

Mauritz Niklas Cartier van Dissel

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Research interests: Algorithmic fairness; computational social science; network science; statistical modeling.

Summary: PhD candidate (Complexity Science Hub in Vienna) working on mathematical and computational methods for analyzing inequalities in network and ranking systems, with a focus on intersectional effects across multiple attributes.

Education

- **PhD in Computer Science**, Graz University of Technology, Graz, Austria (2024–present)
Advisor: **Fariba Karimi**. Thesis: **How multiple identities shape social inequality: Measuring inequality in networks, rankings, and group interactions**.
 - **M.Sc. in Applied Mathematics**, University of Trento, Trento, Italy (2020–2022)
Thesis: **State-Space Models for Multivariate Electricity Load Forecasting** (in collaboration with BCAM).
Grade: **110/110 cum Laude**. Relevant coursework: **Deep Learning, Machine Learning, Network Science, Graphical Models, Advanced Statistical Models**.
 - **B.Sc. in Mathematics**, University of Trento, Trento, Italy (2017–2020)
Thesis: **An analysis of the epidemiological model of Reed and Frost**. Grade: **107/110**.
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Research Experience

- **Junior Researcher/PhD Candidate**, Complexity Science Hub (CSH), Vienna, Austria (Apr 2023–present)
 - Researcher in the [Network Inequality & Fairness Group](#), studying inequality in networks and rankings.
 - Developed mathematical models, inference methods, and software to quantify homophily and between-group inequality in multi-group social networks; work published in *Science Advances* and *Nature Communications Physics*.
 - Designed and evaluated fairness tests for rankings with finite candidate pools using hypergeometric statistics; published at ACM FAccT.
 - Co-led WP 2 in the EU Horizon [MAMMOth](#) project; developed components of an open toolkit addressing fairness under multiple protected attributes and modalities.
 - **Research Intern**, Basque Center for Applied Mathematics (BCAM), Bilbao, Spain (Mar 2022–Jul 2022)
 - Developed models for online prediction of multivariate electricity loads (state-space time series modeling).
 - Implemented and evaluated forecasting pipelines, showing a significant improvement to Kalman Filters.
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Publications (Selected)

- MN Cartier van Dissel, S Martin-Gutierrez, L Espín-Noboa, AM Jaramillo, F Karimi. **hyperFA*IR: A hypergeometric approach to fair rankings with finite candidate pool**. *ACM FAccT*. 2025
 - S Martin-Gutierrez, MN Cartier van Dissel, F Karimi. **Intersectional inequalities in social ties**. *Science Advances*. 2025
 - S Martin-Gutierrez, MN Cartier van Dissel, F Karimi. **A simple preference aggregation rule explains how multidimensional identities shape social networks**. *Nature Communication Physics*. 2026 (forthcoming)
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Software & Projects

- [hyperFA*IR](#): research code and experiments for fairness in finite-population rankings.
 - [multisoc](#): tools for modeling and analyzing multi-attribute / intersectional network processes.
 - [MAMMOth Toolkit](#): software contributions toward multi-attribute, multimodal bias mitigation in AI systems.
 - [State-Space Models](#): code for online multivariate electricity load forecasting.
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Academic Service

- Reviewer for Journal of Artificial Intelligence Research (JAIR) and ACM Transactions on Social Computing (TSC)
 - Organiser of Winter Workshop of Complex Systems 2025
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Skills

- **Programming:** Python, R, MATLAB, C++, Java, PostgreSQL
- **Languages:** Italian (C2), English (C1), German (B2), Spanish (B1)