |
| **2010 LLP Erasmus placement (IT)** | EU commission fundings for an internship at KU Leuven. |

## Publications

### *Journal papers*

1. Dominique Devriese, **Marco Patrignani**, and Frank Piessens. Two parametricities versus three universal types. *ACM Trans. Program. Lang. Syst.*, 44(4), sep 2022

2. Carmine Abate, Roberto Blanco, Adrien Durier, Deepak Garg, Catalin Hritcu, **Marco Patrignani**, Eric Tanter, and Jeremy Thibault. An Extended Account of Trace-Relating Compiler Correctness and Secure Compilation. *ACM Trans. Program. Lang. Syst.*, 43(4), nov 2021

3. **Marco Patrignani** and Deepak Garg. Robustly safe compilation, an efficient form of secure compilation. *ACM Trans. Program. Lang. Syst.*, 43(1), February 2021

4. **Marco Patrignani**, Amal Ahmed, and Dave Clarke. Formal approaches to secure compilation a survey of fully abstract compilation and related work. *ACM Comput. Surv.*, 51(6):125:1–125:36, January 2019

5. Dominique Devriese, **Marco Patrignani**, Frank Piessens, and Steven Keuchel. Modular, Fully-abstract Compilation by Approximate Back-translation. *Logical Methods in Computer Science*, Volume 13, Issue 4, October 2017

6. **Marco Patrignani**, Pieter Agten, Raoul Strackx, Bart Jacobs, Dave Clarke, and Frank Piessens. Secure Compilation to Protected Module Architectures. *ACM Trans. Program. Lang. Syst.*, 37(2):6:1–6:50, April 2015

7. **Marco Patrignani** and Dave Clarke. Fully abstract trace semantics for protected module architectures. *Computer Languages, Systems & Structures*, 42(0):22 – 45, 2015. Special issue on the Programming Languages track at the 29th ACM Symposium on Applied Computing

## *Conference Papers*

1. **Marco Patrignani** and Sam Blackshear. Robust Safety for Move. In *Proceedings of the 36th IEEE Computer Security Foundations Symposium CSF 2023, Dubrovnik, Croatia*, CSF 2023, 2023

2. Alexandra Michael, Anitha Gollamudi, Jay Bosamiya, Evan Johnson, Craig Disselkoen, Aidan Denlinger, Conrad Watt, Bryan Parno, **Marco Patrignani**, Marco Vassena, and Deian Stefan. Mswasm: Soundly enforcing memory-safe execution of unsafe code. Number POPL, New York, NY, USA, jan 2023. ACM

3. Xaver Fabian, Marco Guarnieri, and **Marco Patrignani**. Automatic detection of speculative execution combinations. In *Proceedings of the 2022 ACM SIGSAC Conference on Computer and Communications Security*, CCS '22, New York, NY, USA, 2022. ACM. **Distinguished Paper Award**

4. Will Chricton, **Marco Patrignani**, Maneesh Agrawala, and Pat Hanrahan. Modular information flow through ownership. In *Proceedings of the 43rd ACM SIGPLAN International Conference on Programming Language Design and Implementation*, PLDI 2022, page 1–14, New York, NY, USA, 2022. ACM

5. **Marco Patrignani** and Marco Guarnieri. Exorcising spectres with secure compilers. In *Proceedings of the 2021 ACM SIGSAC Conference on Computer and Communications Security*, CCS '21, page 445–461, New York, NY, USA, 2021. ACM

6. Akram El-Korashy, Stelios Tsampas, **Marco Patrignani**, Dominique Devriese, Deepak Garg, and Frank Piessens. Capableptrs: Securely compiling partial programs using the pointers-as-capabilities principle. In *34th IEEE Computer Security Foundations Symposium, CSF 2021, Dubrovnik, Croatia, June 21-25, 2021*, pages 1–16. IEEE, 2021

7. **Marco Patrignani**, Eric Martin, and Dominique Devriese. On the semantic expressiveness of recursive types. *Proc. ACM Program. Lang.*, 5(POPL), jan 2021

8. David Durst, Matthew Feldman, Dillon Huff, David Akeley, Ross G. Daly, Gilbert Louis Bernstein, **Marco Patrignani**, Kayvon Fatahalian, and Pat Hanrahan. Type-directed scheduling of streaming accelerators. In *Proceedings of the 41st ACM SIGPLAN International Conference on Programming Language Design and Implementation, PLDI 2020, London, UK, June 15-20, 2020*, pages 408–422, 2020

9. Carmine Abate, Roberto Blanco, Adrien Durier, Deepak Garg, Catalin Hritcu, **Marco Patrignani**, Eric Tanter, and Jeremy Thibault. Trace-relating compiler correctness and secure compilation. In Peter Müller, editor, *Programming Languages and Systems*, pages 1–28, Cham, 2020. Springer

10. Carmine Abate, Roberto Blanco, Deepak Garg, Catalin Hritcu, **Marco Patrignani**, and Jeremy Thibault. Journey Beyond Full Abstraction: Exploring Robust Property Preservation for Secure Compilation. In *Proceedings of the 32th IEEE Computer Security Foundations Symposium CSF 2019, Hoboken, USA*, CSF, 2019. **Distinguished Paper Award**

11. **Marco Patrignani** and Deepak Garg. Robustly safe compilation. In *Programming Languages and Systems - 28th European Symposium on Programming, ESOP 2019*, ESOP'19, 2019

12. Dominique Devriese, **Marco Patrignani**, and Frank Piessens. Parametricity versus the universal type. In *Proceedings of the 45th Annual ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages, POPL 2018, Los Angeles, CA, USA*, 2018

13. **Marco Patrignani** and Deepak Garg. Secure Compilation and Hyperproperties Preservation. In *Proceedings of the 30th IEEE Computer Security Foundations Symposium CSF 2017, Santa Barbara, USA*, CSF 2017, 2017

14. **Marco Patrignani**, Dominique Devriese, and Frank Piessens. On Modular and Fully-Abstract Compilation. In *Proceedings of the 29th IEEE Computer Security Foundations Symposium CSF 2016, Lisbon, Portugal*, CSF 2016, 2016

15. Dominique Devriese, **Marco Patrignani**, and Frank Piessens. Fully-abstract compilation by approximate back-translation. In *Proceedings of the 43rd Annual ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages, POPL 2016, St. Petersburg, FL, USA, January 20 - 22, 2016*, pages 164–177, 2016

16. Adriaan Larmuseau, **Marco Patrignani**, and Dave Clarke. Implementing a Secure Abstract Machine. In *Proceedings of the 31th Annual ACM Symposium on Applied Computing*, SAC '16. ACM, 2016

17. Adriaan Larmuseau, **Marco Patrignani**, and Dave Clarke. A secure compiler for ML modules. In *Programming Languages and Systems - 13th Asian Symposium, APLAS 2015, Pohang, South Korea, November 30 - December 2, 2015, Proceedings*, pages 29–48, 2015

18. Adriaan Larmuseau, **Marco Patrignani**, and Dave Clarke. A high-level model for an assembly language attacker by means of reflection. In *Dependable Software Engineering: Theories, Tools, and Applications - First International Symposium, SETTA 2015, Nanjing, China, November 4-6, 2015, Proceedings*, pages 168–182, 2015

19. **Marco Patrignani** and Dave Clarke. Fully Abstract Trace Semantics of Low-level Isolation Mechanisms. In *Proceedings of the 29th Annual ACM Symposium on Applied Computing*, SAC '14, pages 1562–1569. ACM, 2014

20. **Marco Patrignani**, Dave Clarke, and Frank Piessens. Secure Compilation of Object-Oriented Components to Protected Module Architectures. In *Proceedings of the 11th Asian Symposium on Programming Languages and Systems (APLAS'13)*, volume 8301 of *LNCS*, pages 176–191, 2013

21. **Marco Patrignani**, Dave Clarke, and Davide Sangiorgi. Ownership Types for the Join Calculus. In *FMOODS/FORTE 2011*, volume 6722 of *LNCS*, pages 289–303, 2011

## *Theses*

1. **Marco Patrignani**. *The Tome of Secure Compilation: Fully Abstract Compilation to Protected Modules Architectures*. PhD thesis, KU Leuven, Leuven, Belgium, May 2015

# Professional Activities

## *Teaching*

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| **2023-24, 22-23** | Advanced Programming, Programming Language Semantics (@UniTn) |
| **2023-24, 22-23, 21-22** | Programmazione 2 (@UniTn) |
| **2022-23, 21-22** | Doctoral course on secure compilation (@UniTn) (+@UniPi 21-22) |
| **2021-22** | Formal Methods in Security (IFC part) (@CISPA & UdS) |
| **2020-21, 19-20, 18-19** | cs358: Programming Language Foundations (@Stanford) |
| **2020-21, 19-20, 18-19** | cs350: Secure Compilation (@Stanford) |
| **2018-19, 17-18** | Instructor for the seminar on secure compilation (@CISPA & UdS) |
| **2017-18** | Topic supervisor on the CISPA joint conference seminar. (@CISPA & UdS) |
| **2014-15, 13-14, 12-13 11-12** | Comparative Programming Languages: TA *[plus lectures]*; (@ KUL) |
| **2014-15, 13-14** | Problem & solving: TA and organisation. (@ KUL) |
| **2012-13, 10-11** | Fundamentals of Computer Science: TA *[plus lectures]*. (@ KUL) |

Note: P&O is a software development course project equivalent to a Bachelor thesis.

## *Students (PhD first, then Master, Bachelor, and Interns)*

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| **@CISPA** | Xaver Fabian (since 2021/09), Matthis Kruse (since 2021/10) |
| **@Stanford** | Koby Chan, Eric Martin, Wilson Nguyen, Nicholas Barbier, Max DiGiacomo |
| **@CISPA** | Xaver Fabian |
| **@MPI-SWS** | Maximilian Schwenger (with Deepak Garg), Akram El-Korashy (with Deepak Garg) |
| **@KU Leuven** | Matthias van der Hallen, Pieter van Geel |

## *Community Duties*

**Chair** PRISC '25, PRISC '24, FCS '23, FCS '22

**PC** PRISC '24, CSF '24, SecDev '23, PRISC '23, POPL '23; Aplas '22; SecDev '22; SecDev '21; CCS '21; CSF '20; PRISC '19; SAC '19; PRISC '18; SAC '18; SCM '17; SAC '17; FCS '16; SAC '16; SAC '15; ICCSW '14.

**External Reviewer** Elsevier JISAS; JFP; CSF '21; POPL '16; CSF '15; Elsevier COMLAN; FOCLASA '14; GPCE '14; SWJ; IFM '13; FSEN '13; ESOP '12; IWACO '11.

## *Languages*

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| **Italian** | Mothertongue. |
| **English** | Spoken every day and used to write international articles since 2010. |
| **Dutch & German** | Elementary proficiency. |

# Contacts

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Prof. Dominique Devriese

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