Ilie Sarpe

Curriculum Vitae

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About me

I am a postdoctoral researcher mentored by Aristides Gionis. I got my PhD in Computer Engineering under the supervision of Fabio Vandin. My research interests focus the design of efficient, rigorous and scalable algorithms for knowledge extraction (such as patterns) from large data. I am focused on designing algorithms with *provable* theoretical guarantees, often using techniques from probability, and concentration theory. I especially enjoy graphs and networks embedding time.

Education

PhD
Oct 2019 - Mar 2023
University of Padova, Italy
Department of Information Engineering

Thesis Title: Efficient and Rigorous Algorithms for the Analysis of Large Temporal Networks
Advisor: Fabio Vandin

M.S. in Computer Engineering
Oct 2017 - Sep 2019
University of Padova, Italy
Department of Information Engineering

Thesis title: Mining Motifs in Temporal Networks
Grade: 110/110 e lode (*summa cum laude*)
Advisor: Fabio Vandin

B.S. in Computer Engineering
Oct 2014 - Sep 2017
University of Padova, Italy
Department of Information Engineering

Thesis title: Statistical Correlation between Alignment-free and Edit Distance Measures
Grade: 104/110
Advisor: Matteo Comin

Academic Appointments

Visiting Researcher
Oct 2024, Apr 2025 — Department of Computer Science, Brown University, Providence (RI, US), hosted by Eliezer Upfal.

Postdoctoral Researcher
Sep 2023 - current — Department of Computer Science, KTH, Stockholm (Sweden), mentored by Aristides Gionis.

Research Fellow
Mar 2023 - Jun 2023 — Department of Information Engineering, Unipd, Padova (Italy), mentored by Fabio Vandin.

Visiting PhD Student
Oct 2022 - Jan 2023 — Department of Computer Science, KTH, Stockholm (Sweden), hosted by Aristides Gionis.

Teaching

Teaching Assistant
2018 - 2021 — *Big Data Computing*, Department of Information Engineering, University of Padova

Teaching Assistant
2017 - 2019 — *Tutorato Formativo*, Department of Information Engineering, University of Padova

Publications

- Giorgio Venturin*, *Ilie Sarpe** and Fabio Vandin, *Efficient Approximate Temporal Triangle Counting in Streaming with Predictions*, Accepted at the European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML-PKDD 2025). (Acceptance rate $\approx$ 24%)

- *Ilie Sarpe*† and Aristides Gionis, *Efficient and Adaptive Estimation of Local Triadic Coefficients*, Accepted at the 51st International Conference on Very Large Data Bases (VLDB 2025).
- Guangyi Zhang, *Ilie Sarpe* and Aristides Gionis, *Efficient and Practical Approximation Algorithms for Advertising in Content Feeds*, Accepted at the ACM The Web Conference 2025 (WWW 2025). (Acceptance rate 19.8%)
- *Ilie Sarpe*, Fabio Vandin and Aristides Gionis, *Scalable Temporal Motif Densest Subnetwork Discovery*, Accepted at the 30th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2024). (Acceptance rate ≈ 20%)
- Diego Santoro* and *Ilie Sarpe**†, ONBRA*: Rigorous Estimation of the Temporal Betweenness Centrality in Temporal Networks*, Accepted at the ACM The Web Conference 2022 (WWW 2022). (Acceptance rate 17.7%)
- *Ilie Sarpe* and Fabio Vandin, ODEN*: Simultaneous Approximation of Multiple Motif Counts in Large Temporal Networks*, Accepted at the 30th ACM International Conference on Information and Knowledge Management (CIKM 2021). ***Selected presentation*** (only a small number of works were selected for live presentation). (Acceptance rate 21.7%)
- *Ilie Sarpe* and Fabio Vandin, *PRESTO: Simple and Scalable Sampling Techniques for the Rigorous Approximation of Temporal Motif Counts*, Accepted at the 2021 SIAM International Conference on Data Mining (SDM21). (Acceptance rate 21.15%)

∗ denotes equal contribution.

† denotes contact author.

‡ denotes alphabetical order.

Talks at International Conferences

15th September 2025 — *Efficient Approximate Temporal Triangle Counting in Streaming with Predictions*. 22nd International Workshop on Mining and Learning with Graphs at ECMLPKDD 2025.

4th September 2025 — *Efficient and Adaptive Estimation of Local Triadic Coefficients*. 51st International Conference on Very Large Data Bases London, United Kingdom - 1-5 September 2025, London, United Kingdom.

27th August 2024 — *Scalable Temporal Motif Densest Subnetwork Discovery*. 2024 ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 24), 25 - 29 August 2024, Barcelona (Spain).

28th April 2022 — ONBRA*: Rigorous Estimation of the Temporal Betweenness Centrality in Temporal Networks*. ACM The Web Conference 2022 (WWW 2022), 25 - 29 April 2022, Lyon (France), Virtual Event.

4th November 2021 **Selected talk** — ODEN*: Simultaneous Approximation of Multiple Motif Counts in Large Temporal Networks*. 30th ACM International Conference on Information and Knowledge Management (CIKM 2021), 1 - 5 November 2021, Queensland (Australia), Virtual Event.

29th April 2021 — *PRESTO: Simple and Scalable Sampling Techniques for the Rigorous Approximation of Temporal Motif Counts*. 2021 SIAM International Conference on Data Mining (SDM 21), April 29 - May 1, 2021, Virtual Event.

Tutorials

3rd May 2025 — Aristides Gionis, Lutz Oettershagen and *Ilie Sarpe*. *Mining Temporal Graphs: Algorithms and Applications*. 2025 SIAM International Conference on Data Mining (SDM25), 1 - 3 May, 2025, Alexandria, VI, US. Lecture-style.

13th May 2024 — Aristides Gionis, Lutz Oettershagen and *Ilie Sarpe*. *Mining Temporal Networks*. 2024 ACM on Web Conference 2024 (The Web Conference 2024), 13 - 17 May, 2024, Singapore. Lecture-style.

Invited Talks

8th September 2025 — *Efficient and Adaptive Estimation of Local Triadic Coefficients*. University of Liverpool. Algorithms, Complexity Theory and Optimisation Series, seminar.

7th July 2025	*Scalable Temporal Motif Densest Subnetwork Discovery*. Algorithmic Aspects of Temporal Graphs VIII. Workshop at ICALP 2025.
3rd September 2024	*Adaptive Estimation of Triadic Coefficients*. Statistical and Probabilistic Methods in Algorithmic Data Analysis, Dagsthul Seminar.
13th September 2023	*Discovering Temporal Motif Densest Subnetworks*. Workshop on Algorithmic Aspects of Clustering and Related Problems (ALACARTE 2023), Bertinoro BICI.
22nd December 2021	*Motifs in Temporal Networks Definitions, Algorithms and Applications*. Invited lecture for the *Learning from Networks* M.Sc. course, Department of Information Engineering, University of Padova, Italy.

Fellowships and Awards

Jun 2025	Outstanding reviewer for KDD2025 (second cycle).
Sep 2023	Bertinoro BICI travel fellowship.
Oct 2022	SoBigData++ Transnational Access (known as TNA) support for short term visits.
Oct 2019 - Dec 2022	PhD Fellowship from "Department of Information Engineering (DEI)", University of Padova, Italy
2017	Award for scientific degrees, award given to the best 500 students of scientific degrees, University of Padova, Italy
2017	"Mille e una lode", award for the top 5% students of the academic year 2016, University of Padova, Italy
2016	"Mille e una lode", award for the top 5% students of the academic year 2015, University of Padova, Italy

Other Information

Supervision	
Master students	Davide Peressoni (University of Padova, 2022, co-supervised) Giorgio Venturin (University of Padova, 2023, co-supervised) Tommaso Calvani (Sapienza university, 2025, co-supervised) Theofanis Georgakopoulos (KTH university, 2025, co-supervised)
Bachelor students	Filippo Ronco (University of Padova, 2020, co-supervised)
Program Committee Member	KDD 2023, ECCB 2023, WSDM 2024, SDM 2024, WWW 2024, KDD 2024, ACML 2024, WSDM 2025, KDD 2025 (first cycle), KDD 2025 (second cycle, **outstanding reviewer**), WWW 2025, GrAPL 2025 (IPDPS2025 workshop), CIKM 2025, TGL 2025 (KDD 2025 workshop), MLG 2025 (ECML-PKDD2025 workshop), KDD 2026 (first cycle)
Conference Reviewer	RECOMB 2020, KDD 2020, ICDM 2020, WWW 2021, ECML-PKDD 2021, ICDM 2021, WSDM 2022, WWW 2022, KDD 2022, ICDM 2022, ACDA23, WWW 2023, ECML-PKDD 2023, ESA 2023, ISAAC 2024, SDM 2025
Journal Reviewer	Journal of Graph Algorithms and Applications, Data Mining and Knowledge Discovery, Knowledge and Information Systems
Session Chair	TheWebConference 2024, Session: Algorithms for social networks.
Project Participation	PRIN Project n. 20174LF3T8 AHeAD (Efficient Algorithms for Harnessing Networked Data), MIUR Italy. "SID 2020: RATED-X", University of Padova, Italy. ERC Advanced Grant REBOUND n. 834862. EC H2020 RIA project SoBigData++ n. 871042.
Programming Experience	C++, C, Java, Python, MATLAB, SQL, NoSQL, Bash, LaTeX
Programming Frameworks	Apache Spark, IBM ILOG CPLEX, Gurobi
Languages	Native Italian and Romanian Speaker, B2 English

Software Packages Open-source software packages:

- PRESTO: an efficient sampling algorithm for estimating the count of a temporal motif in a temporal network. `https://github.com/VandinLab/PRESTO`.
- ODEN: and efficient sampling algorithm for estimating the counts of multiple temporal motifs sharing a common topological structure. `https://github.com/VandinLab/odeN`.
- ONBRA: an efficient algorithm for estimating the temporal betweenness centrality of the various nodes in a temporal network under two criteria for the paths considered. `https://github.com/iliesarpe/onbra`.
- ALDENTE: a suite of efficient and scalable algorithms to extract dense subnetworks, where density accounts for the number of the temporal motif occurrences. `https://github.com/iliesarpe/ALDENTE`.
- Triad: an efficient and adaptive algorithm to compute the average of local triadic coefficients on graph data. `https://github.com/iliesarpe/triad`.