José Antonio Zamudio Amaya

Ph.D. Candidate in Systems Security & Fuzzing

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SUMMARY

Ph.D. Candidate at CISPA Helmholtz Center for Information Security, researching systems security and fuzz testing under Prof. Andreas Zeller. Lead developer of Fandango, an open-source language-based fuzzer published at ISSTA 2025. Co-authored 8 peer-reviewed papers across ISSTA, MATCOM, and SPLC.

EXPERIENCE

CISPA Helmholtz Center for Information Security
Oct 2023 – Present

Doctoral Researcher · Saarbrücken, Germany

- Conducting PhD research on systems security and fuzz testing under Prof. Andreas Zeller at one of Europe's top-ranked security research centers.
- Lead developer of Fandango, an open-source language-based fuzzer using formal grammars and Python constraints to generate semantically valid test inputs. Published at ISSTA 2025.
- Co-authored 8 peer-reviewed papers across ISSTA, MATCOM, and SPLC, covering fuzzing, protocol testing, XML injection attacks, and GNSS security.
- Extended Fandango into a full protocol fuzzer (v1.1), enabling state-aware automated testing of protocols such as FTP and DNS.
- Delivered 3 conference talks at ISSTA 2025 in Trondheim, Norway.

Max Planck Institute for Security and Privacy (MPI-SP)
Sep – Nov 2025

Visiting Researcher · Bochum, Germany

- Visited the research group of Prof. Marcel Böhme, a leading expert in automated software testing.
- Investigated statistical methods and theoretical foundations to improve the precision and efficiency of coverage-guided fuzzing.

Universität des Saarlandes
Oct 2023 – Feb 2024

Teaching Assistant, Security Testing (Advanced Course) · Saarbrücken, Germany

- Designed exercises, projects, and exams for 207 students covering fuzzing, static analysis, and vulnerability discovery.

Universidad Pablo de Olavide
Feb – Oct 2023

Student Researcher · Seville, Spain

- Designed metaheuristic optimization algorithms (Iterated Greedy variants) for NP-hard combinatorial problems under Prof. Alfredo García Hernández-Díaz.
- Co-authored a publication in Mathematics and Computers in Simulation (2025) introducing the k-weighted dominating set problem.

Universidad de Sevilla
Jan 2022 – Oct 2023

Student Researcher · Seville, Spain

- Researched software product line optimization and variability modeling under Prof. David Benavides Cuevas.
- Developed WebSPL, a tool for code-free SPL configuration and deployment — awarded Bachelor's Thesis Honors Distinction.
- Co-authored a paper at SPLC 2023 on runtime feature model analysis for constraint-based recommender systems.

EDUCATION

Universität des Saarlandes · Ph.D. in Computer Science (Systems Security) — Oct 2023 – Oct 2027

National University of Singapore · Fuzzing and Software Security Summer School 2024 — May – Jun 2024

Università degli Studi di Bergamo · TAROT 2024 Summer School on Software Testing, Verification & Validation — Jul 2024

Universidad de Sevilla · M.Sc. Software Engineering: Big Data, ML, Data Science & AI. Honors Distinction. 2022 – 2023

Universidad de Sevilla · B.Sc. Software Engineering. Honors Distinction. 2018 – 2022

PUBLICATIONS

[2026] A. Liggesmeyer, **J.A. Zamudio Amaya**, A. Zeller. *Language-Based Protocol Testing.* Preprint, 2026.

[2025] **J.A. Zamudio Amaya**, M. Smytzek, A. Zeller. *FANDANGO: Evolving Language-Based Testing.* Proceedings of the ACM on Software Engineering (ISSTA), 2025.

[2025] A. Crump, A. Turcotte, **J.A. Zamudio Amaya**, A. Zeller. *High-Performance Generation of Constrained Inputs.* Preprint, 2025.

[2025] P. Kalbitzer, **J.A. Zamudio Amaya**, A. Zeller. *XAVIER: Grammar-Based Testing for XML Injection Attacks.* ISSTA 2025.

[2025] S. Neuhaus, **J.A. Zamudio Amaya**, A. Zeller. *Personalized Fuzzing: A Case Study with FANDANGO on a GNSS Module.* ISSTA 2025.

[2024] **J.A. Zamudio Amaya**. *Shaping Test Inputs in Grammar-Based Fuzzing.* ISSTA 2024.

[2024] E. Barrena, S. Bermudo, A.G. Hernandez-Diaz, A.D. Lopez-Sanchez et al., **J.A. Zamudio Amaya**. *Finding the Minimum k-Weighted Dominating Sets Using Heuristic Algorithms.* Mathematics and Computers in Simulation, 2024. (Author order alphabetical; individual contributions detailed in paper.)

[2023] S. Lubos, A. Felfernig, V.M. Le, T.N.T. Tran, D. Benavides, **J.A. Zamudio** et al. *Analysis Operations on the Run: Feature Model Analysis in Constraint-Based Recommender Systems.* SPLC 2023.

PROJECTS

Fandango

Aug 2024 – Present

Lead Developer · github.com/fandango-fuzzer/fandango

- Open-source language-based fuzzer that combines formal grammars with Python constraints to generate structured, semantically valid test inputs at scale.
- Supports black-box fuzzing, input mutation, and full protocol fuzzing — Fandango can act as a client or server to test stateful protocols such as FTP and DNS.
- Uses evolutionary algorithms under the hood: starts from a population of random inputs and iteratively mutates and crosses them over until all constraints are satisfied.
- Published at ISSTA 2025. 100+ GitHub stars. 100k+ downloads on PyPI.

SERVICE

Reviewer

2024

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SKILLS

Research	Fuzzing, Vulnerability Research, Systems Security, Software Testing, Protocol Analysis
Languages	Python (expert), Java (proficient), C/C++, JavaScript
Tools	AFL++, LLVM, Git, Docker, Linux
Communication	Spanish (native), English (C2 full professional proficiency)

HONORS & AWARDS

Jul 2023 Master's Thesis Honors Distinction — Universidad de Sevilla

Jun 2022 Bachelor's Thesis Honors Distinction — Universidad de Sevilla