Francesco Bertolotti — Curriculum Vitae

Personal Data

Personal Data	Francesco Bertolotti
Date of Birth	13-01-1995
Citizenship	Italy
Residence	Fontanellato (PR), Strada del Cristo 80

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Education

2009-2014	Degree	Scientific Certificate in Applied Sciences
	Institute	Scientific High School Berenini Fidenza (PR)
	Mark	82/100
2014-2017	Degree	Bachelor in Computer Science
	Institute	Università degli Studi di Parma
	Thesis	GPU-Based Solution Search for CSPs
	Advisor	Dal Palù Alessandro
	Mark	109/110
	date	21/09/2017
2017-2019	Degree	Master in Computer Science
	Institute	Università degli Studi di Milano
	Thesis	Software Feature Mining Through Neural Networks
	Advisor	Walter Cazzola
	date	17/10/2019
	Mark	110/110 cum laude
2020-2024	Degree	Ph.D. in Computer Science
	Institute	Università degli Studi di Milano
	Thesis	☆piler: Not a VM to Rule No One
	Advisor	Walter Cazzola
	Mark	Excellent
	date	26/01/2024

Awards

2024 Spotlight paper award at the Forty-first International Conference on Machine Learning (ICML) — 3.5% acceptance rate (335 selected out of 9473)

Teaching Activity

2020 Teaching Assistant for the Statistics and Data Analysis class, part of the Computer Science, Computer Science for Music, and Computer Science for Communication degree programs, *Università degli Studi di Milano*.

2023 Teaching Assistant for the Algorithms for Massive Datasets class, part of the Data Science and Economics degree program, *Università degli Studi di Milano*.

2023 Co-advisor for master's student Ermanno Righini on his thesis titled Deep Learning for Automatic Loop Vectorization in the Computer Science program at the *Università degli Studi di Milano*.

2024 Teaching Assistant for the Algorithms for Massive Datasets class, part of the Data Science and Economics degree program, *Università degli Studi di Milano*.

2024 Co-advisor for the master's student Stefano Gaetano Grosso Abraham on his thesis titled Netskip: a Real Case Scenario in the Computer Science program at the *Università degli Studi di Milano*.

Peer Reviewed Pubblications

[1] Authors: Bertolotti, Francesco and Cazzola, Walter and Favalli, Luca. Title: On the granularity of linguistic reuse. journal : Journal of Systems and Software. pages : 111704. scimago class: Q1. year : 2023. doi : https:/doi.org/10.1016/j.jss.2023.111704.

[2] Authors: Bertolotti, Francesco and Cazzola, Walter. Title: Fold2Vec: Towards a statement-based representation of code for code comprehension. journal : ACM Transactions on Software Engineering and Methodology. pages : 1--31. scimago class: Q1. year : 2023. doi : https:/doi.org/10.1145/3514232.

[3] Authors: Bertolotti, Francesco and Cazzola, Walter and Favalli, Luca. Title: Features, believe it or not! a design pattern for first-class citizen features on stock jvm. booktitle : Proceedings of the 26th ACM International Systems and Software Product Line Conference-Volume A. pages : 32--42. CORE class : B. year : 2022. doi : https:/doi.org/10.1145/3546932.3546989.

[4] Authors: Broccia, Giovanna and Ferrari, Alessio and Ter Beek, Maurice and Cazzola, Walter and Favalli, Luca and Bertolotti, Francesco. Title: Evaluating a Language Workbench: from Working Memory Capacity to Comprehension to Acceptance. booktitle : 2023 IEEE/ACM 31st International Conference on Program Comprehension (ICPC). pages : 54--58. CORE class : A. year : 2023. doi : https:/doi.org/10.1109/ICPC58990.2023.00017.

[5] Authors: Bertolotti, Francesco and Cazzola, Walter and Favalli, Luca. Title: SPLLPS: Software product lines extraction driven by language server protocol. journal : Journal of Systems and Software. pages : 111809. scimago class: Q1. year : 2023. doi : https:/doi.org/10.1016/j.jss.2023.111809.

[6] Authors: Bertolotti, Francesco and Cazzola, Walter. Title: CombTransformers: Statement-Wise Transformers for Statement-Wise Representations. journal : IEEE Transactions on Software Engineering. scimago class: Q1. year : 2023. doi : https:/doi.org/10.1109/TSE.2023.3310793.

[7] Authors: Bertolotti, Francesco and Cazzola, Walter and Favalli, Luca. Title: ☆piler: Compilers in search of compilations. journal : Journal of Systems and Software. pages : 112006. scimago class: Q1. year : 2024. doi : https:/doi.org/10.1016/j.jss.2024.112006.

[8] Authors: Bertolotti, Francesco and others. Title: ☆piler: Not a VM to Rule no One. year : 2024. url : https://hdl.handle.net/2434/1021772.

[9] Authors: Bertolotti, Francesco and Cazzola, Walter and Ostuni, Dario and Castoldi, Carlo. Title: When the dragons defeat the knight: Basilisk an architectural pattern for platform and language independent development. journal : Journal of Systems and Software. pages : 112088. scimago class: Q1. year : 2024. doi : https:/doi.org/10.1016/j.jss.2024.112088.

[10] Authors: Francesco Bertolotti and Walter Cazzola. Title: By Tying Embedding You are Assuming the Distributional Hypothesis. booktitle : Forty-first International Conference on Machine Learning. CORE class : A*. year : 2024. url : https://openreview.net/forum?id=yyYMAprcAR.

Presentations at Workshops

06/07/2022 Hydra: A Source-to-Source, One-to-Many, Transpiler Infrastructure.

Discussion of the research project during the kick-off meeting of the PRIN T-LADIES project in Pisa, Italy.

07/07/2022 Source-to-Source, Many-to-Many, Transpiler Infrastructure Using Delta-Translations

Discussion of the research project during the kick-off meeting of PRIN T-LADIES project, Pisa, Italy.

11/10/2023 ☆piler: Compilers in Search of Compilations.

Discussion of the research project during the second meeting of PRIN T-LADIES project, Catania, Italy.

13/12/2023 ☆piler: Compilers in Search of Compilations.

Discussion of the research project during the winter MUSEMI meeting, Milano, Italy.

13/06/2024 ☆piler & beyond.

Discussion of the research project during the third meeting of PRIN T-LADIES project, Parma, Italy.

13/06/2024 By Tying Embedding You Are Assuming the Distributional Hypothesis

Discussion of the research project during the third meeting of PRIN T-LADIES project, Parma, Italy.

Specialization Schools

2022 Programming Language Implementation Summer School (PLISS)

Participation in the 22nd edition of the Programming Language Implementation Summer School in Bertinoro, Italy.

Funded Research Projects

2023-2025 Typeful Language Adaptation for Dynamic, Interacting and Evolving Systems (T-LADIES).

Research member of the PRIN 2020TL3X8X project, funded by the Ministero dell'Università e della Ricerca, from June 1, 2022, to May 31, 2025 (36 months)

Review Acitivity

Reviewer for the following international journals:

- Journal of Computer Languages (COLAD), *Elsevier*.
- Transactions on Software Engineering and Methodology (TOSEM), *Association for Computing Machinery* (ACM).

Research Interests

2023-today	In recent years, I have focused my efforts on deep learning, primarily applied to large language models (such as ChatGPT, Claude, and Gemini). My research emphasizes mechanistic interpretability, aiming to uncover the inner workings of these models to enhance their performance.
2020-2023	Previously, I focused on compilers, transpilers, and deep learning applied to source code. My efforts led to the research and development of the ☆piler, an exotic transpilation infrastructure powered by the search algorithm A^*.

Research Experience

2020-2021	I served as a Research Collaborator under the supervision of Professor Walter Cazzola at the *Università degli Studi di Milano*. Our research concentrated on the empirical evaluation of deep learning architectures for code classification.
2023-today	I served as a Postdoctoral Fellow under the supervision of Professor Walter Cazzola at the *Università degli Studi di Milano*. Our research concentrated on the study of language models and their embeddings.

Other Skills

Languages	I am proficient in both spoken and written English. Native Italian speaker.
Technical Knowledge	I am an advanced Python programmer, with a strong knowledge of Java, C, C++, and CUDA. I am familiar with popular deep learning libraries such as Pytorch and Tensorflow. I am familiar with programming language development and infrastructures such as LLVM.
Licenses	A and B

Milano, 18/06/2024