Federico Bruzzone • Curriculum Vitae

Personal Information

Born in Magenta (MI), Italy on 7th of **March 2000**
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PhD Candidate in Computer Science. Programming Languages and Compilers enthusiast. Also, a Sound Engineer and Music Composer. For more information, visit my personal website.

Scientific Publications

International Peer-Reviewed Journal/Conference Publications

[1] F. Bruzzone, W. Cazzola, and L. Favalli, "Code Less to Code More: Streamlining Language Server Protocol and Type System Development for Language Families," *Journal of Systems and Software*, p. 112554, Sept. 2025, doi: 10.1016/j.jss.2025.112554. **Journal Ranked Q1 on Scimago** [bib] [pdf] [SpringerLink] [arXiv]

Preprints Publications

[2] F. Bruzzone, W. Cazzola, M. Brancaleoni, and D. Pellegrino, "Sink or SWIM: Tackling Real-Time ASR at Scale," 2026. **Preprint**
[3] F. Bruzzone, W. Cazzola, and L. Favini, "Prioritizing Configuration Relevance via Compiler-Based Refined Feature Ranking," 2026, [Online]. Available: https://arxiv.org/abs/2601.16008 **Preprint** [bib] [pdf] [arXiv]

Education

2024-Present	**PhD Candidate** in Computer Science at the ADAPT Lab, University of Milan Under the supervision of *W. Cazzola*, my research focuses **compiler/IR construction** and **programming languages**, **analysis** and **transformation** of **optimizing compilers** as well as **type systems** and **support tools** (e.g., LSP).
2022-2024	MSc in Computer Science at University of Milan (*110/110 cum laude*, *W. Cazzola*, 15/07/2024) Thesis: "**Toward a Modular Approach for Type Systems and LSP Generation**" .
2019-2022	BSc in Musical Computer Science at University of Milan (13/10/2022)
2011-2019	Piano and Music Composition at I.S.S.M. Novara Conservatory
2014-2019	Diploma in Computer Science and Telecommunications at E. Alessandrini

Research Activities

2025-Present	**Reviewer** for the Eur. Conf. on Object Oriented Programming (ECOOP 2026), *ACM*, **A on CORE**
2025-Present	**Reviewer** for the Journal of Computer Languages (COLA), *Elsevier*, **C on CORE**
2025-Present	**Reviewer** for the Journal of Software and Systems Modeling (SoSyM), *Springer*, **Q1 on Scimago**
2025-Present	**Reviewer** for the Journal of Systems and Software (JSS), *Elsevier*, **Q1 on Scimago**
2024-Present	MUSEMI **Session Chair**, **Speaker** and **Co-organizer**
2-6 Jun 2025	**Participant** at <Programming> 2025 conference
Apr-Jun 2025	**Committee Member** at the Int. Conf. on Software Language Engineering (SLE 2025), *ACM*, **B on CORE**
2-7 Sep 2024	**Student Volunteer** at the Int. Conf. on Functional Programming (ICFP 2024)
2022-2024	Research **Internship** at ADAPT Lab, working on modular type systems and LSP generation for Neverlang
2021-2022	Research **Internship** at LIM Lab, working on the IEEE 1599 standard

Teaching Activities

Thesis Supervision

10/04/2025	D. Pellegrino, *Scalable Multi-client Real-time Whisper*, BSc, **96**
09/04/2025	A. Longoni, *GUIDE: Graphical User Interface Development Environment*, MSc, **110L**
09/04/2025	L. Albani, *New Generalized Protocol For Software Product Line Extraction And Configuration*, MSc, **110L**
09/04/2025	G. Esposito, *Fr3D: A Framework for DAP-compatible DSL-oriented Debugging*, MSc, **110L**

24/02/2025 L. Favini, *RustyEx: Intrumenting `rustc` to Extract Feature Dependency Graphs*, BSc, **102**

Graduate Courses

2025-2026 Programming 1 (Art. 45), **BSc** in CS, University of Milan, *L. Capra* (coordinator W. Cazzola)
2025-2026 Mathematical Logic (Art. 45), **BSc** in CS, University of Milan, *S. Aguzzoli*
2024-2025 Mathematical Logic, **BSc** in CS, University of Milan, *S. Aguzzoli*
2023-2024 Computer Science, **BSc** in Comm. and Society, University of Milan, *A. Momigliano*
2023-2024 Progtrammin 1, **BSc** in CS, University of Milan, *A. Trentini* (coordinator P. Boldi)
2023-2024 Programming in Python, **MSc** in Chemistry, University of Milan, *M. Monga*

Additional Activities

2023-Present **Private Tutoring** in Computer Science, Mathematics and Physics
Nov 2024 **Collaborator** at the Bebras Challenge , ALaDDIn Lab
Jan-Jun 2024 **Organizer** of the BSc Computer Science Laboratories, ALaDDIn Lab
Jan-Jun 2024 **Collaborator** of the Workshops for schools, ALaDDIn Lab
Nov 2023 **Collaborator** at the Bebras Challenge , ALaDDIn Lab

Public Contributions (Selected)

2026-Present Maintainer of the LLVM Pass Template, a C++ template project to quickly create new LLVM passes.
This project allows developers to quickly bootstrap, test, and benchmark new out-of-tree LLVM passes with minimal effort — that is, without the need to build LLVM from sources.

2025-Present Maintainer of the papers-on-compiler-optimizations, a curated list of scientific publications on compiler optimizations and related topics.
This repository curates a chronologically sorted list of influential papers on compiler optimization, from the seminal works of 1952 through the advanced techniques of 1994.

2024-Present Contributions to the **Rust** compiler, focusing on type systems, diagnostics, and layout computations — by fixing some Internal Compiler Errors (ICEs) and implementing new features.
- Add `TooGeneric` variant to `LayoutError` and emit `Unknown` (closed but merged)
- Use the type-level constant value ty::Value where needed
- Report the note when specified in `diagnostic::on_unimplemented`

2025-Present **Maintainer** of the Tide Compiler, an backend-agnostic IR and compiler framework written in **Rust**.
Tide aims to be a modular and extensible framework for building compilers and language tools, prioritizing simplicity and ease of use. From its quasi-SSA IR to its flexible backend architecture, Tide provides a solid foundation for developing compilers for various programming languages.

2025-Present Contributions to the **Rustworkx** graph library, focusing on implementing the Closeness Centrality algorithm for weighted graphs (following Newman's method) and integrating it into the Python bindings.
- Generalizing Closeness centrality to weighted networks using Newman method (issue 1384)

2024-Present **Maintainer** of the cross-platform tgt project and tdlib-rs TDLib bindings written in **Rust**.
Tgt is a TUI (Terminal User Interface) client for Telegram, built using the tdlib-rs library, which provides safe and idiomatic Rust bindings to the official TDLib (Telegram Database Library) C++ library. Thanks to CI/CD pipelines, we ensure (i) that the projects build and work correctly on Linux, macOS, and Windows, (ii) automatic releases on GitHub and crates.io, and (iii) automatic documentation generation.

Technical Skills

Languages **Rust**, **Python**, **C/C++**, **Go**, OCaml, Java, Scala, Kotlin, Erlang, Lua, Dart, PHP, HTML/CSS, SQL, Bash, TeX
Systems/Tooling **Git**, **CI/CD**, **Docker**, **GDB**, **Valgrind**, Build Systems (e.g., CMake, Cargo, Pip), Cross-language **Linking**, Static/Dynamic Libraries, and **FFI** (e.g., C bindgen)
Area of Expertise **Compiler Construction** and **Optimizations**, Programming Languages, **IR Design** and **Implementation**, Type Systems, Language Support Tools (e.g., LSP), Static Analysis, Parsing Techniques and Parser Generators (e.g., ANTLR), **Rustc** Internals, **LLVM**

Musical Activities

2021-Present **Sound Engineer and Music Producer**, in collaboration with Believe and as a SIAE member.
2006-Present **Pianist and Music Composer**, composing original pieces and arrangements for piano and various ensembles
2019-Present **Piano and Music Teacher**, teaching piano and music theory and composition to students of all ages and levels

Grants and Fellowships

2024 56th Top Github Public Contributor in Italy out of 958
2023-2024 Scholarship for the MSc in Computer Science, awarded by the University of Milan

2020-2024 Scholarship for the BSc in Musical Computer Science, awarded by the University of Milan

Tongues

Italian	Mother tongue
English	Level CEFR B2 (SLAM at University of Milan)
Spanish	Base (A1-A2)

Milan, 25/01/2026