Giuseppa Carrà-Ferro, born on August 1, 1952 in Catania, Italy, was a pioneer in computational differential algebra. She completed her undergraduate and master (laurea) degrees in mathematics at the University of Catania, graduating magna cum laude in 1974. Soon after graduation, on October 10, 1974, she joined the Department of Mathematics and Computer Science at the University of Catania. She was a visiting researcher at the Department of Mathematics of Columbia University for the academic year 1979–80. Her association with Professor Ellis R. Kolchin at Columbia and his group influenced very much her future scientific activities and she brought into the group her knowledge of computer algebra which she acquired from her collaboration with the Italian scientific community. She was an assistant professor of algebra at the University of Catania until November, 1993 and an associate professor until November, 2003 when she become a full professor of algebra.

Her scientific activities have been devoted to differential algebra and computational algebra. She published her first paper on the differential spectrum of a differential ring in 1978. This was
followed by works on the global sections of the structure sheaf, tangent space on affine differential varieties, and Hilbert and Kolchin schemes. On the computational side, she was the first to generalize Gröbner basis techniques to differential algebra. For differential polynomial ideals, a differential Gröbner basis need not exist or be finite. Despite such difficulties, she developed and applied her theory to compute the dimensions of algebraic and differential algebraic varieties and bound their multiplicities. With G. Gallo and others, she derived a dimension method and introduced notions of validity levels, allowing automated proofs and probabilistic verification of geometric and differential geometric statements. She investigated the differential analogs of resultants and the sheaf approach in algebraic geometry, and compared Gröbner basis with characteristic set methods. With other authors, she made fundamental contributions to super-$G$-basis of algebraic ideals (L. Robbiano), classification of rankings (W. Sit), extended characteristic sets (V. Gerdt), and involutive monomial division (V. Marotta). More recently, with her student D. Ferrarello, in a series of papers, she expressed and applied computer algebra techniques to compute properties of graphs.

She was active in promoting computer algebra, helped organizing two international conferences, and taught several courses for undergraduate and graduate students. She was the Italian coordinator for the INTAS\footnote{INTAS is the abbreviation for the \textit{International Association for the Promotion of Cooperation with Scientists from the New Independent States of the former Soviet Union}, which was formed in 1993 and has since included over 30 European countries as members. It is currently “in liquidation” following the proposal of the European Commission.} projects n.93-30, \textit{Computer Algebra, Symbolic and Combinatorial Tools in Differential Algebra and Differential Equations, with impact in Fundamental Physics and Control Theory}, and n.99-01222, \textit{Involutive Systems of Differential and Algebraic Equations}. She was always interested in the most innovative aspects of her field. Besides applying her results to geometric theorem proofing, she was keen to use them for other problems in analog circuit design, statistics, and dynamical systems. The originality of her research was a consequence of her mathematical culture which includes commutative, differential and computational algebra, algebraic geometry, differential equations, algorithms, computational complexity, and graph theory.

Lately she gave a wonderful seminar on \textit{Sturmfel’s Tropical Algebra and its Application to Biology}. Unfortunately she could not continue this research because she was diagnosed with a pancreatic cancer in April 2004. Her last contribution was a survey paper on differential Gröbner bases, to appear posthumously in the volume \textit{Gröbner Bases in Symbolic Analysis}, edited by Markus Rosenkranz and Dongming Wang. She delivered her last lecture, completing her course, a few days before she died in peace with God on March 22, 2007. She was a wonderful wife, mother and teacher. She will always be remembered by her students, colleagues, and fellow researchers.

A complete bibliography of Carrà-Ferro is given next. Please visit her website for listing of preprints and unpublished manuscripts: \url{http://www.dmi.unict.it/~carra/}.

(Communicated by William Sit)
Bibliography of Giuseppa Carrà-Ferro


