FEDERICA MANDREOLI

Curriculum Vitae et Studiorum
October 2022

Personal Information

Date of birth   28/09/1973

Place of birth   Bologna

Nationality   Italian

Marital status   married
three children

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Present Appointment

Since November 2017 Associate Professor in Computer Engineering (Scientific Sector ING-INF/05, Sistemi di Elaborazione delle Informazioni) at Università di Modena e Reggio Emilia.

Summary of competences

My area of expertise are data management and information retrieval, with particular reference to:

- Non-conventional data, such as tree-structured data, graph-structured data, and streaming data;
- Data evolution and temporal data;
- Distributed and heterogeneous data;
- Massive data management;
- Query processing and indexing;
- Scalable data science.

Since 2002, I've been leading research activities and projects of the Information System group (www.isgroup.unimo.it) where we study novel information management and access solutions for a wide range of application contexts and design, develop and evaluate system prototypes.

Education and Professional Experience

Apr. 2021: Obtained the Italian National Habilitation (Abilitazione Scientifica Nazionale) as full professor in the Scientific Sector 01/B1 (Computer Science).

Nov. 2020: Obtained the Italian National Habilitation (Abilitazione Scientifica Nazionale) as full professor in the Scientific Sector 09/H1 (Information Processing Systems).

Visiting professor (Jan. 2020 – Present): Visiting professor in the School of Computing at the Newcastle University with a research appointment on Data Analytics and Machine Learning in the medical field

Associate Professor (Nov. 2017-Present): in Computer Engineering (Scientific Sector ING-INF/05, Sistemi di Elaborazione delle Informazioni) at Università di Modena e Reggio Emilia.

Dec. 2013: Obtained the Italian National Habilitation (Abilitazione Scientifica Nazionale) as associate professor in the Scientific Sector 09/H1 (Information Processing Systems).

Research Fellow (Feb. 2010 – March 2015): at Italian National Research Council (CNR) IEIIT (Istituto di Elettronica di Ingegneria dell'Informazione e delle Telecomunicazioni), Bologna.

Assistant Professor (Nov. 2002-Oct. 2017): in Computer Engineering (Scientific Sector ING-INF/05, Sistemi di Elaborazione delle Informazioni) at Università di Modena e Reggio Emilia.

Postdoctoral Researcher (2001–2002): in Computer Engineering at the Dipartimento di Ingegneria dell'Informazione, Università di Modena e Reggio Emilia; research topic "Integration and Querying of structured and semistructured heterogeneous sources"; supervisor: Prof. Sonia Bergamaschi

Ph.D. (1997–2001): in Computer Engineering at the Dipartimento di Elettronica Informatica e Sistemistica , Università di Bologna; degree Dottore di Ricerca in Computer Engineering, 2001. Thesis: "Temporal Schema Versioning in Object-Oriented Databases"; supervisor: Prof. Maria Rita Scalas.

University (1992–1997): Facoltà di Scienze Fisiche Matematiche e Naturali; degree in Computer Science 110/110 cum laudae, March 1997. Supervisor: Prof. Paolo Ciaccia.

Research

My research activity is in the field of data and information management and access. I'm currently leading within the Dipartimento di Scienze Fisiche Informatiche e Matematiche (FIM) the Information Systems Group (www.isgroup.unimo.it). My current interests mainly focus on information sharing and exchange in heterogeneous and distributed contexts, stream data management, and scalable data science. In the past, I worked on non-conventional data like textual information, tree-structured and graph-structured data, on temporal databases and schema versioning, and on personalized data access. On these topics, my research has been mainly centered around data and query models for effective access and data structures and algorithmic issues for efficient query processing.

The results of my research activity are published in more than one hundred papers. The full list of my publication is available at the following web page:
http://personale.unimore.it/AddressBook/pubblications/fmandreoli.

The values of some of the main metrics measuring the impact of my research activity are reported in the following:

- H-Index (Google Scholar): 25
- n° of articles published in the first two quartiles according to the WoS JCT classification: 9 (Q1), 14 (Q2)
- n° of articles published in the first two quartiles according to the SJR classification: 18 (Q1), 9 (Q2)

List of the 5 best articles in the last 5 years

D. Ferrari, V. Guidetti, F. Mandreoli, Multi-objective Symbolic Regression for Data-Driven Scoring System Management (2022), IEEE International Conference on Data Mining (ICDM), December 2022

F Grandi, F Mandreoli, R Martoglia, W Penzo Unleashing the power of querying streaming data in a temporal database world: A relational algebra approach (2022), Information Systems vol. 103, January 2022

Hribernik, K., Cabri, G., Mandreoli, F., Mentzas, G. Autonomous, context-aware, adaptive Digital Twins—State of the art and roadmap (2021) Computers in Industry, 133, art. no. 103508

Ferrari, D., Milic, J., Tonelli, R., Ghinelli, F., Meschiari, M., Volpi, S., Faltoni, M., Franceschi, G., Iadisernia, V., Yaacoub, D., Ciusa, G., Bacca, E., Rogati, C., Tutone, M., Burastero, G., Raimondi, A., Menozzi, M., Franceschini, E., Cuomo, G., Corradi, L., Orlando, G., Santoro, A., Digaetano, M., Puzzolante, C., Carli, F., Borghi, V., Bedini, A., Fantini, R., Tabbì, L., Castaniere, I., Busani, S., Clini, E., Girardis, M., Sarti, M., Cossarizza, A., Mussini, C., Mandreoli, F., Missier, P., Guaraldi, G. Machine learning in predicting respiratory failure in patients with COVID-19 pneumonia —Challenges, strengths, and opportunities in a global health emergency (2020) PLoS ONE, 15 (11 November), art. no. e0239172, .

L. Carafoli, F. Mandreoli, R. Martoglia, W. Penzo (2017). Streaming Tables: Native Support to Streaming Data in DBMSs. IEEE Transactions on Systems man and Cybernatics: Systems, vol. 47(10), pp. 2768-2782, ISSN: 21682216.

Main scientific collaborations

I actively maintain scientific collaborations with researchers in different areas. The following list reports the most significant ones:

2019 – current: Prof. Paolo Missier (New Castle University, UK) and Prof. Giovanni Guaraldi (Professor of Infectious disease at University of Modena and Reggio Emilia) on data analytics and machine learning in medical domain;

2019 – 2021: Prof. Massimo Mecella (Università Sapienza, Italy) on smart manufacturing;

2013-2015: Dr. George H. L. Fletcher (Eindhoven University of Technology, Netherland) on query-driven mapping discovery in dataspaces;

2009-2012: Prof. Stefano Rizzi and Prof. Matteo Golfarelli (Università degli Studi di Bologna, Italy) on distributed business intelligence and datawarehousing;

2004-2008: Prof. Pavel Zezula (Masaryk University, Ceck Republic) on XML query processing;

1999-2001: Prof. Enrico Franconi (Manchester Univeristy, UK) on description logics and schema versioning and evolution semantics;

2001-current: Prof. Fabio Grandi (Università di Bologna, italy) on temporal databases and data evolution;

1998-2000: Prof. John Roddick (Flinders University, Australia) on schema versioning.

Participation to Research Projects

I have participated/participate to the following peer reviewed projects as a co-investigator, by coordinating the research activities of the Information Systems group and contributing to the results and deliverables of the project:

[P1] EU Horizon Europe IP "WASABI: White-label shop for digital intelligent assistance and human-AI collaboration in manufacturing" (2023-2027)– **PI of UNIMORE unit**

[P2] Giliad Inc. funded project "Assessment of well-being state through Intrinsic capacity, in Post-COVID Syndrome: an international multicentre prospective cohort study" - **coPI**

[P3] POR-FES Project - Region Emilia Romagna "Smart digital twin e condivisione intelligente di dati per l'Industria 4.0" - **PI**

[P4] EU Horizon 2020 Marie Marie Skłodowska-Curie RISE Project "FIRST: virtual Factories: Interoperation suppoRting buSiness innovation" (2017-2022) – **PI of UNIMORE unit**

[P5] EU Horizon 2020 COST (European Cooperation in Science and Technology) Action IC1302 "KEYSTONE: semantic KEYword-based Search on sTrutctured data sOurces" (2014-2017)

[P6] Italian Ministry of Economic Development Project Industria 2015 "PEGASUS: ProgEtto per la Gestione della mobilità Attraverso Sistemi infotelematici per l'ambito Urbano, per la Sicurezza di passeggeri, veicoli e merci" (2009-2012)

[P7] Italian Ministry of University and Research (MIUR) project FIRB "NeP4B: Networked Peers for Business" (2006-2009)

[P8] MIUR project PRIN "WISDOM: Ricerca Intelligente su Web basata su Ontologie di Dominio" (2004-2006)

[P9] MIUR project ex-40% "Il cittadino europeo nell'e-governance: profili filosofico-giuridici, giuridici, informatici ed economici" (2003-2005)

[P10] Italian National Research Council (CNR) funded project "ECD: Technologies and Services for Enhanced Content Delivery" (2002-2005)

[P11] EU 5th framework IST project "SEWASIE: SEmantic Webs and AgentS in Integrated Economies" (2002-2005)

[P12] MIUR project ex-40% "D2I: Data 2 Integration" (2000-2002)

[P13] MIUR project ex-40% "INTERDATA Metodologie e tecnologie per la gestione di dati e processi su reti Internet e Intranet" (1997-1999)

Technology transfer and Participation to Projects in Collaboration with Industry

I'm a member of the Interdepartmental Research Centre in Artificial Intelligence AIRI (http://www.airi.unimore.it/site/en/home.html).

In 2014 I was a member of the Scientific Committee of the Better Decision Forum organized by ICONSULTING S.p.A.

In 2013 I was project manager for the development and implementation of a Web portal on good practices in renewable energies (EU INTERREG IVC Project EnercitEE), commissioning body ASTER S.Cons.p.A.

Finally, I participated as a co-investigator or principal investigator to the following projects in collaboration with industry:

[I1]   Research contract between FIM Department and ExpertAI SpA within the Project "Ibrid AI – Approccio Ibrido al Natural Language Understanding" founded by Emilia Romagna Region (2022-2023, € 180K) **PI**

[I2]   Industrial Project PRRIITT "OUTDOOR VIDEO PROTECTION: visione artificiale e tecnologie informatiche innovative per la sicurezza di ambienti di lavoro all'aperto" in collaboration with BRIDGE 129 SPA SAFETY AND SECURITY (2009-2011).

[I3]   Industial Project FIT - Fondo di Innovazione Tecnologica between Dipartimento di Ingegneria dell'Informazione and Idea Paper S.r.l (2006-2007).

[I4]   "Adoption of computer science methologies to the linguistic field" between Dipartimento di Ingegneria dell'Informazione and Logos S.p.A (2000-2002).

[I5]   "Development of a system for the monitoring of risks related to car accidents in urban areas" between Dipartimento di Ingegneria dell'Informazione and USL Modena (2001).

Research Visits

September 2017-November 2018: 30-day visit period within the project [P1] at the company's GK software AG headquarters in Schöneck (Germany) where she contributed to the EU3 "Business Process Data Management and Visualization" topic of the GK EU Innovation Agenda dealing with real -time business intelligence.

July 2015: Visit the *Eindhoven University of Technology*, Eindhoven (Netherlands), to carry out research on mapping discovery in dataspaces with Dr. George H.L. Fletcher. Mission partially funded by the EU Key Action [P2].

Other Scientific Achievements and Services

Best Paper Awards

The following papers were selected as best papers and invited to be extended for journal submission:

F. Grandi, F. Mandreoli, R. Martoglia and W. Penzo (2017). A Relational Algebra for Streaming Tables Living in a Temporal Database World. Accepted for publication in: Proceedings of the 24th Symposium on Temporal Representation and Reasoning (TIME 2017). Mons, Belgium, October 2017.

M. Furini, F. Mandreoli, R. Martoglia, M. Montangero (2016) - IoT: Science Fiction or real revolution?. In: Proc. Of the 2nd EAI International Conference on Smart Objects and Technologies for Social Good. Venice, Italy, November 30 2016.

M. Golfarelli, F. Mandreoli, W. Penzo, S. Rizzi, E. Turricchia (2010). Towards OLAP Query Reformulation in Peer-to-Peer Data Warehousing. In: -. Proceedings of the ACM 13th international workshop on Data warehousing and OLAP (ACM DOLAP), ACM Press

F. MANDREOLI, GRANDI F, BERGONZINI M, TIBERIO P (2003). A temporal data model and management system for normative texts in XML format. In: Proceedings of the 5th International CIKM Workshop on 2006 Web Information Data Management Workshop (ACM WIDM), ACM Press.

F. MANDREOLI, F. GRANDI, M. R. SCALAS, J. F. RODDICK (1999). Towards a Model for Spatio-Temporal Schema Selection. In: Proceedings of the 10th International Workshop on Database & Expert Systems Applications, IEEE Computer Society

Associate and Guest editorship

2018 – present: associate editor of the International Journal of Knowledge-Based and Intelligent Engineering Systems (KES), IOS Press

2019 – present: associate editor of the Journal of Data Science and Engineering, Springer

2022: Guest (co-)editor of the special issue "Autonomous, context-aware, adaptive digital twins" on Computers in Industry (Elsevier)

2021: Guest (co-)editor of the special issue "Big Data Management in Industry 4.0" on Frontiers in Big Data – Data Mining and Management Section

2016: Guest (co-)editor of the special issue "Query Answering on Graph-Structured Data" on Journal of Computer and System Sciences (Elsevier) 82(1)

Reviewing Activity, Program Committee Membership and Organization of Scientific Events

Scientific coordinator of the Webinar Live "MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE: WHICH APPLICATION IN INFECTIOUS DISEASES" 12 CME Italian Credits

Co-chair of the following events:

International Workshop on Key Enabling Technologies for Digital Factories – KET4DF 2018-2022 co-located with the International Conference on Advanced Information Systems Engineering (CAiSE)

International Workshop on Querying Graph Structured Data - GraphQ
- 2010 Edition co-located with 14th East-European Conference on Advances in Databases and Information Systems (ADBIS 2010)
- 2013-2017 Editions co-located with International Conference on Extending Database Technology / International Conference on Database Theory (EDBT/ICDT Joint Conference).

Program and Scientific Committee Member

- 36th AAAI Conference on Artificial Intelligence 2023
- 34th International Conference on Scientific and Statistical Database Management (SSDBM) 2022
- International Symposium on Temporal Representation and Reasoning (TIME): 2015, 2016, 2019
- International Conference on Knowledge Management and Information Sharing (KMIS): 2015-2022
- Workshop on Advances in Programming Languages (WAPL): 2011-2015, 2017, 2019
- East-European Conference on Advances in Databases and Information Systems (ADBIS): 2010, 2011, 2014, 2017-2022
- International Conference on Knowledge-Based and Intelligent Information & Engineering Systems (KES): 2018-2021
- Italian Symposium on Advanced Database Systems (SEBD): 2008,2019-2021
- 13TH Italian Research Conference on Digital Libraries (IRCDL): 2017
- 2nd International KEYSTONE Conference: 2016
- 12th EDBT Summer School on Graph Data Management: 2015
- ACM International Database Engineering and Applications Symposium - IDEAS: 2010-2012
- ACM International Workshop on Web Information and Data Management - WIDM (ACM CIKM Workshop): 2012;

- 3rd International Workshop on Graph Structures for Knowledge Representation and Reasoning (GKR): 2011
- International Workshop on Database Technologies for Handling XML Information on the Web
- DATAX (EDBT Workshop): 2008-2009
- ACM 6th International Workshop on Data Warehousing and OLAP - DOLAP: 2003;
- International Workshop on Evolution and Change in Data Management - ECDM (ER workshop): 2006, 2008, 2012

Journal Referee

- IEEE Transaction on Knowledge and Data Engineering,
- IEEE Internet Computing,
- ACM Transaction on Database Systems,
- Information Systems (Elsevier),
- Data and Knowledge Engineering (Elsevier),
- Journal of Systems and Software (Elsevier),
- Computers in Biology and Medicine (Elsevier),
- Data Science and Engineering (Elsevier),
- Artificial Intelligence in Medicine (Elsevier),
- Computer Languages, Systems & Structures (Elsevier),
- Journal on Data Semantics (Springer)
- Distributed and Parallel Databases (Springer)
- Multimedia Tools and Applications (Springer),
- Transactions on Large-Scale Data and Knowledge Centered Systems (LNCS Transactions).

Conference Reviewer

- ACM SIGMOD Conference, International Conference on Very Large DataBases (VLDB), International Conference on Data Engineering (ICDE), International Conference on Conceptual Modelling (ER), and ACM International Conference on Information and Knowledge Management (CIKM).

Referee

- European Research Council (ERC) Starting Grant year 2014,
- Italian Ministry of University and Research (MIUR) years 2013 and 2014,
- France-South America STIC AmSud Program 2015,
- Austria FWF Program 2016-2017.

PhD student supervision

I'm a member of the **PhD program in Computer and data science for technological and social innovation** (cds.unimore.it) at Università di Modena e Reggio Emilia.

I was PhD co-supervisor of Simona Sassatelli, student of the XXI cicle, on the topic "Query processing in a PDMS", and PhD supervisor of the following students:

- Federico Motta, XXXVIII cycle, topic "Data Analytics and Machine Learning for P4 medicine"
- Luca Carafoli, XXVI cycle, topic "Data management in intelligent transport systems".
- - Razia Haider, XXIV cycle, topic "Peer-to-peer systems and wireless sensor networks" (from 2010)
- Giorgio Villani, XXII cycle, topic "Managing a network of peers for data and service sharing"