



# PATRICIA GUERRA BALBOA

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## EDUCATION

### PhD in Cybersecurity

Karlsruhe Institute of Technology

October 2021 – Nowadays  
Karlsruhe, Germany

### Master of Science in Mathematics

University of Santiago de Compostela

Sep. 2020 – July 2021  
Santiago de Compostela, Spain

### Bachelor's Degree in Mathematics

University of Santiago de Compostela

Sep. 2016 – July 2020  
Santiago de Compostela, Spain

## WORK EXPERIENCE

### PhD Student Researcher

Chair of Privacy and Security, Karlsruhe Institute for technology

October 2021 – Nowadays  
Karlsruhe, Germany

- Differential Privacy and applications to location privacy and attack mitigation.

### High-level research technician

Universitat Politècnica de Catalunya

July 2021 – September 2022  
Barcelona, Spain

- Short-term research project about Generating Synthetic Data with Differential Privacy Guarantees.

### High-level research technician

University of Santiago de Compostela

March 2021 – July 2021  
Santiago de Compostela, Spain

- Studying and analysis of localization and cohomology on quasicoherent sheaves on schemes and associated spaces. Presentation about schemes package on Lean library

### Intern

Kidcode S.L.

July 2019 – August 2019  
Vigo, Spain

- Scientific divulgator and teacher

## HONORS AND AWARDS

### Audience Award & Silver Medal in the FameLab Germany - regional heat

FameLab Germany

2024

### Best Poster Award Community Congress by Startup Secure

K.I.T. Gründer Schmiede

2023

### "Mejores expedientes"(Best records) Award

University of Santiago de Compostela

2016

## TEACHING EXPERIENCE

### Lecturer, Privacy Enhancing Technologies

Master's course

Every Summer Semester, 2022–present  
Karlsruhe Institute of Technology (KIT)

### Organizer, Seminar on Privacy and Technical Data Protection

Master's course in IT Security

Every Summer Semester, 2022–present  
Karlsruhe Institute of Technology (KIT)

### Organizer, Seminar on Privacy and Security

Master's course in IT Security

Every Winter Semester, 2023–present  
Karlsruhe Institute of Technology (KIT)

### Teaching Assistant, Reading Group on Privacy Enhancing Technologies

Master's course in IT Security

Summer Semester 2022  
Karlsruhe Institute of Technology (KIT)

## Supervised Bachelor's and Master's Theses

|  |           |
|--|-----------|
| <b>Measurement of Attack Resilience of Differential Privacy</b>                  | 2025      |
| Master's Thesis  | KIT       |
| <b>Utility of Semantic Privacy Notions for Correlated Data</b>                   | 2024      |
| Master's Thesis  | KIT & UPC |
| <b>Analysis of Topological Privacy Notions</b>                                   | 2024      |
| Master's Thesis  | KIT       |
| <b>LDP protection of trajectories based on dependency reduction</b>              | 2024      |
| Bachelor's Thesis  | KIT       |
| <b>Riemannian-based Clustering for Differential Private Location Publication</b> | 2023      |
| Master's Thesis  | KIT       |
| <b>Privacy Analysis of Deep Graph Generative Models using M.I.A.s</b>            | 2023      |
| Master's Thesis  | KIT       |

## INVITED TALKS AND PRESENTATIONS

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|---|--------------------------------------|
| <b>"Balancing Privacy and Utility in Correlated Data"</b>                       | November 2025                        |
| Invited talk in the PreMeDICal Seminar  | INRIA Montpellier                    |
| <b>"¿Cómo pueden las matemáticas proteger tu privacidad?"</b>                   | December 2024                        |
| Peregrinando: International carrers in mathematics and physics workshop         | CITMAGA & IGFAE                      |
| <b>"Unlocking the potential of composition in DP"</b>                           | October 2023                         |
| Invited talk in the COSIC Seminar   | KU Leuven                            |
| <b>"Publishing Trajectories: A Study on Privacy Protection"</b>                 | October 2022                         |
| XVII Spanish Meeting on Cryptography and Information Security (RECSI22)         | University of Cantabria              |
| <b>"Mathematics behind privacy"</b>   | June 2022                            |
| Invited talk in García Rodeja Seminar (CITMAGA)                                 | University of Santiago de Compostela |
| <b>"Anonymizing Trajectory Data: Limitations and Opportunities "</b>            | February 2022                        |
| The Third AAAI Workshop on Privacy-Preserving Artificial Intelligence (PPAI-22) | Online Event                         |
| <b>"How sheaves theory can help air-controllers at an airport"</b>              | March 2021                           |
| Invited talk in S.I.I. (Seminario de iniciación a la investigación)             | University of Santiago de Compostela |

## PUBLICATIONS

- [1] M. Lange, P. Guerra-Balboa, J. Parra-Arnau, and T. Strufe. "Balancing Privacy and Utility in Correlated Data: A Study of Bayesian Differential Privacy". In: *Proceedings of the VLDB Endowment* 18.11 (2025), pp. 4090–4103. ISSN: 2150-8097. DOI: 10.14778/3749646.3749679.
- [2] P. Guerra-Balboa, À. Miranda-Pascual, J. Parra-Arnau, and T. Strufe. "Composition in Differential Privacy for General Granularity Notions". In: *37th IEEE Computer Security Foundations Symposium (CSF)* (2024). DOI: 10.1109/CSF61375.2024.00004.
- [3] P. Guerra-Balboa, A. Sauer, and T. Strufe. "Analysis and Measurement of Attack Resilience of Differential Privacy". In: *Proceedings of the 23rd Workshop on Privacy in the Electronic Society*. WPES '24. ACM, 2024. ISBN: 9798400712395. DOI: 10.1145/3689943.3695046.
- [4] À. Miranda-Pascual, P. Guerra-Balboa, J. Parra-Arnau, J. Forné, and T. Strufe. "An overview of proposals towards the privacy-preserving publication of trajectory data". In: 23.6 (2024), pp. 3711–3747. ISSN: 1615-5262. DOI: 10.1007/s10207-024-00894-0.
- [5] À. Miranda-Pascual, P. Guerra-Balboa, J. Parra-Arnau, J. Forné, and T. Strufe. "SoK: Differentially Private Publication of Trajectory Data". In: *Proceedings on Privacy Enhancing Technologies* 2023.2 (Apr. 2023), pp. 496–516. ISSN: 2299-0984. DOI: 10.56553/popets-2023-0065.

## SPECIFIC FORMATION

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| <b>Seminar PETs and AI: Privacy Washing and the Need for a PETs Evaluation Framework</b> | 2025                          |
| Schloss Dagstuhl – Leibniz-Zentrum für Informatik (LZI)                                  | Wadern, Germany               |
| <b>Seminar in Scientific Communication</b>   | 2023                          |
| National Institute of Science Communication (NaWik )                                     | Karlsruhe, Germany            |
| <b>5th Interdisciplinary Summerschool on Privacy (ISP 2023)</b>                          | 2023                          |
| Radboud University   | Berg en Dal, the Netherlands  |
| <b>Seminar in Schemes Theory (Algebraic Geometry)</b>                                    | 2021                          |
| University of Santiago de Compostela   | Santiago de Compostela, Spain |
| <b>Discrete Morse Theory &amp; Introduction to Ergodic Theory course</b>                 | 2019                          |
| R.E.T. In collaboration with U.S.C   | Santiago de Compostela, Spain |
| <b>Course on scientific documents and presentations on LaTex</b>                         | 2019                          |
| University of Santiago de Compostela   | Santiago de Compostela, Spain |
| <b>Mechanical computer assisted design Campus</b>  | 2014                          |
| Carlos III de Madrid University  | Madrid, Spain                 |

## LANGUAGE

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Spanish - Mother tongue

**English: B2.1 with Honors**

Trinity College London

**German: B1**

Karlsruher Institut für Technologie

**Galician: CELGA4**

Consellería de Educación, Xunta de Galicia

## OTHER ACTIVITIES AND INFORMATION

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**Foreign Exchange at Queen Mary's Grammar School Walsall, England**

**Programming:** R, MATLAB, Fortran, SageMath and Python

**Volunteering:** Guide at "Camiño ao respecto". Xunta de Galicia