

Niccolò Di Marco

ASSISTANT PROFESSOR (RTDA) - INFO/01

Tuscia University, Via S.M. in Gradi n.4, 01100 Viterbo, Italy

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Research profile

RESEARCH INTERESTS

- Computational Social Science
- Network Science
- Complex systems
- Combinatorics

SUMMARY OF SCIENTIFIC PRODUCTION

- **Journal Papers:** 16
- **Conference Papers:** 8
- **Total Impact Factor:** 137.3
- **Citations:** 385 (Scopus), 827 (Google Scholar)
- **H-index:** 5 (Scopus), 8 (Google Scholar)

Education

University of Florence

Florence, Italy

PHD IN MATHEMATICS, COMPUTER SCIENCE AND STATISTICS *cum laude*

2020 - 2023

- Advisor: Prof. Andrea Frosini
- Thesis title: *Reconstruction problems on graphs and discrete sets: theoretical results and algorithms* (Discussed on the 8th of November 2023)

University of Florence

Florence, Italy

M.S. *cum laude* IN MATHEMATICS

2018 - 2020

- Advisor: Prof. Andrea Frosini
- Thesis title: *A graph theoretical analysis of functional connectivity in healthy subjects*

University of Siena

Siena, Italy

B.S. *cum laude* IN MATHEMATICS

2015 - 2018

- Advisor: Prof. Cristiano Bocci
- Thesis title: *Nomos Alpha: an algebraic analysis*

Research Experience

Tuscia University

Viterbo, Italy

ASSISTANT PROFESSOR (RTDA)

2025 -

Department of Legal, Social, and Educational Sciences

Sapienza University of Rome

Rome, Italy

POST-DOC RESEARCHER

2023 - 2025

Department of Computer Science

University of Florence

Florence, Italy

RESEARCH ASSISTANT

2020 - 2023

Department of Mathematics and Computer Science "Ulisse Dini"

Teaching experience _____

UNIVERSITY COURSES

Tuscia University

Viterbo, Italy

Lecturer

2025 -

- Master's Degree: *Archival Science and Artificial Intelligence*
- Course: *Digital Archives and Artificial Intelligence*
- CFU: **6**
- Hours: **48**

Tuscia University

Viterbo, Italy

Lecturer

2025 -

- Master's Degree: *Informazione digitale*
- Course: *Interazione ed usabilità dei sistemi digitali*
- CFU: **8**
- Hours: **48**

University of Florence

Florence, Italy

Tutor

2019 - 2024

- Bachelor's Degrees: *Computer Science, Physics, Chemistry, Biology, Mathematics.*
- Courses: *Calculus, Geometry, Numerical Analysis*

MASTER'S COURSES

Tuscia University

Viterbo, Italy

Lecturer

2025

- Master's Course: *Comunicazione strategica*
- Course: *Intelligence dei dati e delle fonti aperte*
- CFU: **1**
- Hours: **4**

Tuscia University

Viterbo, Italy

Lecturer

2025

- Master's Course: *Comunicazione strategica*
- Course: *Internet e piattaforme di social media*
- CFU: **1**
- Hours: **4**

Tuscia University

Viterbo, Italy

Lecturer

2025

- Master's Course: *Percorso formativo abilitante da 60 CFU*
- Course: *Risorse per l'apprendimento: materiali didattici e ambienti digitali*
- CFU: **5**
- Hours: **30**

UnitelmaSapienza University of Rome

Rome, Italy

Lecturer

2025 -

- Master's Course: *Analisi e modellazione dei dati e dei processi: metodi e modelli - AMDP*
- Course: *Analisi di reti sociali*
- CFU: **3**
- Hours: **12**

Publications _____

REFEREED JOURNAL PUBLICATIONS

1. Loru, E., Galeazzi, A., Bonetti, A., Sangiorgio, E., **Di Marco, N.**, Cinelli, M., Falkenberg, M., Baronchelli, A., & Quattrocchi, W. (2025). Ideology and polarization set the agenda on social media. *Scientific Reports*, 15(1). <https://doi.org/10.1038/s41598-025-19776-z>

2. Loru, E., Nudo, J., **Di Marco, N.**, Santirocchi, A., Atzeni, R., Cinelli, M., Cestari, V., Rossi-Arnaud, C., & Quattrociocchi, W. (2025). The simulation of judgment in LLMs. *Proceedings of the National Academy of Sciences*, 122(42). <https://doi.org/10.1073/pnas.2518443122>
3. **Di Marco, N.**, Brunetti, S., Cinelli, M., & Quattrociocchi, W. (2025). Post-hoc Evaluation of Nodes Influence in Information Cascades: The Case of Coordinated Accounts. *ACM Transactions on the Web*, 19(2), 1–19. <https://doi.org/10.1145/3700644>
4. Pecile, G., **Di Marco, N.**, Cinelli, M., & Quattrociocchi, W. (2025). Mapping the global election landscape on social media in 2024. In V. Auriemma (Ed.), *PLOS ONE* (Vol. 20, Issue 2, p. e0316271). Public Library of Science (PLOS). <https://doi.org/10.1371/journal.pone.0316271>
5. Sangiorgio, E., **Di Marco, N.**, Etta, G., Cinelli, M., Cerqueti, R., & Quattrociocchi, W. (2025). Evaluating the effect of viral posts on social media engagement. In *Scientific Reports* (Vol. 15, Issue 1). Springer Science and Business Media LLC. <https://doi.org/10.1038/s41598-024-84960-6>
6. **Di Marco, N.**, Loru, E., Bonetti, A., Serra, A. O. G., Cinelli, M., & Quattrociocchi, W. (2024). Patterns of linguistic simplification on social media platforms over time. In *Proceedings of the National Academy of Sciences* (Vol. 121, Issue 50). *Proceedings of the National Academy of Sciences*. <https://doi.org/10.1073/pnas.2412105121>
7. **Di Marco, N.**, Frosini, A., & Picouleau, C. (2024). The complexity of 2-intersection graphs of 3-hypergraphs recognition for claw-free graphs and triangulated claw-free graphs. In *Discrete Applied Mathematics* (Vol. 355, pp. 232–246). Elsevier BV. <https://doi.org/10.1016/j.dam.2024.05.009>
8. Etta, G., Cinelli, M., **Di Marco, N.**, Avalle, M., Panconesi, A., & Quattrociocchi, W. (2024). A Topology-Based Approach for Predicting Toxic Outcomes on Twitter and YouTube. In *IEEE Transactions on Network Science and Engineering* (Vol. 11, Issue 5, pp. 4875–4885). Institute of Electrical and Electronics Engineers (IEEE). <https://doi.org/10.1109/tnse.2024.3398219>
9. **Di Marco, N.**, Cinelli, M., Alipour, S., & Quattrociocchi, W. (2024). Users Volatility on Reddit and Voat. In *IEEE Transactions on Computational Social Systems* (Vol. 11, Issue 5, pp. 5871–5879). Institute of Electrical and Electronics Engineers (IEEE). <https://doi.org/10.1109/tcss.2024.3379318>
10. Avalle, M., **Di Marco, N.**, Etta, G., Sangiorgio, E., Alipour, S., Bonetti, A., Alvisi, L., Scala, A., Baronchelli, A., Cinelli, M., & Quattrociocchi, W. (2024). Persistent interaction patterns across social media platforms and over time. In *Nature* (Vol. 628, Issue 8008, pp. 582–589). Springer Science and Business Media LLC. <https://doi.org/10.1038/s41586-024-07229-y>
11. Alipour, S., **Di Marco, N.**, Avalle, M., Etta, G., Cinelli, M., & Quattrociocchi, W. (2024). The drivers of global news spreading patterns. In *Scientific Reports* (Vol. 14, Issue 1). Springer Science and Business Media LLC. <https://doi.org/10.1038/s41598-024-52076-6>
12. **Di Marco, N.**, Di Palma, A., & Frosini, A. (2023). A study on the predictive strength of fractal dimension of white and grey matter on MRI images in Alzheimer’s disease. In *Annals of Mathematics and Artificial Intelligence* (Vol. 92, Issue 1, pp. 201–214). Springer Science and Business Media LLC. <https://doi.org/10.1007/s10472-023-09885-8>
13. Etta, G., Sangiorgio, E., **Di Marco, N.**, Avalle, M., Scala, A., Cinelli, M., & Quattrociocchi, W. (2023). Characterizing engagement dynamics across topics on Facebook. In V. A. Traag (Ed.), *PLOS ONE* (Vol. 18, Issue 6, p. e0286150). Public Library of Science (PLOS). <https://doi.org/10.1371/journal.pone.0286150>
14. **Di Marco, N.**, Frosini, A., Kocay, W. L., Pergola, E., & Tarsissi, L. (2022). Structure and Complexity of 2-Intersection Graphs of 3-Hypergraphs. In *Algorithmica* (Vol. 85, Issue 3, pp. 745–761). Springer Science and Business Media LLC. <https://doi.org/10.1007/s00453-022-00990-4>
15. Falkenberg, M., Galeazzi, A., Torricelli, M., **Di Marco, N.**, Larosa, F., Sas, M., Mekacher, A., Pearce, W., Zollo, F., Quattrociocchi, W., & Baronchelli, A. (2022). Growing polarization around climate change on social media. In *Nature Climate Change* (Vol. 12, Issue 12, pp. 1114–1121). Springer Science and Business Media LLC. <https://doi.org/10.1038/s41558-022-01527-x>
16. Cinelli, M., Etta, G., Avalle, M., Quattrociocchi, A., **Di Marco, N.**, Valensise, C., Galeazzi, A., & Quattrociocchi, W. (2022). Conspiracy theories and social media platforms. In *Current Opinion in Psychology* (Vol. 47, p. 101407). Elsevier BV. <https://doi.org/10.1016/j.copsyc.2022.101407>

CONFERENCE PROCEEDINGS

1. Pecile, G., **Di Marco, N.**, Cinelli, M., & Quattrociocchi, W. (2025). Decoding Political Polarization in Social Media Interactions. In *Studies in Computational Intelligence* (pp. 282–293). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-82435-7_23

2. Böhnlein, T., **Di Marco, N.**, & Frosini, A. (2023). Minimum Surgical Probing with Convexity Constraints. In Lecture Notes in Computer Science (pp. 136–147). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-34347-6_12
3. **Di Marco, N.**, & Frosini, A. (2023). The Generalized Microscopic Image Reconstruction Problem for Hypergraphs. In Lecture Notes in Computer Science (pp. 317–331). Springer International Publishing. https://doi.org/10.1007/978-3-031-23612-9_20
4. **Di Marco, N.**, & Frosini, A. (2022). Properties of SAT Formulas Characterizing Convex Sets with Given Projections. In Lecture Notes in Computer Science (pp. 153–166). Springer International Publishing. https://doi.org/10.1007/978-3-031-19897-7_13
5. Franzoni, V., **Di Marco, N.**, Biondi, G., & Milani, A. (2021). How Virtual Reality Influenced Emotional Well-being Worldwide During the Covid-19 Pandemics. In IEEE/WIC/ACM International Conference on Web Intelligence (pp. 268–272). WI-IAT '21: IEEE/WIC/ACM International Conference on Web Intelligence. ACM. <https://doi.org/10.1145/3498851.3499021>
6. Franzoni, V., **Di Marco, N.**, Biondi, G., & Milani, A. (2021). Virtual Reality for Enhancement of Emotional Mindset in the First Lockdown of United Kingdom for the Covid-19 Pandemics. In Lecture Notes in Computer Science (pp. 189–198). Springer International Publishing. https://doi.org/10.1007/978-3-030-86993-9_18
7. **Di Marco, N.**, Cinelli, M., & Quattrociocchi, W. (2022). Reliability of Content and Echo Chambers on YouTube during the COVID-19 Debate. ICWSM. <https://doi.org/10.36190/2022.64>
8. **Di Marco, N.**, Frosini, A., & Kocay, W. L. (2021). A Study on the Existence of Null Labelling for 3-Hypergraphs. In Lecture Notes in Computer Science (pp. 282–294). Springer International Publishing. https://doi.org/10.1007/978-3-030-79987-8_20

PREPRINTS UNDER REVIEW

1. Fracaro, N., Cecconello, S., Conti, M., **Di Marco, N.**, & Galeazzi, A. (2025). Disc-Cover Complexity Trends in Music Illustrations from Sinatra to Swift. arXiv. <https://doi.org/10.48550/ARXIV.2510.00990>
2. **Di Marco, N.**, Bonetti, A., Di Martino, E., Loru, E., Nudo, J., Pandolfo, M. E., Pecile, G., Sangiorgio, E., Scalco, I., Zollo, S., Cinelli, M., Zollo, F., & Quattrociocchi, W. (2025). Patterns, Models, and Challenges in Online Social Media: A Survey. arXiv. <https://doi.org/10.48550/ARXIV.2507.13379>
3. Amadori, E., Cirulli, D., Di Martino, E., Nudo, J., Sahakyan, M., Sangiorgio, E., Santoro, A., Zollo, S., Galeazzi, A., & **Di Marco, N.** (2025). Involvement drives complexity of language in online debates. arXiv. <https://doi.org/10.48550/ARXIV.2506.22098>
4. **Di Marco, N.**, Loru, E., Galeazzi, A., Cinelli, M., & Quattrociocchi, W. (2025). Decoding Musical Evolution Through Network Science. arXiv. <https://doi.org/10.48550/ARXIV.2501.07557>

Presentations

INVITED TALKS

TEDx Brescia 2025, Brescia, Italy. *Il costo nascosto di un mondo iperconnesso.*

TAIR 2025, Milan, Italy. *Maximizing influence in network structures.*

TAIR 2022, Milan, Italy. *The null label problem and the reconstruction of the 2-intersection graph.*

PRESENTATIONS IN INTERNATIONAL CONFERENCES

NETSCI 2025, Maastricht, Netherlands. *Decoding musical evolution through network science.*

IWOCA 2023, Tainan, Taiwan. *Minimum surgical probing with convexity constraints.*

DGMM 2022, Strasbourg, France. *Properties of SAT formulas characterizing convex sets with given projection.*

IWCIA 2022, Messina, Italy. *The generalized microscopic image reconstruction problem for hypergraphs.*

WI-IAT 2021, Melbourne, Sidney. *How virtual reality influenced emotional well-being worldwide during the Covid-19 pandemics*

IWOCA 2021, Ottawa, Canada. *A study on the existence of null label for 3-hypergraphs*

POSTERS IN INTERNATIONAL CONFERENCES

COMPLEX NETWORKS 2024, Istanbul, Turkey. *Post-hoc evaluation of nodes influence in information cascades: The case of coordinated accounts.*

Awards & Grants

AWARDS

2022 **Best Paper for PhD student Award**, IEEE/ACM/WIC Web Intelligence conference 100 USD

GRANTS

2024 **Bando Ricerca Scientifica 2024 - Avvio alla ricerca**, Sapienza University of Rome 2000 Euros

Mentoring

- 2025 **Francesca Magri**, *Evoluzione dei dati nella rete sociale digitale in risposta ad un evento ad alta rilevanza mediatica*, Master in AMDP, UnitelmaSapienza University of Rome
- 2025 **Amato Salvatore Ivan**, *Trame sonore: reti sociali nelle Variazioni Goldberg di Bach*, Master in AMDP, UnitelmaSapienza University of Rome
- 2025 **Di Biase Francesca**, *Topologie musicali: analisi dei brani di Chopin usando la teoria dei grafi*, Master in AMDP, UnitelmaSapienza University of Rome
- 2025 **Salvatorini Eva Costanza**, *Analisi delle transazioni bancarie: Social Network Analysis per il riconoscimento delle frodi*, Master in AMDP, UnitelmaSapienza University of Rome
- 2025 **Sorrentino Andrea**, *Mapping Truth: un'analisi delle dinamiche sociali su Truth Social durante le elezioni presidenziali USA 2024*, Master in AMDP, UnitelmaSapienza University of Rome

Professional Development

LANGUAGES

- English (Advanced)
- Italian (Native speaker)

SOFTWARE SKILLS

- R and Python for Statistics and Data Science
- MATLAB for numerical analysis and simulations
- Natural Language Processing
- Data mining
- Machine learning

SCHOOLS AND WORKSHOPS AS ATTENDANT

ETH Zurich

NETHIKE 2022

Castasegna, Switzerland
2022

Istituto Nazionale Alta Matematica Francesco Severi

MATHEMATICS OF MACHINE LEARNING SUMMER SCHOOL

Cortona, Italy
2022

University of Perugia

SCUOLA MATEMATICA INTERUNIVERSITARIA

Perugia, Italy
2019

TUTOR IN SCHOOLS AND WORKSHOPS

Carlos III University of Madrid, Spain
COMPLEXITY 72H

Madrid, Spain
2025

CONFERENCE ORGANIZING COMMITTEE

University of Florence
DGMM 2024

Florence, Italy
2024

CONFERENCE SCIENTIFIC COMMITTEE

University of Trento
CS2ITALY 2025

Trento, Italy
2025

INTERNATIONAL PROJECTS

Sapienza University of Rome
IRIS RESEARCH COALITION

Rome, Italy
11/2021 - 11/2023

The IRIS Research Coalition Project studied infodemics and promoted healthy information ecosystems, in collaboration with leading institutions including London School of Hygiene & Tropical Medicine, University of Cambridge, University of Harvard, Sapienza University of Rome, Ca' Foscari University of Venice, City University of London, and the Alan Turing Institute.

JOURNAL REFEREE

- IEEE Transactions on Network Science and Engineering
- ACM Transactions on the Web
- Discrete Applied Mathematics
- Journal of Mathematical Imaging and Vision
- EPJ Data Science
- Plos One

MEMBERSHIPS

- Center for Data Science and Complexity for Society (CDCS)

Research Media Coverage

SELECTED PRESS AND MEDIA COVERAGE

- **Corriere della Sera** - L'AI ha un pregiudizio politico?
- **Discover Magazine** - Music's Soundscape Is Becoming Simpler over Time
- **ANSA** - Testi brevi e lessico povero, come anche i social hanno cambiato linguaggio nel tempo
- **La Repubblica** - Odio online, l'algoritmo non c'entra: perché sui social diamo il peggio di noi
- **Le Science** - La polarizzazione del dibattito climatico sui social network è alimentata dalle ideologie politiche

MEDIA INTERVIEWS

- **Startmag** - Che effetto hanno i social media sul linguaggio?

- **Etabeta (RAI)** - L'AI su Sanremo: tra accordi e disaccordi l'algoritmo fa le scale
- **Radio Svizzera Italiana** - Musica leggerissima: Sulle cause occulte della semplificazione nella scrittura musicale
- **Radio Centro Idea**- Le parole sono importanti! Parola della settimana "musica"