

# Anna Badalyan

Tübingen | anna.badalyan@tue.ellis.eu | +39 351 798 09 79 | <https://badalyananna.github.io/>

## About me

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Research intern at the ELLIS institute Tübingen, advised by Celestine Mender-Dünner. I am broadly interested in the field of machine learning for social good. Recently, I have been thinking about these questions:

- Do current LLM evaluation benchmarks actually measure the knowledge?
- What are better ways to represent specific algorithms when modeling human-algorithm interactions?

## Education

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**M.S. in Data Science**, University of Padua – Padua, Italy Oct 2021 – Feb 2024

- GPA: 29.3/30.0 (Graduated with honors)
- Curriculum in Mathematics for Data Science
- **Thesis:** Inference and Community Detection in Hypergraphs: Incorporating Node Attributes

**B.S. in Economics**, National Research University Higher School of Economics – Moscow, Russia Oct 2015 – Jun 2019

- GPA: 8.04/10.0
- Major in World Economy, Minor in Law
- **Thesis:** Opportunities and Limitations of the Program of Digitalization of the Economy of Italy (“Industria 4.0”)

## Experience

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**Research Intern**, ELLIS Institute Tübingen – Tübingen, Germany June 2024 – Nov 2024

- Supervised by Celestine Mender-Dünner

**Research Intern**, Max Planck Institute for Intelligent Systems – Tübingen, Germany April 2023 – Oct 2023

- Developed a stochastic block model for community detection and inference on hypergraphs which incorporates node attributes.
- Conducted experiments to evaluate the performance of the model and analysed results.
- Supervised by Caterina De Bacco.

**Data Science Tutor**, University of Padua – Padua, Italy Oct 2022 – Jul 2023

- Helped first-year Data Science students with Computer Science and Mathematics related subjects.
- Carried out 50 hours of teaching activities.

**Research Intern**, Machine Learning Group, University of Padua – Padua, Italy Sept 2022 – Oct 2022

- Worked on improving natural language understanding by applying the concept of discursive repertoires.
- Improved the performance of BERT based classifier by fine tuning model parameters.

**Assistant and Researcher**, Liaison Office at the Embassy of Italy in Uzbekistan – Tashkent, Uzbekistan Sept 2019 – Oct 2021

- Collected and analyzed security and drug-related data in Central Asian countries.
- Used NLP techniques to create a news filter app for efficient news search.

**Junior Data Analyst**, Valiotti Analytics – (remote) Apr 2021 – July 2021

- Analyzed data of the game app using Redash and SQL.
- Created dashboards in Redash, Tableau and Power BI.

**Web Developer**, Self Employed – (remote) Aug 2018 – Aug 2019

- Built web pages using HTML, CSS, and JavaScript

**Teaching Assistant**, National Research University Higher School of Economics – Moscow, Russia Feb 2017 – Jun 2017

- Teaching assistant for the Introduction to World Economy course.

**Research Assistant**, National Research University Higher School of Economics – Moscow, Russia

Dec 2016 – Feb 2017

- Collected data from census archives.

## Publications

**Structure and inference in hypergraphs with node attributes**

Aug 2024

*Anna Badalyan*, Nicolò Ruggeri, Caterina De Bacco

10.1038/s41467-024-51388-5

## Projects

**Frank Wolfe for Cluster Detection on Hypergraphs**

[github link](#)

- Implemented Frank Wolfe variants to solve maximum clique problem on uniform hypergraphs.

**COVID-19 prediction from X-ray images: explainability**

- Discovered that simplest NN architectures works similarly well to the advanced ones due to the bias in the provided dataset.

**Click Models**

[github link](#)

- Built probabilistic click models for predicting the relevance of web search.
- Implemented Maximum Likelihood and Expectation Maximization algorithms from scratch.

**News filter**

[github link](#)

- Implemented a web app that filters news by keywords.
- Tools: Python, Django, JavaScript.

## Additional Experience And Awards

**Challenges in Building Billion Users Cloud Applications**, Summer School – Varena, Italy

Sept 2023

- Top 5% students based on the GPA were selected to participate in the program.

**Data Analytics Nanodegree**, Udacity

Nov 2020 – Dec 2020

- Won an Uzbek nationwide competition and received a scholarship to participate in the program.

**Academic Exchange Program Erasmus Plus**, University of Rome Tor Vergata – Rome, Italy

Feb 2018 – Jul 2018

- Awarded a highly competitive Erasmus Plus scholarship to participate in an Exchange program abroad.

**Vyshaya Proba Mathematics Olympiad**, 2nd degree awardee

2015

- Became a 2nd degree awardee of an international Mathematics Olympiad carried out by National Research University Higher School of Economics among high-school students.

## Technologies

**Computer Languages:** Python (advanced), R (intermediate), Java (intermediate), SQL (intermediate).

**Natural Languages:** Armenian (speaking with mum), English (consuming most content), French (singing songs), German (mit Karte, bitte <sup>1</sup>), Italian (watching cooking tutorials), Russian (doing math in my head), Uzbek (speaking in Bazaars).

<sup>1</sup>The expression is used when doing shopping and paying with card meaning "with card, please". This is one of the few expressions I am able to use confidently in my daily communications in German.