# Federico Bruzzone • Curriculum Vitae

## Personal Information

Born in Magenta (MI), Italy on 7th of **March 2000**
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## Contact Information

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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." [Online]. Available: https://arxiv.org/abs/2601.17097 — [bib] [pdf] [arXiv]
[3] F. Bruzzone, W. Cazzola, and L. Favini, "Prioritizing Configuration Relevance via Compiler-Based Refined Feature Ranking." [Online]. Available: https://arxiv.org/abs/2601.16008 — [bib] [pdf] [arXiv]

## Education

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| **2024-Present** | **PhD Candidate** in Computer Science at the ADAPT Lab, University of Milan<br>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)<br>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

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| **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

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| **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** |

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| **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

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| **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

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| **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)

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| **2026-Present** | Maintainer of the LLVM Pass Template, a C++ template project to quickly create new LLVM passes.<br>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: Analysis and Transformations, a curated list of scientific publications on compiler optimizations and related topics.<br>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.<br>• Add `TooGeneric` variant to `LayoutError` and emit `Unknown` (closed but merged)<br>• Use the type-level constant value ty::Value where needed<br>• 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**.<br>**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.<br>• 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**.<br>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

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| **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

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| **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

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| **2024** | 56th Top Github Public Contributor in Italy out of 958 |

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| **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

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

Milan, 27/01/2026