

Short Curriculum of Didactic and Scientific activity
by Carla Fiori

In 2021 the Military Academy awarded her the title of Cadet ad Honorem. The motivation reads “*Teacher with a very high moral and professional profile, you have interpreted your role under the banner of total and unconditional dedication to service in the training of Officer Cadets. Etc. ...*”

In 2023 the Union of Centenary Societies of Modena awarded her the "*Loyalty and Solidarity Award*" presented by the President of the Emilia Romagna Region.

Current position :

- Full Professor of II bracket of ALGEBRA (Mat / 02) serving at the Department of Physical, Computer and Mathematical Sciences of the University of Modena and Reggio Emilia.
- Professor of *Algebra A* and *Algebra B* courses for the degree course in Mathematics; the teaching of *Mathematics I* for the degree course in Strategic Sciences at the Military Academy; of 24 hours of teaching *General and Financial Mathematics* for the degree course in Business Economics and Management at the “Marco Biagi” Department of Economics.

Academic training:

- Graduated in Mathematics on June 28, 1975 at the University of Modena with 110/110.
- CNR scholarship holder for research in the field of mathematical sciences, Algebra and Geometry.
- Confirmed University Researcher, group 89, Algebra and Geometry.
- 1992 winner of the competition for second level University Professor, grouping n. A013 (now Mat / 04), in service at the University of Trieste (1992-1995) and from 1996 onwards at the University of Modena and Reggio Emilia.
- Since 2002 Full Professor of II level of ALGEBRA (Mat / 02).
- Other academic qualifications: Archival, Paleography and Diplomatic Diploma. Some postgraduate diplomas.

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Main academic positions and institutional activities:

- Member of the Board of Directors of the University of Modena and Reggio Emilia (from 1.11.2000 to 31.10.2007).
- Rector's Delegate for the Right to Study and Relations with Students (2007-2011).
- President of the Commission for the financing of the Cultural and Social Activities of students and for the financing of the Activities of Student Associations (2008-2011).
- Member of the Council of the Language Center of the University of Modena and Reggio Emilia (2000-2007).
- For the University of Modena and Reggio Emilia you collaborated in the activation of the Degree Course in Strategic Sciences. She was the referent and subsequently President of the Board of the Degree Course in Strategic Sciences (2000-2018).
- Member of the Joint Teachers-Students Commission of the FIM Department, 2014-2021.
- President of the centennial Society of Naturalists and Mathematicians of Modena (2008-11

- Member of the Proposal Committee and of the Board of the Specialization School for Secondary Teaching. Head of the Economic-Legal address (1999-2004).
- Head of the Didactic Research Unit in Mathematics of the University of Trieste (1992-95). Responsible and conductor of activities aimed at the training / updating of teachers, as part of an agreement between the University of Modena and the Educational Documentation Center of the Municipality of Modena.

Organizational and cultural activities:

- On the occasion of the bicentenary of Darwin's birth (member of the Society of Naturalists and Mathematicians of Modena), in 2009 he organized an exhibition visited by 30,000 people.
- He organized together with Prof. Umberto Torelli (Academy of Sciences, Letters and Arts of Modena) the Commemorative Day "DARWIN in Modena" (March 21, 2009), followed by a cycle of conferences on Evolutionism, March-May 2009 with speakers from international fame.
- He promoted, organized and subsequently edited the Proceedings of the Conference *Days of Didactics, History and Epistemology of Mathematics* in memory of Prof. Giovanni Torelli. About 200 people took part in the conference, held in Trieste on 29 and 30 August 1995.
- He promoted and organized together with Luciana Zuccheri the *VIII Conference Internuclei Elementary School, held in Grado (GO)* on 22, 23, 24 April 1993 on the theme "Learning difficulties in mathematics".
- He promoted and organized, together with P.Quattrocchi and G.Rinaldi, the International Conference of *Algebra and Combinatorial Geometry* held in Modena on 16 and 17 September 1993.

Teaching activity

- As a graduate, CNR fellow, confirmed researcher, over the years I have carried out exercises in the courses of *Elementary Mathematics from a higher point of view, Complementary Mathematics, Number Theory, Mathematical Institutions, Geometry I and Algebra*.
- As Associate Professor I was the holder of the *Complementary Mathematics* course at the University of Trieste; while since 1995 at the University of Modena and Reggio Emilia I have held courses in *General Mathematics* (L in Business Economics); *Higher Algebra, Algebra and Theory of Codes, Algebraic Structures* (LM in Mathematics); *Algebra I, Algebra II, Algebra A, Algebra B, Group Theory* (L in Mathematics); *Mathematics I* (L in Strategic Sciences).
- In my activity as confirmed researcher first and then as associate professor, I have held seminars and have been supervisor of many degree theses.

Scientific activity

My scientific activity is essentially located in two sectors:

1. Algebra and Combinatorial Geometry.
2. Foundations, History and Didactics of Mathematics.

For both sector 1. and sector 2. the research was carried out within national projects funded by MURST or the C.N.R., and led to results collected in works published in national and international journals, all with referees. She is the author of two popular monographs on real numbers.

- Within the first sector, the incidence structures associated (naturally) with groups, or more generally with sets, of strictly k -transitive finite permutations have been studied. In particular,

the research was addressed to Minkowski's plans or structures because they have particular geometric-combinatorial interest, so much so that they are the subject of a vast international literature. These structures have been studied by me from various points of view; problems of existence, characterization, extension have been faced and solved with algebraic and / or combinatorial methods. I recently published a result of mine on the existence of new strictly 3-transitive sets which also solves open problems on invertible sets. Other aspects of the permutation sets (with respect to the Hamming distance, with respect to k-homogeneity, with respect to regularity in the sense of J.Key) have been considered and largely solved. The study of the group of automorphisms of Minkowski structures had an intrinsic importance (e.g. characterization of the automorphisms of a Minkowski plane), but it also served to highlight characteristic properties of the structures studied (e.g. regularity in the sense of J.Key, k-homogeneity etc.). In a more specifically combinatorial field, the works concerning the theory of codes should be placed.

- Within the second sector, the issues addressed are part of research lines that, in recent years, have emerged on a national and international level and can be classified in the following four branches: foundations, dissemination and applications of mathematics; teaching / learning of mathematics; problems of connection between school groups; history of mathematics. In the first branch, particular attention was paid to the foundations of geometry and to some applications of Pólya's Theorem (well known in Mathematics and Statistics). In 1995 she was scientific manager of the operational unit of the University of Modena and Reggio Emilia of a coordinated national project, funded by the C.N.R., entitled: *Design and experimentation of methodologies and didactic paths for the teaching and dissemination of mathematics, also historical reference*. You have participated as head of the country Sweden, in the national project CoNCIRD for a Survey on Initial and Continuing Education of Teachers in Europe (EURINS) funded by MURST and coordinated by G.Luzzatto.
- Numerous (about fifty) participations in Conferences and Congresses (Combinatorics, GNSAGA, UMI, AMASES, Internuclei Scuola Superiore, etc ..).

Modena, april 30, 2023.