Francesco Bertolotti — Curriculum Vitae

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Personal Data

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

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 and conferences:

- **Journal of Computer Languages** (COLAD), *Elsevier*.
- **Transactions on Software Engineering and Methodology** (TOSEM), *Association for Computing Machinery* (ACM).
- **The Thirteenth International Conference on Learning Representations** (ICLR), *OpenReview*.
- **Knowledge and Information Systems** (KAIS), *Springer Nature*.
- **Cluster Computing** (CLUSTER), *Springer Nature*.

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 **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, 30/12/2024