

CV SUMMARY – MAURIZIO FERRARI DACREMA

1. GENERAL INFORMATION

DATE OF BIRTH 06/11/1990

EDUCATION

2020 **PhD Degree cum laude** in Information Technology, Politecnico di Milano, Italy.

2016 **Master of Science Degree** in Ingegneria Informatica, Politecnico di Milano, Italy (Final Grade 110/110).

CAREER

2023 – current **Assistant Professor**, at DEIB, Politecnico di Milano, Italy

2020 – 2023 **Post-Doc Researcher** (Assegnista di Ricerca), at DEIB, Politecnico di Milano, Italy

2019 **Visiting PhD Student**, Alpen-Adria-Universität Klagenfurt (AAU), Austria, 3 months

2016 – 2020 **Ph.D. Student** in Information Technology, Politecnico di Milano, Italy

RESEARCH INTERESTS

- **Quantum Computing:** design, evaluation and benchmarking of machine learning algorithms on quantum computers as well as machine learning methods to support current generation quantum computers
- **Recommender Systems:** design, evaluation and reproducibility of algorithms for recommender systems

2. QUALITY OF SCIENTIFIC AND/OR PROJECT PRODUCTION

PRODUCTIVITY AND IMPACT METRICS

Scientific Productivity: 62 publications (of which 6 journal papers, 26 papers in peer-reviewed conferences, 2 book chapters, 19 workshop papers and 7 posters at industrial conferences), 50 entries on Scopus and 81 co-authors on Scopus (17 from international research groups and 7 from other national universities and companies).

- Author/Co-author of 5 top-ranked Q1 journal papers based on SCIMAGO (**ACM Transactions on Information Systems, Nature Scientific Reports, User Modeling and User-Adapted Interaction, Frontiers in Big Data, IEEE Access**)
- Author/Co-author of 26 scientific publications on peer-reviewed conferences, including:
 - 12 top-level A++/A+ Class 1 conference papers according to GII-GRIN-SCIE conf. ranking (**NeurIPS, SIGIR, CIKM, AAAI, IJCAI**);
 - 14 top-level A*/A CORE conference papers according to CORE conf. ranking (**NeurIPS, SIGIR, CIKM, AAAI, IJCAI, RecSys, ECIR**).

Publication Impact:

- Based on Google Scholar: h-index **13** citations **1430** [Profile link](#)
- Based on Scopus: h-index **11** citations **792** [Profile link](#)

- SciVal Overall Field-Weighted Citation Impact: **2.96**

- According to the simulation ASN 2023-2025 provided by Re.Public@polimi, I meet all 3 bibliometric indicators for “Professore di seconda fascia”:

Number of articles in last 5 years	6	the threshold is 5
Number of citations in last 10 years	787	the threshold is 126
H-index in last 10 years	10	the threshold is 7

AWARDS AND RECOGNITIONS

- 2023 **Best Academic Team at the ACM RecSys Challenge**, sponsored by ShareChat, at the 17th ACM Conference on Recommender Systems (RecSys)
- 2022 **Best reviewer** at the 31st ACM International Conference on Information and Knowledge Management (CIKM)
- 2021 “Prof. Florian Daniel” Award: **Best doctoral thesis** in Computer Science Engineering, DEIB, Politecnico di Milano
- 2021 **Best Academic Team at the ACM RecSys Challenge**, sponsored by Twitter, at the 15th ACM Conference on Recommender Systems (RecSys)
- 2020 **Invited paper** at the Sister Conferences Best Papers Track of the 29th International Joint Conference on Artificial Intelligence (IJCAI)
- 2020 **Best Reviewer Nomination** at the 14th ACM Conference on Recommender Systems (RecSys)

- 2019 **Best Paper Award** for paper “Are We Really Making Much Progress? A Worrying Analysis of Recent Neural Recommendation Approaches”, at the 13th ACM Conference on Recommender Systems (RecSys)
- 2019 **Best Reviewer Nomination** at the 13th ACM Conference on Recommender Systems (RecSys)
- 2018 2nd place in the ACM RecSys Challenge, sponsored by Spotify, at the 12th ACM Conference on Recommender Systems (RecSys)

TALKS AND SEMINARS AT NATIONAL AND INTERNATIONAL EVENTS

INVITED TALKS

- 2024 Invited seminar, **Politecnico di Milano**, School of Management, Observatory on Quantum Computing & Communication, “Basic Notions of Quantum Computing”
- 2024 Invited seminar, **Politecnico di Milano**, Department of Mathematics, “The Magic of Quantum Computers”
- 2021 Invited seminar at **Politecnico di Bari** “Quantum Computing for Machine Learning”
- 2021 Invited seminar at DEIB, Politecnico di Milano to present my PhD thesis, winner of the “Prof. Florian Daniel” Award for **best doctoral thesis** in Computer Science Engineering.
- 2021 Invited paper presentation at **SIGIR** for the paper published at ACM TOIS “A Troubling Analysis of Reproducibility and Progress in Recommender Systems Research”
- 2021 Invited seminar at **Farfetch** (Porto) “Are We Really Making Much Progress? A Worrying Analysis of Recent Neural Recommendation Approaches”
- 2021 Invited podcast at **Data Exchange** “The state of research in recommendation systems”
- 2020 Invited paper presentation at **IJCAI** “Methodological Issues in Recommender Systems Research (Extended Abstract)”
- 2020 Invited talk at **Aggregate Intellect** “Are We Really Making Much Progress? A Worrying Analysis of Recent Neural Recommendation Approaches”

TALKS AND SEMINARS

- 2024 **Tutorial presenter**, International ACM SIGIR Conference on Research and Development in Information Retrieval (**SIGIR**), “Using and Evaluating Quantum Computing for Information Retrieval and Recommender Systems”
- 2024 **Tutorial presenter**, European Conference on Information Retrieval (**ECIR**), “Quantum Computing for Information Retrieval and Recommender Systems”
- 2022 Paper presentation at **IIR** “Evaluating recommendations in a user interface with multiple carousels”
- 2022 Paper presentation at **RecSys** “Towards the Evaluation of Recommender Systems with Impressions” and “Towards Recommender Systems with Community Detection and Quantum Computing”
- 2022 Paper presentation at **SIGIR** “Towards Feature Selection for Ranking and Classification Exploiting Quantum Annealers”
- 2022 Paper presentation at **IIR Workshop** “Evaluating recommendations in a user interface with multiple carousels”
- 2021 Talk at **Qubits** Conference “Feature Selection for Recommender Systems with Quantum Computing”
- 2021 Paper presentation at **AAAI** “Demonstrating the Equivalence of List Based and Aggregate Metrics to Measure the Diversity of Recommendations (Student Abstract)”
- 2021 Paper presentation at **RecSys** “Optimizing the Selection of Recommendation Carousels with Quantum Computing”
- 2020 Paper presentation at **CIKM** “Critically examining the claimed value of convolutions over user-item embedding maps for recommender systems”
- 2019 Paper presentation at **RecSys** “Are We Really Making Much Progress? A Worrying Analysis of Recent Neural Recommendation Approaches”
- 2019 Paper presentation at **RecSys Workshop** on Interfaces and Human Decision Making for Recommender Systems “Towards evaluating user profiling methods based on explicit ratings on item features”
- 2018 Paper presentation at **RecSys Workshop** on Knowledge-aware and Conversational Recommender Systems “Deriving item features relevance from collaborative domain knowledge”
- 2018 Paper presentation at **RecSys** “Eigenvalue analogy for confidence estimation in item-based recommender systems”
- 2018 Paper presentation at **IIR Workshop** “Item-based CF as an Inverse Eigenvalue Problem”

INSTITUTIONAL RESPONSIBILITIES

- 2020-2022 **Department Council**, Representative of the Research Assistants, Politecnico di Milano
- 2014-2015 **Academic Senate**, Politecnico di Milano
- 2012-2013 **University Assessment Commission (Nucleo di Valutazione)**, Politecnico di Milano
- 2011-2014 **School of Industrial and Information Engineering**, Member of the School Council, Joint teachers-students Commission and Council of Course of Study in Engineer of Computer Systems

ORGANIZATION OF SCIENTIFIC MEETINGS

- 2024 **Conference Program Co-Chair**, Co-Chair responsible for the Demo and Late-Breaking Results track at the 18th ACM Conference on Recommender Systems (RecSys, Bari)
Evaluation Lab Organizer, Lab on “QuantumCLEF - Quantum Computing at CLEF” at the Conference and Labs of the Evaluation Forum (CLEF Initiative, Grenoble)
- 2023 **Workshop Organizer**, Workshop on “Learning and Evaluating Recommendations with Impressions” at the 17th ACM Conference on Recommender Systems (RecSys, Singapore)
- 2022-24 **Member of the Scientific Board**, Observatory for Quantum Technologies, School of Management, Politecnico di Milano
- 2022 **Session Chair**, Fourth Knowledge-Aware and Conversational Recommender Systems Workshop located at the 16th ACM Conference on Recommender Systems (KaRS@RecSys, Seattle)
Session Chair and local organization committee, Italian Information Retrieval Workshop (IIR, Milan).
- 2018-ongoing Program Committee Member for conferences: **RecSys, SIGIR, KDD, CIKM, WWW, WSDM, UMAP, LREC, ICWE**

PARTICIPATION IN EDITORIAL BOARDS

- 2024 **Reviewer** for journals: Quantum Information Processing (Springer), ACM Transactions on Information Systems, ACM Transactions on Recommender Systems
- 2023 **Reviewer** for journals: ACM Transactions on Information Systems, ACM Transactions on Recommender Systems
- 2022 **Guest Editor** of Special Issue on Quantum Computing and its Applications (MDPI Electronics)
Reviewer for journals: ACM Transactions on Information Systems, ACM Transactions on Recommender Systems
- 2021 **Reviewer** for journals: Computers & Security (Elsevier), Information Processing and Management (Elsevier), ACM Transactions on Information Systems, IEEE Transactions on Multimedia, IEEE Transactions on Service Computing
- 2020 **Reviewer** for journals: IEEE Transactions on Emerging Topics in Computing, Future Generation Computer Systems, Neurocomputing (Elsevier)

COMMISSIONS OF TRUST

Since 2015 I participated in 30+ National Accreditations and International Evaluations of Higher Education Institutions.

- 2015-22 **Italian National Agency for the Evaluation of Universities and Research Institutes (ANVUR)** and **Italian Agency for the Quality Certification and EUR-ACE Accreditation of Engineering Programs (QUACING)**, Member of **25+ commissions for the national accreditation of Italian universities** according to the AVA framework.
- 2024 **Kosovo Accreditation Agency (KAA)**, Evaluator for the Institutional Accreditation of the UBT College and the AAB College, Kosovo.
- 2022 **ANVUR**, Member of one of the three commissions charged to test the new proposed national accreditation framework AVA3 with an on-site visit at Università degli Studi di Torino.
QUACING, Evaluator for the Institutional Accreditation of the TEK-UP University, Tunisia.
- 2020-22 **ANVUR**, Member of the commission responsible for the initial accreditation of the proposals to establish new private Italian universities. The commission evaluated **10 proposals**.
- 2021 **Turkish Higher Education Quality Council (THEQC)**, International evaluator for the Institutional Accreditation of the Ahi Evran University, Türkiye.
- 2020 **Accreditation Organisation of the Netherlands and Flanders (NVAO)**, EUniQ Project for the Development of a European framework for comprehensive quality assurance of European universities (**Erasmus+**). Member of the regular panel for the University Network for Innovation Technology and Engineering (**UNITE**).
Accreditation Organisation of the Netherlands and Flanders (NVAO), Member of the Core Faculty Panel of the University of Luxembourg.
- 2018 **Agència per a la Qualitat del Sistema Universitari de Catalunya (AQU)**, TeSLA Project, Adaptive trust e-assessment system (Horizon 2020). Member of the regular panel for Pilot 3 at the Technical University of Sofia, Bulgaria

2021-ongoing **International Expert on Quality Assurance in Higher Education Institutions** for: Quality Agency for Higher Education (Latvia); Turkish Higher Education Quality Council (Türkiye); Agency for Higher Education of Republic of Srpska (Bosnia and Herzegovina); Accreditation Board of Quality Assurance Agency in Higher Education (Albania); Kosovo Accreditation Agency (Kosovo); National Center for Education Quality Enhancement (Georgia).

3. TEACHING ACTIVITIES

COURSES WITH A PRIMARY RESPONSIBILITY

Institution name	Course name	Credits	No. of students	Reference Study Course	Time period	Students Evaluation
Polimi	Recommender Systems	5	N/A	CSE - Master Level	AA 2024-25	-
Polimi	Informatica e Elementi di Informatica Medica	7	220	BIO - Bachelor Level	AA 2022-23	3.2 / 4
Polimi	Applied Quantum Machine Learning	5	48	CSE - PhD Level	AA 2020-21	-

TEACHING ASSISTANT

Institution name	Course name	Credits	Reference Study Course	Time period	Students Evaluation
Polimi	Fondamenti di Informatica	10	CSE - Bachelor Level	AA 2023-24	-
Polimi	Recommender Systems	5	CSE - Master Level	AA 2023-24	-
Polimi	Quantum Computing	5	CSE - Master Level	AA 2023-24	-
Polimi	Fondamenti di Informatica	10	CSE - Bachelor Level	AA 2022-23	2.8 / 4
Polimi	Recommender Systems	5	CSE - Master Level	AA 2022-23	3.4 / 4
Polimi	Fondamenti di Informatica	10	CSE - Bachelor Level	AA 2021-22	2.8 / 4
Polimi	Recommender Systems	5	CSE - Master Level	AA 2021-22	3.4 / 4
Polimi	Fondamenti di Informatica	10	CSE - Bachelor Level	AA 2020-21	3.2 / 4
Polimi	Recommender Systems	5	CSE - Master Level	AA 2020-21	3.2 / 4
Polimi	Recommender Systems	5	CSE - Master Level	AA 2019-20	3.2 / 4
Polimi	Recommender Systems	5	CSE - Master Level	AA 2018-19	3.1 / 4
Polimi	Recommender Systems	5	CSE - Master Level	AA 2017-18	3.2 / 4
Polimi	Computer Systems	5	CSE - Master Level	AA 2016-17	Medium

OTHER TEACHING ACTIVITY

Institution name	Course name	Credits	Role	Reference Study Course	Time period	Students Evaluation
Polimi	Informatica A	10	Tutor	CSE - Bachelor Level	AA 2022-23	-
Polimi	Fondamenti di Informatica	10	Tutor	CSE - Bachelor Level	AA 2021-22	-
Polimi	Informatica A	5	Tutor	CSE - Master Level	AA 2021-22	-
Polimi	Fondamenti di Informatica	10	Tutor	CSE - Bachelor Level	AA 2020-21	-
Polimi	Informatica A	10	Tutor	GES - Bachelor Level	AA 2020-21	-
Polimi	Fondamenti di Informatica	10	Tutor	CSE - Bachelor Level	AA 2019-20	-
Polimi	Informatica A	10	Tutor	GES - Bachelor Level	AA 2019-20	-
Polimi	Fondamenti di Informatica	10	Lab assistant	CSE - Bachelor Level	AA 2017-18	2.6 / 4
Polimi	Fondamenti di Informatica	10	Tutor	CSE - Bachelor Level	AA 2016-17	Medium
Polimi	Prova Finale	3	Tutor	CSE - Bachelor Level	AA 2016-17	-
Polimi	Prova Finale	3	Tutor	CSE - Bachelor Level	AA 2015-16	-
Polimi	Informatica B	7	Tutor	ENG/MEC - Bachelor Level	AA 2015-16	Medium
Polimi	Tutoring students with disabilities	-	Tutor	CSE - Bachelor Level	AA 2014-15	-
Polimi	Prova Finale	3	Tutor	CSE - Bachelor Level	AA 2014-15	-

SUPERVISION OF MASTER, DOCTORAL STUDENTS

- 2023 - present **Advisor of 1 Doctoral Student**, Ph.D. program in Information Technology, Politecnico di Milano.
Co-advisor of 1 Doctoral Student, Italian National Ph.D. program in Artificial Intelligence for Industry 4.0, Politecnico di Milano.
- 2019 - present **Co-advisor of 5 Doctoral Students**, Ph.D. program in Information Technology, Politecnico di Milano.
- 2016 - present **Advisor of 13 Master Students, Co-advisor of 18 Master Students**, Master Degree in Computer Science and Engineering, Politecnico di Milano.

4. PARTICIPATION/RESPONSIBILITY IN RESEARCH PROJECTS

During my research activity I collaborated with the following institutions and companies: Politecnico di Bari, Università di Padova, Politecnico di Torino, Universidad Autónoma de Madrid, Alpen-Adria-Universität (Klagenfurt), University Politehnica of Bucharest, Johannes Kepler University Linz, CINECA, ContentWise SpA (Milano), Netflix (Los Gatos), Amazon Braket (Seattle), Farfetch (Porto), Ferrari (Bologna).

PARTICIPATION IN RESEARCH PROJECTS

Project Title /Acronym	Time Period	Promoting / Funding Research Institution	Role of the applicant	Research Funding Scheme	Budget for the applicant's institution
EUMaster4HPC	2022-2026	EU/H2020	WP3 leader	EuroHPC-CSA	640 k€
QA4FS, ML4MINOR, PC4QA	2021-2024	CINECA	Principal Investigator	ISCRA	15 k€
"Execution of the Data Science programme"	2022	EIT Digital Academy	Participant	H2020	32 k€
"FlipBot as an AI teaching assistant"	2018	EIT Digital Blended Master	Participant	H2020	175 k€
"Street Smart Retail"	2017	EIT Digital Innovation Factory	Participant	H2020	308 k€
"Execution of the Data Science programme"	2017	EIT Digital Academy	Participant	H2020	47.5 k€

PARTICIPATION IN INDUSTRIAL-FUNDED RESEARCH PROJECTS

Project Title / Acronym	Time Period	Funding Company	Role of the applicant	Budget for the applicant's institution
Content-to-content video recommendation	2023 - ongoing	ContentWise SpA	Principal Investigator	20 k€

VISITING PERIODS

- 2019 Visiting PhD student at the **Alpen-Adria-Universität Klagenfurt** (March/June), this collaboration led to the paper "*Are We Really Making Much Progress? A Worrying Analysis of Recent Neural Recommendation Approaches*" which won the **Best Paper Award** at the 13th ACM Conference on Recommender Systems (RecSys)

5. TECHNOLOGY TRANSFER**DEVELOPMENT OF PRODUCTS / OPEN-SOURCE TOOLS / APPLICATIONS / SYSTEMS / SERVICES**

- **Open-source evaluation framework**¹ released in 2019 as part of my work on reproducibility of recommender system research. This project has now received **981 stars** and has been forked **253 times**.
- **Open-source teaching material**², released in 2018 and regularly updated since, contains teaching materials I developed for the MSc course Recommender Systems, and includes examples and tutorials on how to build, train and evaluate several recommendation systems models. This project has now received **142 stars** and has been forked **348 times**.

¹ https://github.com/MaurizioFD/RecSys2019_DeepLearning_Evaluation

² https://github.com/MaurizioFD/RecSys_Course_AT_PoliMi

PARTICIPATION OR LEADERSHIP IN INDUSTRY-RELEVANT EXPLOITATION OR STANDARDIZATION INITIATIVES

- 2024 **Ferrari S.p.A.**, “Recommendation System for the Ferrari Car Configurator”, ongoing
Banca Mediolanum S.p.A., “Quantum Computing for finance” (signing of the contract is in progress)
Cisco Systems Italia, “Distributed Quantum Computing for Measurement-Based Models” (finalization of the scope with Cisco is in progress)
- 2022 – present **Member of the Scientific Board**, Observatory for Quantum Technologies, School of Management, Politecnico di Milano
- 2021 – present **Moviri and ContentWise**, “Recommendation Systems and Quantum Computing”
- 2021 **Amazon Braket**, “Quantum Computing for Feature Selection”
Farfetch, “Recommender Systems Leveraging Impression data for Fashion Recommendation”

6. TWELVE MOST RELEVANT PUBLICATIONS

The classification of publication/venue is according to Scimago for journal papers and GII-GRIN-SCIE for conference papers

1. Carugno, C., Ferrari Dacrema, M., Cremonesi, P.

“Evaluating the job shop scheduling problem on a D-Wave quantum annealer”

(2022) *Nature Scientific Reports*, 12, 1, pp. 6539-6550

<https://doi.org/10.1038/s41598-022-10169-0>

Scimago Rank: Q1

Citations: Google Scholar 37, Scopus 19

Why Important: the paper focuses on issues often overlooked in previous research on quantum benchmarking such as the computational cost of transforming the problem in the required formulation, the impact of different problem structures and constraints on the number of qubits required and on the quality of the solution.

Role: defining the study methodology, writing of the paper

2. Ferrari Dacrema, M., Felicioni, N., Cremonesi, P.

“Offline Evaluation of Recommender Systems in a User Interface with Multiple Carousels”

(2022) *Frontiers in Big Data*, 5, 21 pages

<https://doi.org/10.3389/fdata.2022.910030>

Scimago Rank: Q1

Citations: Google Scholar 10, Scopus 6

Why Important: the paper discusses the importance of accounting for the user interface when evaluating the offline recommendation quality to better represent the user behaviour. In particular, it proposes a novel evaluation procedure that accounts for the two-dimensional layout used by most video on demand services.

Role: main contributor of research activity and writing

3. Bernardis, C., Ferrari Dacrema, M., Pérez Maurera, F. B., Quadrana, M., Scriminaci, M., Cremonesi, P.

“From Data Analysis to Intent-Based Recommendation: An Industrial Case Study in the Video Domain”

(2022) *IEEE Access*, 10, pp. 14779-14796

<https://doi.org/10.1109/ACCESS.2022.3148434>

Scimago Rank: Q1

Citations: Google Scholar 3, Scopus 2

Why Important: This work studies the development process of a next-item recommender for a video-on demand service, with a strong industrial perspective. In particular, the paper discusses challenges usually not considered in academic papers that affect the results in a real setting.

Role: design of the study methodology, writing of the paper

4. Ferrari Dacrema, M., Boglio, S., Cremonesi, P., Jannach, D.

“A Troubling Analysis of Reproducibility and Progress in Recommender Systems Research”

(2021) *ACM Transactions on Information Systems (TOIS)*, 39 (2), pp. 1-49.

<https://doi.org/10.1145/3434185>

Scimago Rank: Q1

Citations: Google Scholar 211, Scopus 118

Why Important: culmination of my PhD on the reproducibility of neural recommender systems research. The result is that less than half of papers is reproducible and almost none is competitive against baselines. Issues such as information leakage, poorly optimized baselines and errors in the evaluation are very common.

Role: main contributor of research activity and writing

5. Nembrini, R., Ferrari Dacrema, M., Cremonesi, P.

“Feature Selection for Recommender Systems with Quantum Computing”

(2021) *Entropy* 23 (8), 970, 22 pages

<https://doi.org/10.3390/e23080970>

Scimago Rank: Q2

Citations: Google Scholar 35, Scopus 19

Why Important: the paper describes an algorithm to perform feature selection for a recommender model with a formulation that allows it to be solved with currently available quantum technology. The results indicate that the strategy is effective and that quantum computers are now able to tackle problems of interesting size

Role: ideating the approach, design of the study methodology, writing of the paper

6. Deldjoo, Y., Ferrari Dacrema, M., Constantin, M.G., Eghbal-zadeh, H., Cereda, S., Schedl, M., Ionescu, B., Cremonesi, P.

“Movie genome: alleviating new item cold start in movie recommendation”

(2019) *User Modeling and User-Adapted Interaction (UMUAI)*, 29 (2), pp. 291-343.

<https://doi.org/10.1007/s11257-019-09221-y>

Scimago Rank: Q1

Citations: Google Scholar 108, Scopus 71

Why Important: the paper discusses a recommender system that combines heterogeneous data sources: interaction data and features extracted from the movie track; able to improve the recommendation quality in the challenging scenario when no user feedback is available for an item.

Role: main contributor of research activity and methodology, writing of the paper

7. Turati, G., Ferrari Dacrema, M., Cremonesi, P.

“Benchmarking Adaptive Variational Quantum Algorithms on QUBO Instances”

(2023) *IEEE International Conference on Quantum Computing and Engineering (QCE)*, pp. 407-413

<https://doi.org/10.1109/QCE57702.2023.00053>

Citations: Google Scholar 1, Scopus 1

Why Important: many adaptive variational algorithms have been proposed but their benchmarking is often inconsistent and challenging due to the interaction of three components, classical machine learning, classical optimization and quantum computing. The paper proposes a methodology and evaluates SoA algorithms.

Role: project coordinator, design of the study methodology, writing of the paper

8. Felicioni, N., Ferrari Dacrema, M., Restelli, M., Cremonesi, P.

“Off-Policy Evaluation with Deficient Support Using Side Information”

(2022) *In Advances in Neural Information Processing Systems (NeurIPS 2022)*, 15 pages

https://proceedings.neurips.cc/paper_files/paper/2022/hash/c32be49c09eec3aad1f2bb587543e7f6-Abstract-Conference.html

GGs Rating: A++

Citations: Google Scholar 8, Scopus 4

Why Important: one of the most used off-policy estimators, IPS, assumes that all actions are supported. This assumption is frequently violated in recommender systems when new items are added to the catalogue, hence the paper proposes two estimators that use item features and are therefore suited for cold start scenarios.

Role: project coordinator, design of the study methodology, writing of the paper

9. Ferrari Dacrema, M., Moroni, F., Nembrini, R., Ferro, N., Faggioli, G., Cremonesi, P.
“Towards Feature Selection for Ranking and Classification Exploiting Quantum Annealers”
(2022) *Proceedings of the 45th International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*, pp. 2814–2824.
<https://doi.org/10.1145/3477495.3531755>
GGs Rating: A++
Citations: Google Scholar 26, Scopus 19

Why Important: the paper uses currently available quantum computers to perform feature selection for both ranking and classification. The effectiveness obtained with quantum computing is comparable to that of classical solvers, indicating that quantum computers are now reliable enough to tackle interesting problems.
Role: main contributor of research activity and writing
10. Ferrari Dacrema, M., Parroni, F., Cremonesi, P., Jannach, D.
“Critically Examining the Claimed Value of Convolutions over User-Item Embedding Maps for Recommender Systems”
(2020) *29th ACM International Conference on Information & Knowledge Management (CIKM)*, pp. 355-363.
<https://doi.org/10.1145/3340531.3411901>
GGs Rating: A+
Citations: Google Scholar 23, Scopus 14

Why Important: the paper describes a theoretical error present in a core assumption of three models published at IJCAI that are based on CNNs applied on embeddings. The paper shows that those embeddings do not have a topology and that the supposedly superior quality of the CNN methods was due to methodological errors.
Role: identification of the methodological issue, main contributor of research activity and writing
11. Pérez Maurera, F. B., Ferrari Dacrema, M., Saule, L., Scriminaci, M., and Cremonesi, P.
“ContentWise Impressions: An Industrial Dataset with Impressions Included”
(2020) *The 29th ACM International Conference on Information and Knowledge Management (CIKM)*, pp. 3093-3100
<https://doi.org/10.1145/3340531.3412774>
GGs Rating: A+
Citations: Google Scholar 27, Scopus 22

Why Important: the paper proposes an industrial dataset containing the impressions (items the user was shown but did not interact with), which were almost impossible to find in publicly available resources. The dataset opens new research directions in how to leverage this information previously only available to companies.
Role: design of the research question and methodology, writing of the paper
12. Ferrari Dacrema, M., Cremonesi, P., Jannach, D.
“Are we really making much progress? A worrying analysis of recent neural recommendation approaches”
(2019) *The Thirteenth ACM Conference on Recommender Systems (RecSys)*, pp. 101-109.
<https://doi.org/10.1145/3298689.3347058>
ACM Best Long Paper Award
GGs Rating: A
Citations: Google Scholar 690, Scopus 392

Why Important: the paper reports the first results of the reproducibility and competitiveness analysis of 18 neural recommender systems models. Half of the papers is not reproducible and almost none is competitive against simple baselines due to information leakage, weak baselines, methodological errors, and cherry-picking
Role: main contributor of research activity and writing

LIST OF THREE PEERS WHO COULD PROVIDE A REFERENCE LETTER

- DIETMAR JANNACH, FULL PROFESSOR UNIVERSITY OF KLAGENFURT (AUSTRIA), dietmar.Jannach@aau.at
- MARKUS SCHEDL, FULL PROFESSOR JOHANNES KEPLER UNIVERSITY LINZ (AUSTRIA), markus.schedl@jku.at
- MARTHA LARSON, FULL PROFESSOR RADBOUD UNIVERSITY (THE NETHERLANDS), m.Larson@cs.ru.nl

1) RESEARCH STATEMENT

ON-GOING RESEARCH AND RECENT ACHIEVEMENTS (1-2 PAGES)

My recent research activities focus on two different topics. The first topic is **recommender systems**, which was the focus of my PhD Thesis and has allowed me to build a reputation in the field, where I became expert in machine learning and deep learning methods. Motivated by the huge computational demands of new and ever more complex machine learning models, in 2019 I started a new research direction on **quantum computing**, a technology that promises improved scalability for several difficult problems. Quantum computing is now becoming my primary research interest and I approach it in a way that is synergistic with my machine learning background, focusing on how to effectively combine both using **quantum computing to accelerate classical machine learning** as well as how to use **machine learning to improve the effectiveness of quantum computers**.

QUANTUM COMPUTING AND MACHINE LEARNING

In 2019 I started to explore the potential of currently available quantum computers for machine learning tasks. With the size and complexity of machine learning tasks and methods ever increasing, new scalability challenges emerge to ensure their practical applicability to large scale domains. Quantum computing is an emerging technology that promises to accelerate several problems that are difficult to solve with traditional approaches. Although the technology is still relatively new, the physical principles it is based on are well understood, this has allowed the research community to work on algorithms at a theoretical level, often relying on simulators. My research activity is characterized by an empirical focus rather than a theoretical one and an applied perspective that is grounded on my years-long experience with machine learning as well as the tasks, scenarios and challenges faced in recommender systems environments.

For this reason, my first work targets the feature selection problem which is particularly relevant in data-mining scenarios. In particular, leveraging the domain experience of a previous publication [6], I have proposed a new feature selection approach [5] that can be solved on a quantum annealer and produce competitive results on datasets that have a significant size. This work has been presented at both the industrial conference organized by D-Wave (Qubits) and the European Quantum Technologies Conference, as well as further developed and benchmarked in a project with Amazon Braket. My work on feature selection was then expanded beyond the recommendation systems domain towards more general classification and information retrieval problems [9]. This line of work also includes a new Evaluation Lab at the CLEF initiative for 2024 that recently concluded.

While my initial activity on Quantum Machine Learning has been specifically focused on the recommender systems and information-retrieval domain, I am now exploring wider application areas that span outside those fields and into a more general machine learning and optimization perspective. In particular, [1] presents an empirical analysis on the effectiveness of quantum annealers for the Job-Shop scheduling problem, an important task for the allocation of resources in production environments. In further research I have studied how to leverage quantum annealers for community detection and for the allocation of virtual services on communication networks. A new journal paper, currently under minor revisions, explores the relationships of the characteristics of a problem on the ability of a real quantum computer to solve them effectively, accounting for its underlying physical processes.

While my past research focus was primarily on quantum annealers, which are special-purpose solvers for optimization problems of a certain structure, I am expanding my research to universal quantum computers. In a recent work I have studied their effectiveness on feature selection for the classification problems explored in [9] by leveraging variational algorithms.

Variational quantum algorithms are hybrid methods that use quantum computers to accelerate a portion of the

overall algorithms and a classical optimizer to guide the process. A more advanced family, called *adaptive variational algorithms*, introduce a further degree of freedom to search for the optimal structure for the quantum computation via a machine learning model. This creates a complex interaction between the quantum computer, the machine learning model and the classical optimizer. While studying the state of the art I realized that the evaluation methodologies used in many studies were not detailed enough to allow to measure precisely the impact of the different elements of the adaptive variational algorithms and therefore made very challenging to assess their effectiveness and compare them. This led to [7] which presents a benchmark study of adaptive variation algorithms with a methodology I designed and to further ongoing activities related to the development of more advanced adaptive variational algorithms. In particular, I am now studying how to use machine learning methods to generate quantum circuits tailored for different tasks.

EVALUATION AND REPRODUCIBILITY FOR RECOMMENDER SYSTEMS

The core of my past research activity has been the assessment of reproducibility and methodological issues in recommender system research. Although the independent reproducibility of published results has long been a cornerstone of the scientific process, it is known that several scientific fields face what has been called “*reproducibility crisis*”, to indicate that it is not possible to replicate a substantial part of published research. The recommender systems field is no exception and the issues I encountered in reproducing published results have contributed to make this a core topic of my research.

This reproducibility study begun in my PhD years and involved a long and methodical analysis of neural recommender system papers published in several high-level conferences (SIGIR, WWW, KDD, IJCAI, WSDM, RecSys). The analysis showed that out of 26 papers only 12 could be reproduced and only 1 was barely competitive against well optimized simple baseline methods. A preliminary version of this findings [12] won the Best ACM Long Paper Award. This work has been further expanded for a Journal paper [4]. I have been invited to present these results at the 2020 IJCAI and 2021 SIGIR conferences, to two seminars (Farfetch, Aggregate Intellect) and a podcast (Data Exchange).

I have traced back the sources of this problem to several issues: (i) absence of incentives for the publication of source code and relevant materials; (ii) lack of hypothesis and justification for the experimental scenario, which is often unique; (iii) use of weak baselines and poor hyperparameter optimization of baselines; (iv) frequent errors in the implementation or theoretical errors in core assumptions of the model itself; and (v) frequent information leakage during the training of the neural model.

I have also detected more fundamental problems in how claims are demonstrated. For instance, some articles used convolutional neural networks (CNN) applied to embeddings that did not have the topological properties they were assumed to have. In my study [10] I could show the claims of superior quality of the CNN models were based on a flawed methodology.

This line of research is going forward to include other areas of machine learning and information retrieval, such as the use of GANs and graph-based models.

Overall, this research direction has been very well received by most of the RecSys community, the results of papers [4,10,12] were confirmed by other research groups and have a cumulative **924** citations on Google Scholar and **524** on Scopus. The publicly available source code has also been successful, with 981 stars and 253 forks. Furthermore, since 2020 the RecSys conference opened a “Reproducibility Track” and the number of papers that propose deeper inquiry in the adopted evaluation methodologies has increased.

SHORT-TO-MID-TERM RESEARCH DIRECTIONS (UP TO 5 YEARS) (1-2 PAGES) FOR CANDIDATES TO RTT POSITIONS

While most of my past research has been focused on recommender systems, my short-to-mid-term research direction is strongly focused on how to best combine quantum computing with machine learning in a way that leverages the strengths of both. In summary, the directions I plan to pursue are: (i) study how the characteristics of a problem impact its suitability for a quantum device accounting for its physical properties, (ii) develop new methods based on classical machine learning to improve the effectiveness and reliability of quantum computers in particular for adaptive variational algorithms, (iii) assess how those quantum algorithms can be used as accelerators to perform machine learning and optimization tasks.

The goal of effectively leveraging the potential of quantum computing is indeed a long and complex journey which brings together challenges in hardware development but also in understanding how to use it, which tasks fit well the hardware capabilities and how can we integrate it into today's successful applications. The research conducted on applied machine learning has tended to consider the quantum device as a black box, with limited consideration to its underlying complexity, such as the way in which its physical processes affect the quality of the solution and which problems have the right characteristics to be solved effectively. An important research direction is to investigate this connection, and the expected outcome is a better understanding of the potential that this new computational paradigm brings which will be very important to inform the subsequent research goals.

Compared to quantum annealers, much less work has been done on empirical machine learning for universal quantum computers which presents several open research questions and challenges I plan to work on. In particular, for the foreseeable future quantum computers will have a limited number of qubits and will be affected by noise, limiting the complexity of the tasks that can be performed successfully and requiring ad-hoc strategies to adapt the algorithms to the limited hardware.

A particularly interesting idea that has shown promising results and fits well within the limitations of near-term and possibly mid-term quantum devices are variational algorithms. The idea is to have a hybrid quantum-classical algorithm. The quantum device is used to accelerate a small step of the overall computation and a classical algorithm governs the process. Successful examples of variational algorithms can calculate eigenvalues, solve linear systems of equations, factor numbers and run principal component analysis. A more advanced form of variational algorithms, called *adaptive*, optimizes the structure of the quantum computation itself adding considerable flexibility but also complexity.

Regarding the development of machine learning methods to improve the effectiveness of quantum computers, there are several interesting directions that can be pursued, from the optimization of quantum circuits that are too complex for the existing hardware, to the development of methods to perform distributed computation on more quantum computers as well as the design of more advanced strategies to discover the best quantum circuit for a given task. Significant challenges arise from the fundamental mismatch that exists between the complexity of the underlying physical system and the expressive ability of the classical machine learning or optimizer method that is trying to steer the computation in the right direction. In particular, a quantum computer able to provide interesting speedup for a certain task will likely be impossible to simulate exactly and very costly to approximate, therefore it will be particularly challenging to develop methods able to optimize the structure of the quantum computation. The expected outcome is the design of new and more efficient methods.

Regarding the assessment of how quantum computers can be used as accelerators for machine learning, the challenge is both to identify which classical machine learning models use mathematical operations that can be tackled via quantum variational algorithms but also to assess the implications, for example the overall solution quality, the convergence of the training process, the robustness to noise, the overall computational cost and time, limitations on the problem size or structure etc. The expected outcome will be an assessment of which machine learning techniques can be effectively adapted to use quantum computers of both the available paradigms (Quantum Annealing and Gate Model) as well as an empirical analysis and benchmarking to assess how well they perform in terms of quality and scalability.

2) TEACHING STATEMENT

SHORT-TO-MID-TERM TEACHING PLAN (UP TO 5 YEARS) (1-2 PAGES) FOR CANDIDATES TO RTT POSITIONS

I have always enjoyed teaching and I began my teaching experience as a lab tutor for Bachelor courses in 2014, as soon as I became a Master student. Since then, I had the opportunity to be involved in various courses and in different roles, from tutor or lab tutor to teaching assistant to lecturer, for a total of **730+** hours of which **260+** as teaching assistant, lab assistant and lecturer.

The way I try to approach teaching is to see the student as an active participant in the learning process providing them not only the relevant knowledge but also a frame of reference to help them navigate autonomously between the topics and develop their own critical thinking.

In the last years I have been teaching in both a Master degree course, Recommender Systems, and a Bachelor degree one, Fondamenti di Informatica. While those courses are very different, in both cases I strive to present the topics in a way that engages the student's critical thinking and understanding, rather than memorization. For example, when presenting exercises in Fondamenti di Informatica before showing a single line of code I always spend some time to discuss the goal of the exercise, the data we have, the type of operations we need to perform and how those can be connected in a higher level algorithm. I believe this is useful practice for the students to help them develop the capacity to think critically and reason autonomously that are essential for an engineer. In Recommender Systems, on the other hand, the students already have an understanding of some of the technical aspects involved but have no experience in the domain and the challenges it entails. While teaching them how to build recommender models I always try to highlight the important (and sometimes implicit) choices that are made and discuss the reasoning behind them as well as how different models can be used (and are appropriate) for different types of user behavior. This is to ensure that they will not use them as black boxes but rather they will understand why and how they might be appropriate for a given context or task.

I also strive to provide the students with adequate materials and resources, for example for the Recommender System course I created a public repository with several notebooks and examples.

I also had the opportunity to work actively to create a course program for "Applied Quantum Machine Learning", a 2021 PhD course of which I was lecturer. That course constituted a particular challenge as it required to put together aspects from physics, operations research, machine learning and real case examples into a new course. Part of the evaluation was done with projects, one of which has been extended into a publication at the IEEE International Conference on Quantum Computing and Engineering (QCE 2022). I have learned a lot from that experience which was particularly useful in my role as teaching assistant for the Quantum Computing course at the master degree in High Performance Computing.

The way I approach teaching has also been affected by my experience as a member of the accreditation commissions for higher education institutions both at national and European level. An essential component of this activity is to look at the substantial aspects of how the courses are organized, how the curriculum has been designed and the different teaching activities connected, as well as how those activities are carried out with the students and how the students see them. By speaking with all actors involved, study program coordinator, professors and students, I had the opportunity to get a rare perspective in how the various points of view come together. This I believe is a crucial aspect of the community that the university is.

In the short term I hope I'll have the opportunity to continue to teach at both Bachelor and Master degree.

In the mid-term as my research in quantum computing progresses and the field grows, I see the opportunity to propose a further quantum computing course that would go beyond the basics into more advanced methods. Indeed the field is vast and entire Master degrees in Quantum Engineering exist, for example at Politecnico di Torino and Università degli Studi di Napoli Federico II, though they tend to focus on hardware aspects as well as on sensing, while programs with a more ample perspective exist for example at EPFL. I believe that there is much need for Engineers with a Computer Science background to work on architectures, middleware, applications etc. and that could eventually fit well as a dedicated track in the HPC Master degree.

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Education

Politecnico di Milano

Milano, Italy

PHD INFORMATION TECHNOLOGY

2016 - 2020

- Advisor: Prof. Paolo Cremonesi
- Thesis: An assessment of reproducibility and methodological issues in neural recommender systems research

Politecnico di Milano

Milano, Italy

MS COMPUTER SCIENCE ENGINEERING

2013 - 2016

- Advisor: Prof. Francesco Amigoni
- Thesis: A method to find the optimal structure of a multiagent system tasked to identify anomalies in space applications

Politecnico di Milano

Milano, Italy

BS COMPUTER SCIENCE ENGINEERING

2009 - 2013

Professional Experience

- 2023-present **Assistant Professor**, Politecnico di Milano, Italy
- 2017-2023 **Teaching Assistant**, Politecnico di Milano, Italy
- 2016-2023 **Research Assistant**, Politecnico di Milano, Italy
- 2014-present **Evaluation Expert**, Quality assurance of national and European higher education Institutions

Research Experience

RESEARCH INTEREST

Quantum Computing, design, evaluation and benchmarking of machine learning algorithms on quantum computers as well as machine learning methods to support current generation quantum computers

Recommender Systems, design, evaluation and reproducibility of algorithms for recommender systems

SCIENTIFIC PRODUCTIVITY

Total Publications, 62 peer-reviewed publications

Top-ranked Journals, 5 publications on top-ranked journals Q1 on SCIMAGO

Top-ranked Conferences, 14 publications on top-ranked A*/A CORE conferences

Impact **Google Scholar**, h-index 13 and citations 1430

Scopus, h-index 11 and citations 792

FUNDED PROJECTS AND INTERNATIONAL COLLABORATIONS

- 2023-present **Horizon Europe Framework Programme (Horizon 2020)**, 2022-2026 JTI-EUROHPC, project “EUMaster4HPC”, Funding 640.000 €, Work Package 3 leader
- CINECA, Italian SuperComputing Resource Allocation (ISCRA)**, project: “Machine learning for a more efficient minor embedding” (ML4MINOR), “Quantum Annealing for Feature Selection” (QA4FS), “Impact of Problem Characteristics on the Effectiveness of Quantum Annealing” (PC4QA), Funding 15.000 €, Principal investigator
- Industrial project with ContentWise SpA for content-to-content video recommendation**, Funding 20.000 €, Technical responsible

- 2022 **Horizon Europe Framework Programme (Horizon 2020), EIT Digital Academy, project “Programme Execution of the Data Science programme”**, Funding: 32.000 €, Participant
- 2021 Collaboration with **Amazon Braket, Moviri SpA, ContentWise SpA**, for the development and benchmarking of a recommendation engine with quantum annealers based on my previous research paper [6]. The results are published in the AWS Quantum Technologies Blog¹
- 2019 Visiting PhD student at the **Alpen-Adria-Universität Klagenfurt** (March/June), this collaboration led to paper [31] which won the **Best Paper Award** at the 13th ACM Conference on Recommender Systems (RecSys)
- 2018 **Horizon Europe Framework Programme (Horizon 2020), EIT Digital Blended Master, project “FlipBot as an AI teaching assistant”**, Funding: 175.000 €, Participant
- 2017 **Horizon Europe Framework Programme (Horizon 2020), EIT Digital Innovation Factory, project “Street Smart Retail”**, Funding: 308.000 €, Participant
Horizon Europe Framework Programme (Horizon 2020), EIT Digital Academy, project “Programme Execution of the Data Science programme”, Funding: 47.500 €, Participant

Awards and Recognitions

- 2023 **Best Academic Team at the ACM RecSys Challenge**, sponsored by **ShareChat** at the 17th ACM Conference on Recommender Systems (RecSys)
- 2022 **Best Reviewer**, 31st ACM International Conference on Information and Knowledge Management (CIKM)
- 2021 **“Prof. Florian Daniel” Award**, best doctoral thesis in Computer Science Engineering, DEIB, Politecnico di Milano, Italy
Best Academic Team at the ACM RecSys Challenge, sponsored by **Twitter** at the 15th ACM Conference on Recommender Systems (RecSys)
- 2020 **Best Reviewer Nomination**, 14th ACM Conference on Recommender Systems (RecSys)
- 2019 **Best Paper Award**, for paper “Are We Really Making Much Progress? A Worrying Analysis of Recent Neural Recommendation Approaches” [31], at the 13th ACM Conference on Recommender Systems (RecSys)
Best Reviewer Nomination, 13th ACM Conference on Recommender Systems (RecSys)
- 2018 **2nd place in the ACM RecSys Challenge**, sponsored by **Spotify** at the 12th ACM Conference on Recommender Systems (RecSys)

¹<https://aws.amazon.com/it/blogs/quantum-computing/implementing-a-recommendation-engine-with-amazon-braket/>

Complete Publication List

Invited Conference Paper

- [1] Maurizio Ferrari Dacrema, Paolo Cremonesi, and Dietmar Jannach. 2020. Methodological issues in recommender systems research (extended abstract). In *Proceedings of the Twenty-Ninth International Joint Conference on Artificial Intelligence, IJCAI 2020*. Christian Bessiere, editor. ijcai.org, 4706–4710. doi: 10.24963/ijcai.2020/650. <https://doi.org/10.24963/ijcai.2020/650>.

Journal Publication

- [2] Cesare Bernardis, Maurizio Ferrari Dacrema, Fernando Benjamín Pérez Maurera, Massimo Quadrana, Mario Scriminaci, and Paolo Cremonesi. 2022. From data analysis to intent-based recommendation: an industrial case study in the video domain. *IEEE Access*, 10, 14779–14796. doi: 10.1109/ACCESS.2022.3148434. <https://doi.org/10.1109/ACCESS.2022.3148434>.
- [3] Costantino Carugno, Maurizio Ferrari Dacrema, and Paolo Cremonesi. 2022. Evaluating the job shop scheduling problem on a d-wave quantum annealer. *Nature Scientific Reports*, 12, 1, (April 2022), 6539–6550. issn: 2045-2322. doi: 10.1038/s41598-022-10169-0. <https://doi.org/10.1038/s41598-022-10169-0>.
- [4] Maurizio Ferrari Dacrema, Nicolò Felicioni, and Paolo Cremonesi. 2022. Offline evaluation of recommender systems in a user interface with multiple carousels. *Frontiers Big Data*, 5, 21 pages. issn: 2624-909X. doi: 10.3389/fdata.2022.910030. <https://doi.org/10.3389/fdata.2022.910030>.
- [5] Maurizio Ferrari Dacrema, Simone Boglio, Paolo Cremonesi, and Dietmar Jannach. 2021. A troubling analysis of reproducibility and progress in recommender systems research. *ACM Trans. Inf. Syst.*, 39, 2, 20:1–20:49. doi: 10.1145/3434185. <https://doi.org/10.1145/3434185>.
- [6] Riccardo Nembrini, Maurizio Ferrari Dacrema, and Paolo Cremonesi. 2021. Feature selection for recommender systems with quantum computing. *Entropy*, 23, 8, 970. doi: 10.3390/e23080970. <https://doi.org/10.3390/e23080970>.
- [7] Yashar Deldjoo, Maurizio Ferrari Dacrema, Mihai Gabriel Constantin, Hamid Eghbal-zadeh, Stefano Cereda, Markus Schedl, Bogdan Ionescu, and Paolo Cremonesi. 2019. Movie genome: alleviating new item cold start in movie recommendation. *User Model. User Adapt. Interact.*, 29, 2, 291–343. doi: 10.1007/s11257-019-09221-y. <https://doi.org/10.1007/s11257-019-09221-y>.

Book Chapter

- [8] Maurizio Ferrari Dacrema, Iván Cantador, Ignacio Fernández-Tobías, Shlomo Berkovsky, and Paolo Cremonesi. 2022. Design and evaluation of cross-domain recommender systems. In *Recommender Systems Handbook*. Francesco Ricci, Lior Rokach, and Bracha Shapira, editors. Springer US, New York, NY, 485–516. isbn: 978-1-0716-2197-4. doi: 10.1007/978-1-0716-2197-4_13. https://doi.org/10.1007/978-1-0716-2197-4_13.
- [9] Paolo Cremonesi, Franca Garzotto, and Maurizio Ferrari Dacrema. 2018. User preference sources: explicit vs. implicit feedback. In *Collaborative Recommendations - Algorithms, Practical Challenges and Applications*. Shlomo Berkovsky, Iván Cantador, and Domonkos Tikk, editors. WorldScientific, 233–252. doi: 10.1142/9789813275355_0007. https://doi.org/10.1142/9789813275355_0007.

Conference Paper

- [10] Andrea Pasin, Maurizio Ferrari Dacrema, Paolo Cremonesi, and Nicola Ferro. 2024. Overview of QuantumCLEF 2024: the quantum computing challenge for information retrieval and recommender systems at CLEF. In *Experimental IR Meets Multilinguality, Multimodality, and Interaction. Proceedings of the Fifteenth International Conference of the CLEF Association (CLEF 2024)*. Lorraine Goeuriot, Philippe Mulhem, Georges Quénot, Didier Schwab, Laure Soulier, Giorgio Maria Di Nunzio, Petra Galuščáková, Alba García Seco de Herrera, Guglielmo Faggioli, and Nicola Ferro, editors. **(To appear)**, 23 pages.
- [11] Maurizio Ferrari Dacrema, Andrea Pasin, Paolo Cremonesi, and Nicola Ferro. 2024. Using and evaluating quantum computing for information retrieval and recommender systems. In *SIGIR '24: The 47th International ACM SIGIR Conference on Research and Development in Information Retrieval, Washington, USA, July 14 - 18, 2024*. **(To appear)**, 4 pages.

- [12] Andrea Pasin, Maurizio Ferrari Dacrema, Paolo Cremonesi, and Nicola Ferro. 2024. QuantumCLEF - Quantum computing at CLEF. In *Advances in Information Retrieval - 46th European Conference on Information Retrieval, ECIR 2024, Glasgow, UK, March 24-28, 2024, Proceedings, Part V* (Lecture Notes in Computer Science). Nazli Goharian, Nicola Tonellotto, Yulan He, Aldo Lipani, Graham McDonald, Craig Macdonald, and Iadh Ounis, editors. Volume 14612. Springer, 482–489. doi: 10.1007/978-3-031-56069-9_66. https://doi.org/10.1007/978-3-031-56069-9_66.
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- [14] Maurizio Ferrari Dacrema, Pablo Castells, Justin Basilico, and Paolo Cremonesi. 2023. Workshop on learning and evaluating recommendations with impressions (LERI). In *Proceedings of the 17th ACM Conference on Recommender Systems, RecSys 2023, Singapore, Singapore, September 18-22, 2023*. Jie Zhang, Li Chen, Shlomo Berkovsky, Min Zhang, Tommaso Di Noia, Justin Basilico, Luiz Pizzato, and Yang Song, editors. ACM, 1248–1251. doi: 10.1145/3604915.3608756. <https://doi.org/10.1145/3604915.3608756>.
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- [16] Andrea Pasin, Maurizio Ferrari Dacrema, Paolo Cremonesi, and Nicola Ferro. 2023. qCLEF: A proposal to evaluate quantum annealing for information retrieval and recommender systems. In *Experimental IR Meets Multilinguality, Multimodality, and Interaction - 14th International Conference of the CLEF Association, CLEF 2023, Thessaloniki, Greece, September 18-21, 2023, Proceedings* (Lecture Notes in Computer Science). Avi Arampatzis, Evangelos Kanoulas, Theodora Tsikrika, Stefanos Vrochidis, Anastasia Giachanou, Dan Li, Mohammad Aliannejadi, Michalis Vlachos, Guglielmo Faggioli, and Nicola Ferro, editors. Volume 14163. Springer, 97–108. doi: 10.1007/978-3-031-42448-9_9. https://doi.org/10.1007/978-3-031-42448-9_9.
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- [18] Nicolò Felicioni, Maurizio Ferrari Dacrema, Marcello Restelli, and Paolo Cremonesi. 2022. Off-policy evaluation with deficient support using side information. In *NeurIPS*, 15 pages. http://papers.nips.cc/paper%5C_files/paper/2022/hash/c32be49c09eec3aad1f2bb587543e7f6-Abstract-Conference.html.
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- [25] Maurizio Ferrari Dacrema. 2021. Demonstrating the equivalence of list based and aggregate metrics to measure the diversity of recommendations (student abstract). In *Thirty-Fifth AAAI Conference on Artificial Intelligence, AAAI 2021, Thirty-Third Conference on Innovative Applications of Artificial Intelligence, IAAI 2021, The Eleventh Symposium on Educational Advances in Artificial Intelligence,*

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Workshop Paper

- [36] Paolo Basso, Arturo Benedetti, Nicola Cecere, Alessandro Maranelli, Salvatore Marragony, Samuele Peri, Andrea Riboni, Alessandro Verosimile, Davide Zanutto, and Maurizio Ferrari Dacrema. 2023. Pessimistic rescaling and distribution shift of boosting models for impression-aware online advertising recommendation. In *ACM RecSys Challenge 2023, Singapore, 19 September 2023*. ACM, 33–38. doi: 10.1145/3626221.3627288. <https://doi.org/10.1145/3626221.3627288>.
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- [38] Riccardo Pellini, Maurizio Ferrari Dacrema, and Paolo Cremonesi. 2023. Does the structure of the QUBO problem affect the effectiveness of quantum annealing? an empirical perspective (extended abstract). In *Proceedings of the International Workshop on AI for Quantum and Quantum for AI (AIQxQIA 2023) co-located with 22nd International Conference of the Italian Association for Artificial Intelligence (AIIA 2023), November 6–9, 2023, Roma Tre University, Rome, Italy*. (CEUR Workshop Proceedings). Volume 3586. CEUR-WS.org, 2 pages. <https://ceur-ws.org/Vol-3586/poster2.pdf>.

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 - [40] Fernando B. Pérez Maurera, Maurizio Ferrari Dacrema, Pablo Castells, and Paolo Cremonesi. 2023. Incorporating impressions to graph-based recommenders. In *Proceedings of the Workshop on Learning and Evaluating Recommendations with Impressions co-located with the 17th ACM Conference on Recommender Systems (RecSys 2023)*, Singapore, September 19th, 2023 (CEUR Workshop Proceedings). Maurizio Ferrari Dacrema, Pablo Castells, Justin Basilico, Paolo Cremonesi, and Fernando B. Pérez Maurera, editors. Volume 3590. CEUR-WS.org, 62–67. <https://ceur-ws.org/Vol-3590/short5.pdf>.
 - [41] Fernando Benjamín Pérez Maurera, Maurizio Ferrari Dacrema, Pablo Castells, and Paolo Cremonesi. 2023. Impressions in recommender systems: present and future. In *Proceedings of the 13th Italian Information Retrieval Workshop (IIR 2023)*, Pisa, Italy, June 8-9, 2023 (CEUR Workshop Proceedings). Franco Maria Nardini, Nicola Tonellotto, Guglielmo Faggioli, and Antonio Ferrara, editors. Volume 3448. CEUR-WS.org, 97–104. <https://ceur-ws.org/Vol-3448/paper-23.pdf>.
 - [42] Riccardo Pellini, Maurizio Ferrari Dacrema, and Paolo Cremonesi. 2023. Towards improved QUBO formulations of IR tasks for quantum annealers. In *Proceedings of the 13th Italian Information Retrieval Workshop (IIR 2023)*, Pisa, Italy, June 8-9, 2023 (CEUR Workshop Proceedings). Franco Maria Nardini, Nicola Tonellotto, Guglielmo Faggioli, and Antonio Ferrara, editors. Volume 3448. CEUR-WS.org, 137–142. <https://ceur-ws.org/Vol-3448/paper-05.pdf>.
 - [43] Nicola Della Volpe, Lorenzo Mainetti, Alessio Martignetti, Andrea Menta, Riccardo Pala, Giacomo Polvanesi, Francesco Sammarco, Fernando Benjamin Perez Maurera, Cesare Bernardis, and Maurizio Ferrari Dacrema. 2022. Lightweight model for session-based recommender systems with seasonality information in the fashion domain. In *Proceedings of the Recommender Systems Challenge 2022 (RecSysChallenge '22)*. Association for Computing Machinery, Seattle, WA, USA, 18–23. ISBN: 9781450398565. DOI: 10.1145/3556702.3556829. <https://doi.org/10.1145/3556702.3556829>.
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 - [48] Luca Carminati, Giacomo Lodigiani, Pietro Maldini, Samuele Meta, Stiven Metaj, Arcangelo Pisa, Alessandro Sanvito, Mattia Surricchio, Fernando Benjamín Pérez Maurera, Cesare Bernardis, and Maurizio Ferrari Dacrema. 2021. Lightweight and scalable model for tweet engagements predictions in a resource-constrained environment. In *RecSysChallenge '21: Proceedings of the Recommender Systems Challenge 2021 (RecSysChallenge 2021)*, October 1, 2021, Amsterdam, Netherlands. ACM, 8 pages. DOI: 10.1145/3487572.3487597. <https://doi.org/10.1145/3487572.3487597>.
 - [49] Nicolò Felicioni, Maurizio Ferrari Dacrema, Fernando Benjamín Pérez Maurera, and Paolo Cremonesi. 2021. Measuring the ranking quality of recommendations in a two dimensional carousel setting. In *International Workshop on Industrial Recommendation Systems (IRS '21) at KDD '21, August 15, 2021*, 6 pages.
 - [50] Nicolò Felicioni, Andrea Donati, Luca Conterio, Luca Bartoccioni, Davide Yi Xian Hu, Cesare Bernardis, and Maurizio Ferrari Dacrema. 2020. Multi-objective blended ensemble for highly imbalanced sequence aware tweet engagement prediction. In *RecSys Challenge '20: Proceedings of the Recommender Systems Challenge 2020, Virtual Event Brazil, September, 2020*. ACM, 29–33. <https://dl.acm.org/doi/10.1145/3415959.3415998>.
 - [51] Edoardo D'Amico, Giovanni Gabbolini, Daniele Montesi, Matteo Moreschini, Federico Parroni, Federico Piccinini, Alberto Rossetti, Alessio Russo Introito, Cesare Bernardis, and Maurizio Ferrari Dacrema. 2019. Leveraging laziness, browsing-pattern aware stacked models for sequential accommodation learning to rank. In *Proceedings of the Workshop on ACM Recommender Systems Challenge, Copenhagen, Denmark, September 2019*. Peter Knees, Yashar Deldjoo, Farshad Bakhshandegan Moghaddam, Jens Adamczak, Gerard Paul Leyson, and Philipp Monreal, editors. ACM, 7:1–7:5. DOI: 10.1145/3359555.3359563. <https://doi.org/10.1145/3359555.3359563>.
 - [52] Luca Luciano Costanzo, Yashar Deldjoo, Maurizio Ferrari Dacrema, Markus Schedl, and Paolo Cremonesi. 2019. Towards evaluating user profiling methods based on explicit ratings on item features. In *Proceedings of the 6th Joint Workshop on Interfaces and*

Human Decision Making for Recommender Systems co-located with 13th ACM Conference on Recommender Systems(RecSys 2019), Copenhagen, Denmark, September 19, 2019 (CEUR Workshop Proceedings). Peter Brusilovsky, Marco de Gemmis, Alexander Felfernig, Pasquale Lops, John O'Donovan, Giovanni Semeraro, and Martijn C. Willemsen, editors. Volume 2450. CEUR-WS.org, 72–76. <http://ceur-ws.org/Vol-2450/short4.pdf>.

- [53] Maurizio Ferrari Dacrema, Alberto Gasparin, and Paolo Cremonesi. 2018. Deriving item features relevance from collaborative domain knowledge. In *Proceedings of the Workshop on Knowledge-aware and Conversational Recommender Systems 2018 co-located with 12th ACM Conference on Recommender Systems, KaRS@RecSys 2018, Vancouver, Canada, October 7, 2018* (CEUR Workshop Proceedings). Vito Walter Anelli, Tommaso Di Noia, Pasquale Lops, Cataldo Musto, Markus Zanker, Pierpaolo Basile, Derek G. Bridge, and Fedelucio Narducci, editors. Volume 2290. CEUR-WS.org, 1–4. http://ceur-ws.org/Vol-2290/kars2018%5C_paper1.pdf.
- [54] Sebastiano Antenucci, Simone Boglio, Emanuele Chioso, Ervin Dervishaj, Shuwen Kang, Tommaso Scarlatti, and Maurizio Ferrari Dacrema. 2018. Artist-driven layering and user's behaviour impact on recommendations in a playlist continuation scenario. In *Proceedings of the ACM Recommender Systems Challenge, RecSys Challenge 2018, Vancouver, BC, Canada, October 2, 2018*. ACM, 4:1–4:6. DOI: 10.1145/3267471.3267475. <https://doi.org/10.1145/3267471.3267475>.
- [55] Paolo Cremonesi, Maurizio Ferrari Dacrema, Massimo Perini, and Filippo Calzavara. 2018. Item-based CF as an inverse eigenvalue problem. In *Italian Information Retrieval Workshop (IIR '18)*, 12 pages.

Industrial Conference Poster

- [56] Riccardo Pellini, Maurizio Ferrari Dacrema, and Paolo Cremonesi. 2023. Assessing how the structure of the QUBO problem affects the effectiveness of quantum annealing. *3rd European Quantum Technologies Conference (EQTC), Hannover, Germany, October 16–18, 2023*, 1 page poster.
- [57] Gloria Turati, Maurizio Ferrari Dacrema, and Paolo Cremonesi. 2023. A benchmark study of adaptative-VQAs on QUBO instances. *3rd European Quantum Technologies Conference (EQTC), Hannover, Germany, October 16–18, 2023*, 1 page poster.
- [58] Riccardo Nembrini, Maurizio Ferrari Dacrema, and Paolo Cremonesi. 2023. Quantum annealing-assisted bipartite community detection for recommender systems. *3rd European Quantum Technologies Conference (EQTC), Hannover, Germany, October 16–18, 2023*, 1 page poster.
- [59] Maurizio Ferrari Dacrema, Nicolò Felicioni, and Paolo Cremonesi. 2021. Personalizing video recommendation layout with quantum annealing. *2nd European Quantum Technologies Virtual Conference (EQTC), 29 November, 2021*, 1 page poster.
- [60] Maurizio Ferrari Dacrema, Tang-Tang Zhou, Riccardo Nembrini, and Paolo Cremonesi. 2021. Quantum annealing linear regression for collaborative filtering recommendations. *2nd European Quantum Technologies Virtual Conference (EQTC), 29 November, 2021*, 1 page poster.
- [61] Costantino Carugno, Maurizio Ferrari Dacrema, and Paolo Cremonesi. 2021. Reverse annealing improves solutions of job shop scheduling problems on a quantum annealer. *2nd European Quantum Technologies Virtual Conference (EQTC), 29 November, 2021*, 1 page poster.
- [62] Riccardo Nembrini, Maurizio Ferrari Dacrema, Dario Cardamone, and Paolo Cremonesi. 2021. Quantum personalization: an application of quantum annealing recommender systems. *2nd European Quantum Technologies Virtual Conference (EQTC), 29 November, 2021*, 1 page poster.

Teaching Experience ---

COURSES WITH PRIMARY RESPONSIBILITY

- 2024-25 **Recommender Systems**, Professor (Master Level)
- 2022-23 **Computer Science and Elements of Medical Informatics**, Professor (Bachelor Level)
- 2020-21 **Applied Quantum Machine Learning**, Lecturer (PhD Level)

TEACHING ASSISTANT AND TUTOR

- 2023-24 **Fundamentals of Computer Science**, Teaching Assistant (Bachelor Level)
Recommender Systems, Teaching Assistant (Master Level)
Quantum Computing, Teaching Assistant (Master Level)
- 2022-23 **Fundamentals of Computer Science**, Teaching Assistant and Tutor (Bachelor Level)
Recommender Systems, Teaching Assistant (Master Level)
Computer Science A, Tutor (Bachelor Level)
- 2021-22 **Fundamentals of Computer Science**, Teaching Assistant and Tutor (Bachelor Level)
Recommender Systems, Teaching Assistant (Master Level)
Computer Science A, Tutor (Bachelor Level)
- 2020-21 **Recommender Systems**, Teaching Assistant (Master Level)
Fundamentals of Computer Science, Teaching Assistant and Tutor (Bachelor Level)
Computer Science A, Tutor (Bachelor Level)
- 2019-20 **Recommender Systems**, Teaching Assistant (Master Level)
Fundamentals of Computer Science, Tutor (Bachelor Level)
Computer Science A, Tutor (Bachelor Level)
- 2018-19 **Recommender Systems**, Teaching Assistant (Master Level)
- 2017-18 **Recommender Systems**, Teaching Assistant (Master Level)
Fundamentals of Computer Science, Lab Assistant (Bachelor Level)
- 2016-17 **Fundamentals of Computer Science**, Tutor (Bachelor Level)
Software Engineering, Tutor (Bachelor Level)
Computer Systems, Teaching Assistant (Master Level)
- 2015-16 **Software Engineering**, Tutor (Bachelor Level)
Computer Science B, Tutor (Bachelor Level)
- 2014-15 **Software Engineering**, Tutor (Bachelor Level)
Tutoring students with disabilities, Tutor (Bachelor Level)

Talks and Seminars ---

- 2024 **Tutorial presenter**, International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR), “Using and Evaluating Quantum Computing for Information Retrieval and Recommender Systems” [11]
Tutorial presenter, European Conference on Information Retrieval (ECIR), “Quantum Computing for Information Retrieval and Recommender Systems” [12]
Invited seminar, Politecnico di Milano, School of Management, Observatory on Quantum Computing & Communication, “Basic Notions of Quantum Computing”
Invited seminar, Politecnico di Milano, Department of Mathematics, “The Magic of Quantum Computers”

- 2021 **Invited seminar**, Politecnico di Bari, “Quantum Computing for Machine Learning”
Invited seminar, Politecnico di Milano, presenting my PhD thesis, winner of the “Prof. Florian Daniel” Award for best doctoral thesis in Computer Science Engineering
Invited paper presentation, International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR), “A Troubling Analysis of Reproducibility and Progress in Recommender Systems Research” [5]
Invited seminar, Farfetch, “Are We Really Making Much Progress? A Worrying Analysis of Recent Neural Recommendation Approaches” [31]
Invited podcast, Data Exchange, “The state of research in recommendation systems”
Talk, Qubits, D-Wave, “Feature Selection for Recommender Systems with Quantum Computing” [6]
- 2020 **Invited paper presentation**, International Joint Conferences on Artificial Intelligence (IJCAI), “Methodological Issues in Recommender Systems Research (Extended Abstract)” [1]
Invited talk, Aggregate Intellect, “Are We Really Making Much Progress? A Worrying Analysis of Recent Neural Recommendation Approaches” [31]

Service

- 2024 **Conference Program Co-Chair**, Co-Chair responsible for the *Demo and Late-Breaking Results* track the at the 18th ACM Conference on Recommender Systems (RecSys)
Evaluation Lab Organizer, Lab on “QuantumCLEF - Quantum Computing at CLEF” at the Conference and Labs of the Evaluation Forum (CLEF)
Reviewer for journals, Quantum Information Processing (Springer), ACM Transactions on Information Systems (TOIS), ACM Transactions on Recommender Systems (TORS)
- 2023 **Workshop Organizer**, Workshop on “Learning and Evaluating Recommendations with Impressions” at the 17th ACM Conference on Recommender Systems (RecSys)
Reviewer for journals, ACM Transactions on Information Systems (TOIS), ACM Transactions on Recommender Systems (TORS)
- 2022-present **Member of the Scientific Board**, Observatory for Quantum Technologies, School of Management, Politecnico di Milano
- 2022 **Guest Editor**, Special Issue “Quantum Computing Applied” (MDPI Electronics)
Session Chair, Fourth Knowledge-aware and Conversational Recommender Systems Workshop located at the 16th ACM Conference on Recommender Systems, RecSys
Session Chair and Local organization committee, Italian Information Retrieval Workshop
- 2021 **Reviewer for journals**, Computers & Security (Elsevier), Information Processing and Management (Elsevier), ACM Transactions on Information Systems, IEEE Transactions on Multimedia, IEEE Transactions on Service Computing
- 2020 **Reviewer for journals**, IEEE Transactions on Emerging Topics in Computing, Future Generation Computer Systems, Neurocomputing (Elsevier)
- 2018-present **Program Committee Member**, RecSys, SIGIR, KDD, CIKM, WWW, WSDM, UMAP, LREC, ICWE

ADVISOR OF DOCTORAL STUDENTS AND MASTER STUDENTS

- 2023-present **Riccardo Pellini**, Advisor, Ph.D. program in Information Technology, Politecnico di Milano
- 2023-present **Andrea Pisani**, Co-Advisor, Italian National Ph.D. program in Artificial Intelligence for Industry 4.0, Politecnico di Milano
- 2021-present **Gloria Turati**, Co-advisor, Ph.D. program in Information Technology, Politecnico di Milano
- 2021-present **Nicolò Felicioni**, Co-advisor, Ph.D. program in Information Technology, Politecnico di Milano
- 2020-present **Riccardo Nembrini**, Co-advisor, Ph.D. program in Information Technology, Politecnico di Milano
- 2020-present **Costantino Carugno**, Co-advisor, Ph.D. program in Information Technology, Politecnico di Milano
- 2019-2024 **Fernando Benjamín Pérez Maurera**, Co-advisor, Ph.D. program in Information Technology, Politecnico di Milano
- 2016-present **Advisor of 13 master students, Co-advisor of 18 master students**, Master Degree in Computer Science and Engineering, Politecnico di Milano

MEMBER OF UNIVERSITY BODIES AND COMMITTEES

- 2020-2022 **Department Council**, Representative of the Research Assistants, Politecnico di Milano
- 2014-2015 **Academic Senate**, Politecnico di Milano
- 2012-2013 **University Assessment Commission (Nucleo di Valutazione)**, Politecnico di Milano
- 2011-2014 **School of Industrial and Information Engineering**, Member of the School Council, Joint teachers-students Commission and Council of Course of Study in Engineer of Computer Systems

Quality Assurance of Higher Education Institutions

NATIONAL ACCREDITATIONS

- 2022 **Italian National Agency for the Evaluation of Universities and Research Institutes (ANVUR)**, Member of one of the three commissions charged to test the new proposed national accreditation framework AVA3 with an on-site visit at Università degli Studi di Torino.
- 2020-2022 **ANVUR**, Member of the commission responsible for the initial accreditation of the proposals to establish new private Italian universities. The commission evaluated 10 proposals.
- 2019-2023 **ANVUR**, Register of experts in evaluation, Coordinator Profile
- 2016-present **Italian Agency for the Quality Certification and EUR-ACE Accreditation of Engineering Programs (QUACING)**, Evaluator Student Profile, on-site visits: Università di Roma “La Sapienza”, Università di Padova, Politecnico di Torino, Università Carlo Cattaneo, Università di Salerno. Some universities received multiple visits.
- 2014-2021 **ANVUR**, Register of experts in evaluation, Student Profile. Accreditation on-site visits: Università Niccolò Cusano, Università di Modena e Reggio Emilia, Università degli studi di Torino, Politecnico di Torino, Università Commerciale Luigi Bocconi, Università IUAV di Venezia, Università del Piemonte Orientale, Università degli Studi di Palermo, Università di Cagliari, Università Telematica Pegaso, Università degli Studi di Trento, Università Ca’ Foscari, Università di Bari, Università di Pisa, Università di Parma, Politecnico di Bari, Università di Scienze Gastronomiche, Università per Stranieri di Perugia.

INTERNATIONAL EVALUATIONS

- 2024 **Kosovo Accreditation Agency (KAA)**, Evaluator for the Institutional Accreditation of the UBT College and the AAB College, Kosovo.
- 2022 **Italian Agency for the Quality Certification and EUR-ACE Accreditation of Engineering Programs (QUACING)**, Evaluator for the Institutional Accreditation of the TEK-UP University, Tunisia.
- 2021 **Turkish Higher Education Quality Council (THEQC)**, International evaluator for the Institutional Accreditation of the Ahi Evran University, Türkiye.
- 2020 **Accreditation Organisation of the Netherlands and Flanders (NVAO)**, EUniQ Project for the Development of a European framework for comprehensive quality assurance of European universities (Erasmus+). Member of the regular panel for the University Network for Innovation Technology and Engineering (UNITE).
Accreditation Organisation of the Netherlands and Flanders (NVAO), Member of the Core Faculty Panel of the University of Luxembourg.
- 2018 **Agència per a la Qualitat del Sistema Universitari de Catalunya (AQU)**, TeSLA Project, Adaptive trust e-assessment system (Horizon 2020). Member of the regular panel for Pilot 3 at the Technical University of Sofia, Bulgaria.
- 2018-today **International Expert on Quality Assurance in Higher Education Institutions**, Quality Agency for Higher Education (Latvia); Turkish Higher Education Quality Council (Türkiye); Agency for Higher Education of Republic of Srpska (Bosnia and Herzegovina); Accreditation Board of Quality Assurance Agency in Higher Education (Albania); Kosovo Accreditation Agency (Kosovo); National Center for Education Quality Enhancement (Georgia).

LECTURER IN COURSES

- 2018 **The Italian model for the accreditation of universities**, University of Verona, Italy
- 2016 **The Italian model for the accreditation of universities**, Politecnico di Milano, Italy
The role of evaluation experts student profile, ANVUR - Italian National Agency For The Evaluation Of Universities And Research Institutes