



PATRICIA GUERRA BALBOA

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EDUCATION

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

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

October 2021 – Nowadays

Karlsruhe, Germany

High-level research technician

Universitat Politècnica de Catalunya

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

July 2021 – September 2022

Barcelona, Spain

High-level research technician

University of Santiago de Compostela

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

March 2021 – July 2021

Santiago de Compostela, Spain

Intern

Kidcode S.L.

- Scientific divulgator and teacher

July 2019 – August 2019

Vigo, Spain

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

"Mellores 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

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

INVITED TALKS AND PRESENTATIONS

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

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

LANGUAGE

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

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