Domenico MANDAGLIO

Assistant Professor (RTDa) at University of Calabria

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RESEARCH INTERESTS

My research interests lie primarily in the broad areas of *artificial intelligence* and *(algorithmic) data science*, with the main goal of tackling (novel) problems and designing effective yet efficient algorithms that are useful to gain knowledge from data. Due to the fact that much of today's data can be represented as graphs, my emphasis has primarily been on formalizing data-driven challenges as graph problems. More specifically, my recent research interests include graph mining and learning, correlation clustering and explainable AI.

RESEARCH EXPERIENCES

Assistant Professor (RTDa)   June 2023 - present
University of Calabria, DIMES department   Rende, Italy

> Research manager: prof. Sergio Greco
> Area of research: polarization detection, link prediction, graph representation learning, eXplainable AI

Postdoctoral Researcher   May 2021 - June 2023
University of Calabria, DIMES department   Rende, Italy

> Research manager: prof. Andrea Tagarelli
> Area of research: correlation clustering, combinatorial bandits, active learning

Research & Teaching Assistant   October 2017 - May 2021
University of Calabria, DIMES department   Rende, Italy

> Research managers: prof. Sergio Greco and prof. Andrea Tagarelli
> Area of research: community detection, clustering uncertain graphs, preference learning

Research Fellow   April 2018 - June 2018
University of Calabria, DIMES department   Rende, Italy

> Research manager: prof. Filippo Furfaro
> Area of research: privacy-preserving synopses of multidimensional data

EDUCATION

Ph.D. in Information and Communication Technologies   October 2017 - May 2021
University of Calabria   Rende, Italy

> Thesis: "Mining and Learning Problems in Complex Graph Data"
> Supervisors: prof. Sergio Greco and prof. Andrea Tagarelli

M.Sc. in Computer Science & Engineering (*with honors*)   October 2014 - September 2017
University of Calabria   Rende, Italy

> Thesis: "Ensemble-based Community Detection in Multilayer Networks"
> Supervisor: prof. Andrea Tagarelli

B.Sc. in Computer Science & Engineering (*with honors*)   October 2011 - September 2014
University of Calabria   Rende, Italy

> Thesis: "Implementation of Outlier Detection Algorithms in Weka"
> Supervisor: prof. Fabio Fassetti

SCIENTIFIC COMMUNITY SERVICE

Program Committee

> *ACM SIGKDD International Conference on Knowledge Discovery & Data Mining* (**KDD**) (*Research* track) [2023]
> *ACM The Web Conference* (**WWW**) (*Graph Algorithms and Learning for the Web* track) [2024]
> *ACM The Web Conference* (**WWW**) (*Social Network Analysis and Graph Algorithms* track) [2022, 2023]
> *ACM International Conference on Web Search and Data Mining* (**WSDM**) [2023]
> *AAAI Conference on Artificial Intelligence* (**AAAI**) [2023, 2024]
> *European Conference on Artificial Intelligence* (**ECAI**) [2023]

> - *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases* (**ECML-PKDD**) (*Research* track) [2022, 2023]
> - *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases* (**ECML-PKDD**) (*Applied Data Science* track) [2021, 2022]
> - *International Symposium on Methodologies for Intelligent Systems* (**ISMIS**) [2022]
> - *Workshop on MIning DAta for financial applicationS* (**MIDAS**), in conjuction with the *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases* (**ECML-PKDD**) [2021, 2022, 2023]

Conference Reviewing (The list does not include reviews done as Program Committee member)

> - *ACM SIGMOD International Conference on Management of Data* (**SIGMOD**) [2023]
> - *ACM SIGKDD International Conference on Knowledge Discovery & Data Mining* (**KDD**) [2019, 2020, 2021, 2022]
> - *International Joint Conference on Artificial Intelligence* (**IJCAI**) [2022]
> - *ACM The Web Conference* (**WWW**) [2019, 2020]
> - *IEEE International Conference on Data Mining* (**ICDM**) [2018, 2020, 2021]
> - *SIAM International Conference on Data Mining* (**SDM**) [2018]
> - *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases* (**ECML-PKDD**) [2018, 2019]

Journal Reviewing

> - *IEEE Transactions on Knowledge and Data Engineering* (**TKDE**)
> - *Machine Learning* (**MACH**)
> - *Social Network Analysis and Mining* (**SNAM**)
> - *Journal of Intelligent Information Systems* (**JIIS**)

Scientific Boards

> - Member of the Editorial Board of Data Mining and Management as Review Editor for Frontiers in Big Data

TALKS & POSTERS

Presenting Author

> - *A Combinatorial Multi-Armed Bandit Approach to Correlation Clustering*, European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (**ECML-PKDD '23**), Turin, Italy, September 2023
> - *Learning to Active Learn by Gradient Variation Based on Instance Importance*, International Conference on Pattern Recognition (**ICPR '22**), Montréal, Québec, August 2022
> - *Correlation Clustering: from Local to Global Constraints*, Italian Symposium on Advanced Database Systems (**SEBD '22**), Tirrenia (Pisa), Italy, June 2022
> - *Correlation Clustering with Global Weight Bounds*, European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (**ECML-PKDD '21**), Virtual Event, September 2021
> - *In and Out: Optimizing Overall Interaction in Probabilistic Graphs under Clustering Constraints*, ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**KDD '20**), Virtual Event, August 2020
> - *A Combinatorial Multi-Armed Bandit Based Method for Dynamic Consensus Community Detection in Temporal Networks*, International Conference on Discovery Science (**DS '19**), Split, Croatia, October 2019
> - *Dynamic consensus community detection and combinatorial multi-armed bandit*, IEEE/ACM Int. Conference on Advances in Social Networks Analysis and Mining (**ASONAM '19**), Vancouver, Canada, August 2019

Tutorials

> - Domenico Mandaglio, Lucio La Cava and Andrea Tagarelli. *Fair Clustering and Polarization Detection on Online Social Networks through Correlation Clustering*, 16th ACM Web Science Conference (**WebSci '24**), Stuttgart, Germany, May 2024

EXTERNALLY-FUNDED RESEARCH PROJECTS

Partecipation as a research-staff member

> - *D-All: sfruttare la potenza dei big data per effettuare analisi predittiva in applicazioni innovative di cross-market*, Funding entity: Italian PON 2018-2020, CUP: B48I17000820008.
> - *Future Artificial Intelligence Research (FAIR), Spoke 9 - Green-Aware AI*, Funding entity: MUR PNRR 2023-2025, CUP: H23C22000860006

TEACHING

Instructor
University of Calabria   Rende, Italy

> - *Data Mining*, B.Sc. in Computer Science & Engineering, 24 hours/year.   '23-'24

- *Database Systems and Data Analytics*, B.Sc. in Statistics for Data Science, 16 hours/year.   '23-'24
- *Correlation Clustering: from classic to Reinforcement Learning-based theoretical frameworks, with applications to fairness and diversity related problems*, PhD program in ICT, 10 hours/year.   '22-'23

Teaching Assistant
University of Calabria   Rende, Italy

- *Database Systems and Data Analytics*, B.Sc. in Statistics for Data Science, 5 hours/year.   '23-'24
- *Algorithms and Data Structures (Group A)*, B.Sc. in Computer Science & Engineering, 18 hours/year.   '21-'22, '22-'23
- *Algorithms and Data Structures (Group B)*, B.Sc. in Computer Science & Engineering, 18 hours/year.   '21-'22
- *Algorithms and Data Structures*, B.Sc. in Computer Science & Engineering, 18 hours/year.   '17-'18, '18-'19, '20-'21
- *Database Systems*, M.Sc. in Management Engineering, 15 hours/year.   '18-'19, '19-'20

AWARDS

- **WWW 2023 Best Reviewer Award**: granted to reviewers *"selected by track chairs of the research track from the Program Committee and Senior Program Committee, based on the quality of their reviews and metareviews, and their engaged participation during the discussion phase"* (Top 130 out of 1,300+)

SKILLS (NON-EXHAUSTIVE)

General-Purpose Programming Languages: Python, Java, C
Domain-Specific Languages: SQL (relational DB querying), Bash (shell scripting), LaTeX (typesetting)
Versioning Technology: Git
Interacting Computing Technology: Jupyter Notebook
Software Libraries: numpy, scikit-learn, PyTorch, PyTorch Geometric, pandas, seaborn, NetworkX, igraph
Operating Systems: macOS, Windows, Unix/Linux
Language Skills: (Native) Italian, (Fluent) English, (Basic) French

PUBLICATIONS

International Conferences

[1] Gianvincenzo Alfano, Sergio Greco, Domenico Mandaglio, Francesco Parisi, and Irina Trubitsyna. "Complexity of verification and existence problems in epistemic argumentation framework". In *Proceedings of the European Conference on Artificial Intelligence* (**ECAI '23**), Krakow, Poland, September 30 - October 4, 2023, pp. 77–84.

[2] Francesco Gullo, Lucio La Cava, Domenico Mandaglio, and Andrea Tagarelli. "When Correlation Clustering Meets Fairness Constraints". In *Proceedings of the International Conference on Discovery Science* (**DS '22**), Montpellier, France, October 10-12, 2022, pp. 302–317.

[3] Sergio Flesca, Domenico Mandaglio, Francesco Scala, and Andrea Tagarelli. "Learning to Active Learn by Gradient Variation Based on Instance Importance". In *Proceedings of the International Conference on Pattern Recognition* (**ICPR '22**), Montréal, Québec, Canada, August 21-25, 2022, pp. 2224–2230.

[4] Domenico Mandaglio, Andrea Tagarelli, and Francesco Gullo. "Correlation Clustering with Global Weight Bounds". In *Proceedings of the European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases* (**ECML-PKDD '21**), Bilbao, Spain, September 13-17, 2021, pp. 1371–13815.

[5] Domenico Mandaglio, Andrea Tagarelli, and Francesco Gullo. "In and Out: Optimizing Overall Interaction in Probabilistic Graphs under Clustering Constraints". In *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining* (**KDD '20**), Virtual Event, CA, USA, August 23-27, 2020, pp. 1371–1381.

[6] Domenico Mandaglio and Andrea Tagarelli. "Dynamic consensus community detection and combinatorial multi-armed bandit". In *IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining* (**ASONAM '19**), Vancouver, British Columbia, Canada, 27-30 August, 2019, pp. 184–187.

[7] Domenico Mandaglio and Andrea Tagarelli. "A Combinatorial Multi-Armed Bandit Based Method for Dynamic Consensus Community Detection in Temporal Networks". In *Proceedings of the International Conference on Discovery Science* (**DS '19**), Split, Croatia, October 28-30, 2019, pp. 412–427.

[8] Domenico Mandaglio, Alessia Amelio, and Andrea Tagarelli. "Consensus Community Detection in Multilayer Networks Using Parameter-Free Graph Pruning". In *Proceedings of the Pacific-Asia Conference on Knowledge Discovery and Data Mining* (**PAKDD '18**), Melbourne, VIC, Australia, June 3-6, 2018, pp. 193–205.

Journals

[9] Francesco Gullo, Domenico Mandaglio, and Andrea Tagarelli. "A Combinatorial Multi-Armed Bandit Approach to Correlation Clustering". *Data Mining and Knowledge Discovery* (**DAMI**) (2023), pp. 1630–1691.

[10] Domenico Mandaglio and Andrea Tagarelli. "Generalized Preference Learning for Trust Network Inference". **IEEE Access** (2019), pp. 174583–174596.

National Conferences & Workshops

[11] Gianvincenzo Alfano, Sergio Greco, Domenico Mandaglio, Francesco Parisi, and Irina Trubitsyna. "On the Verification and Existence Problems in Epistemic Argumentation Framework". In *Proceedings of the 7th Workshop on Advances in Argumentation in Artificial Intelligence* (**AI^3 '23**) *co-located with the 22nd International Conference of the Italian Association for Artificial Intelligence* (**AIxIA '23**)*, Rome, Italy, November 9,* vol. 3546. 2023.

[12] Sergio Flesca, Domenico Mandaglio, Francesco Scala, and Andrea Tagarelli. "A Meta-Active Learning Approach Exploiting Instance Importance based on Learning Gradient Variation". In *Proceedings of the 31th Italian Symposium on Advanced Database Systems* (**SEBD '23**), Galzingano Terme, Italy, July 2-5, 2023, pp. 535–544.

[13] Domenico Mandaglio, Andrea Tagarelli, and Francesco Gullo. "Correlation Clustering: from Local to Global Constraints". In *Proceedings of the 30th Italian Symposium on Advanced Database Systems* (**SEBD '22**), Tirrenia (Pisa), Italy, June 19-22, 2022, pp. 445–452.

Preprints

[14] Lucio La Cava, Domenico Mandaglio, and Andrea Tagarelli. "Polarization in Decentralized Online Social Networks". In *arXiv:2312.05668*. 2023.