Francesco Masillo

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Education

01/10/2021 – 26/06/2025 **Ph.D. Computer Science, University of Verona, Italy**.
Thesis title: *On Data Structures for Texts and Permutations.*
Supervisor: *Prof. Zsuzsanna Lipták*

01/10/2019 – 15/07/2021 **M.Sc. Medical Bioinformatics, University of Verona, Italy**.
Thesis title: *On data structures and algorithms for permutations and the Burrows-Wheeler-Transform*.
Supervisor: *Prof. Zsuzsanna Lipták*
Grade[1]: 110/110 e lode (top grade with distinction)

01/10/2016 – 17/07/2019 **B.Sc. Bioinformatics, University of Verona, Italy**.
Thesis title: *Data analysis for autonomous aquatic drones: tools and methods*.
Supervisor: *Prof. Alberto Castellini*
Grade[1]: 109/110

15/09/2011 – 14/07/2016 **Dipl. Liceo Scientifico e Classico "Peano-Pellico", Cuneo, Italy**.
Grade[2]: 95/100

Reseach Projects and employments

since 2025 **Postdoc.** Postdoc position at Prof. Johannes Fischer's group (TU Dortmund).

12/2020 – 06/2021 **Postgraduate Scholarship.** Borsa di ricerca post-lauream: "Detection of anomalies in the control of intelligent heating systems", under the supervision of Prof. Alessandro Farinelli, University of Verona.

02/2021 – 04/2021 Development of an algorithm involving splay trees in Java, under the supervision of Prof. Zsuzsanna Lipták, University of Verona

06/2020 – 10/2020 Development of a tool and web app "CRISPRme" based on the software "CRISPRitz" in Python and using the Dash framework for web development, under the supervision of Prof. Rosalba Giugno, University of Verona

10/2019 – 06/2020 **Scholarship.** Co.Co.Co. (Contratto di collaborazione coordinata e continuativa): "Development of interpretable predictive algorithms and related tools for data analysis in smart grid and smart building applications", under the supervision of Prof. Alessandro Farinelli, University of Verona.

11/2018 – 07/2019 **Scholarship.** Co.Co.Co. (Contratto di collaborazione coordinata e continuativa): "Development of algorithms and tools for data analysis in smart grid and smart building applications", under the supervision of Prof. Alessandro Farinelli, University of Verona.

11/2018 – 01/2019 Development of a tool for visualizing dataset features and clustering results called "eXplainable Modeling (XM)", under the supervision of Prof. Alberto Castellini, University of Verona

[1] Italian university grade system: minimum pass 66, maximum 110.
[2] Italian high school grade system: minimum pass 60, maximum 100

Teaching and Student Supervision

10/2023 – 04/2024	**Teaching Assistant.** "Introduction to Programming" course in the Bachelor degree of Bioinformatics, University of Verona.
10/2023 – 03/2024	**Master thesis supervision.** Martina Lucà: experiments on the variability of the size of the dictionary and parse of Prefix-Free Parsing (PFP) with real and simulated biological data.
06/2023 – 10/2023	**Research project supervision.** Martina Lucà: experiments with different implementations of binary search for computing the Matching Statistics with the Suffix Array. This led to a publication that is currently under submission.
05/2023 – 08/2023	**Research project supervision.** Elena Soriato: experiments on the number of runs in the Burrows-Wheeler Transform.
03/2023 – 06/2023	**Teaching Assistant.** "Introduction to Programming" course in the Bachelor degree of Bioinformatics, University of Verona.

Reviewing

- Annual European Symposium on Algorithms (ESA 2024)
- Italian Conference on Theoretical Computer Science (ICTCS 2023)
- Symposium on String Processing and Information Retrieval (SPIRE 2023)
- Italian Conference on Theoretical Computer Science (ICTCS 2022)
- Symposium on String Processing and Information Retrieval (SPIRE 2022)

Presentations at International Conferences

- Zs. Lipták, F. Masillo, and G. Navarro, "A textbook solution for dynamic strings," ESA 2024, Royal Holloway, United Kingdom, Sept. 4, 2024.
- Zs. Lipták, M. Lucà, F. Masillo, and S. J. Puglisi, "Fast matching statistics for sets of long similar strings," PSC 2024, Prague, Czech Republic, Aug. 26, 2024.
- Zs. Lipták, F. Masillo, G. Navarro, and A. Williams, "Constant time and space updates for the Sigma-Tau problem," SPIRE 2023, Pisa, Italy, Sept. 26, 2023.
- F. Masillo, "Matching statistics speed up BWT construction," ESA 2023, Amsterdam, Netherlands, Sept. 4, 2023.
- Zs. Lipták, F. Masillo, "Maintaining the cycle structure of permutations efficiently," WCTA 2022, Concepción, Chile, (online), Nov. 11, 2022
- Zs. Lipták, F. Masillo, and S. J. Puglisi, "Suffix sorting via matching statistics," WABI 2022, Potsdam, Germany, Sept. 5, 2022.

Presentations at Monday Meetings

Seminar of the Algorithms Group in Verona, under the regular participation of researchers from Palermo, Helsinki, and Santiago; see https://profs.scienze.univr.it/liptak/MondayMeetings.html

- "A textbook solution for dynamic strings," October 10, 2024.
- "BAT-LZ out of hell," May 13, 2024.
- "Matching Statistics speed up BWT construction," Oct. 23, 2023.
- "Entropy bounds on the BWT - part II," Jan. 16, 2023.
- "Entropy bounds on the BWT - part I," Jan. 09, 2023.
- "Maintaining the cycle structure of permutations efficiently," Nov. 07, 2022.

Presentations at Monday Meetings (continued)

- "An overview of a simple linear-time Lyndon array construction algorithm," Oct. 10, 2022.
- "On the suffix array construction algorithm DivSufSort," Apr. 04, 2022.
- "On the suffix array construction algorithm GSACA," Jan. 10, 2022.
- "Adapting tools for the Hamming distance to pseudo-local metrics - part II," Nov. 15, 2021.
- "Adapting tools for the Hamming distance to pseudo-local metrics - part I," Oct. 25, 2021.
- "On data structures and algorithms for permutations and the Burrows-Wheeler-Transform," July 12, 2021.
- "Advances on the DollarBWT topic: pseudo-cycles finder," May 3, 2021.
- "On implementing the DollarBWT algorithm," Dec. 1, 2020.

Publications

Journal Articles

1. Zs. Lipták, F. Masillo, and S. J. Puglisi, "Suffix sorting via matching statistics," *Algorithms Mol. Biol.*, vol. 19, no. 1, pp. 1–11, 2024.
2. A. Castellini, F. Masillo, D. Azzalini, F. Amigoni, and A. Farinelli, "Adversarial data augmentation for HMM-based anomaly detection," *IEEE Trans. Pattern Anal. Mach. Intell.*, vol. 45, no. 12, pp. 14 131–14 143, 2023.
3. S. Giuliani, Zs. Lipták, F. Masillo, and R. Rizzi, "When a dollar makes a BWT," *Theor. Comput. Sci.*, vol. 857, pp. 123–146, 2021.
4. A. Castellini, M. Bicego, F. Masillo, M. Zuccotto, and A. Farinelli, "Time series segmentation for state-model generation of autonomous aquatic drones: A systematic framework," *Eng. Appl. Artif. Intell.*, vol. 90, p. 103 499, 2020.
5. A. Castellini, M. Bicego, D. Bloisi, J. Blum, F. Masillo, S. Peignier, and A. Farinelli, "Subspace clustering for situation assessment in aquatic drones: A sensitivity analysis for state-model improvement," *Cybern. Syst.*, vol. 50, no. 8, pp. 658–671, 2019.

Conference Proceedings

6. Zs. Lipták, M. Lucà, F. Masillo, and S. J. Puglisi, "Fast matching statistics for sets of long similar strings," in *Proc. of the 27th Prague Stringology Conference (PSC 2024)*, Prague, Czech Republic, August 26-28, 2024.
7. Zs. Lipták, F. Masillo, and G. Navarro, "A textbook solution for dynamic strings," in *Proc. of the 32nd Annual European Symposium on Algorithms (ESA 2024)*, London, United Kingdom, September 2-4, 2024.
8. Zs. Lipták, F. Masillo, and G. Navarro, "BAT-LZ out of hell," in *Proc. of the 35th Annual Symposium on Combinatorial Pattern Matching (CPM 2024)*, ser. LIPIcs, vol. 296, Schloss Dagstuhl – Leibniz-Zentrum für Informatik, 2024, 21:1–21:17.
9. Zs. Lipták, F. Masillo, G. Navarro, and A. Williams, "Constant time and space updates for the Sigma-Tau problem," in *Proc. of the 30th International Symposium on String Processing and Information Retrieval (SPIRE 2023)*, ser. Lecture Notes in Computer Science, vol. 14240, Springer, 2023, pp. 323–330.
10. F. Masillo, "Matching statistics speed up BWT construction," in *Proc. of the 31st Annual European Symposium on Algorithms (ESA 2023)*, ser. LIPIcs, vol. 274, Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2023, 83:1–83:15.
11. S. Giuliani, Zs. Lipták, and F. Masillo, "When a dollar in a fully clustered word makes a BWT," in *Proc. of the 23rd Italian Conference on Theoretical Computer Science (ICTCS 2022)*, ser. CEUR Workshop Proceedings, vol. 3284, CEUR-WS.org, 2022, pp. 122–135.

12 Zs. Lipták, F. Masillo, and S. J. Puglisi, "Suffix sorting via matching statistics," in *Proc. of the 22nd International Workshop on Algorithms in Bioinformatics (WABI 2022)*, ser. LIPIcs, vol. 242, Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2022, 20:1–20:15.

13 F. Bianchi, F. Masillo, A. Castellini, and A. Farinelli, "XM_HeatForecast: Heating load forecasting in smart district heating networks," in *Proc. of the 6th International Conference Machine Learning, Optimization, and Data Science (LOD 2020)*, ser. Lecture Notes in Computer Science, vol. 12565, Springer, 2020, pp. 601–612.

14 A. Castellini, F. Masillo, M. Bicego, D. Bloisi, J. Blum, A. Farinelli, and S. Peignier, "Subspace clustering for situation assessment in aquatic drones," in *Proc. of the 34th ACM/SIGAPP Symposium on Applied Computing (SAC 2019)*, ACM, 2019, pp. 930–937.

15 A. Castellini, F. Masillo, R. Sartea, and A. Farinelli, "eXplainable Modeling (XM): Data analysis for intelligent agents," in *Proc. of the 18th International Conference on Autonomous Agents and MultiAgent Systems (AAMAS 2019)*, International Foundation for Autonomous Agents and Multiagent Systems, 2019, pp. 2342–2344.

Languages

Native	Italian
Strong	Reading, writing and speaking in English.
Beginner	Reading, writing and speaking in German.
	Reading, speaking in French.

Coding

Good	C/C++
	Python
	Java
Intermediate	R
Beginner	Rust