

Preface

by

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Dorin Popescu was born on 21st of March 1947 in the village Mărunțișu, Buzău county, Romania. He completed his Bachelor at the Faculty of Mathematics, University of Bucharest in 1969, having already 4 published research papers by that time. Following the graduation he was immediately hired as teaching assistant at the Faculty of Mathematics (FMI), University of Bucharest and he moved at (nowadays) the “Simion Stoilow” Institute of Mathematics of the Romanian Academy (IMAR) in 1979 where he remained until 1990, when he decided to return to FMI, keeping a part-time position at IMAR. He was one of the connecting persons between IMAR and FMI until 2011, when he moved from the University of Bucharest to a full-time position to IMAR, where he continues to do research as intensive as always.

Dorin started his research activity in the field of homological algebra, under the guidance of Nicolae Popescu, while he was still an undergraduate student. Up to the defense of his Ph.D thesis he had already published 10 articles in category theory. However, after finishing his undergraduate studies he started to work in approximation theory, when his Ph.D advisor Ionel Bucur gave him as a problem a conjecture stated by Michael Artin at the International Congress of Mathematicians from Nice, 1970. He answered in affirmative this problem, and successfully defended his Ph.D thesis “A strong approximation theorem over discrete valuation rings” in 1974.

Soon after his defense, in a joint work with G. Pfister, Dorin had proved the strong approximation theorem for all complete local noetherian rings, a paper which appeared in *Inventiones Mathematicae*. New proofs of this result appeared later in USA, using new methods, coming from the theory of models. Since 1978 Dorin has started to work on Michael Artin’s most important conjecture: all excellent local henselian rings have approximation property. Benefiting of a research fellowship of 6 months at the Institute for Advanced Studies Princeton (SUA) in 1980–1981 he had the opportunity to meet and discuss several times with Michael Artin about his famous conjecture. A few years later Dorin succeeded in getting a complete answer to Michael Artin’s conjecture, a fundamental scientific result nowadays, carried out in two articles published as a single author in *Nagoya Math. Journal* in 1985 and 1986.

Dorin’s most striking result so far can be resumed in a non-technical language as a possibility to replace sometimes the solving of polynomial system of equations with some bigger systems, where it is possible to apply the Implicit Function Theorem. And what can be a better proof of the fundamental importance that Dorin brought to this field of research than the fact that this result was a consequence of what nowadays is called the General

Néron-Popescu Desingularization theorem, namely: any regular ring morphism between Noetherian rings is the filtered inductive limit of smooth morphisms of finite type. The importance of these results consists in the various applications they have in different fields. We resume a few of them. The so-called nested Artin approximation holds for algebraic power series rings and is very useful in singularity theory especially because it is not valid for convergent power series rings over the complex number field as Gabrielov showed in 1971 by a counterexample. Also, there are recent applications in analytic geometry, CR geometry, microdifferential systems. In addition, these results served as step-stones to Dorin for answering partially the challenging conjectures of Bass–Quillen, respectively Quillen, still open in their full generality. The Bass–Quillen conjecture states that every finitely generated projective module of a polynomial ring in finitely many indeterminates over a regular local ring is free and was proved by Dorin Popescu in some important cases in 1989 and 2002.

After nearly two decades spent mainly in approximation theory Dorin started to work on Cohen-Macaulay rings and modules, a favourite topic also today. This change of topic was facilitated by the Humboldt fellowship of one year obtained by Dorin Popescu in 1990–1991 at University of Essen, the starting point of a long and fruitful collaboration with Jürgen Herzog. During the 90’s Dorin wrote a series of important papers, some of them joint works with Mihai Cîpu, Jürgen Herzog, Gerhard Pfister, Marko Roczen on indecomposable (generalized) Cohen-Macaulay modules and deformations of maximal Cohen-Macaulay modules, which were published in Transactions of AMS, *Compositio Math.*, *Math. Zeitschrift*. One of Dorin’s most important papers in this area was published in *Mathematische Annalen* in 1997 when, together with Jürgen Herzog, in the idea of Thom-Sebastiani’s problems gave a relation (of algorithmic nature) between the maximal Cohen-Macaulay modules over hypersurface rings of type $f(x)$ and those over hypersurface rings of type $f(x) + y^n$, which is very useful for descriptions of maximal Cohen-Macaulay modules. Later on, in several joint works (with Viviana Ene, Florian Enescu, Radu Laza, Gerhard Pfister) he described the maximal Cohen-Macaulay modules over some hypersurfaces.

The end of the 90’s and the collaboration with Jürgen Herzog brought Dorin to the emerging hot research area of combinatorial commutative algebra, to whom he has devoted nearly two decades and obtained important results. In a naive, personal attempt of capturing the essence out of nearly 50 publications we have chosen: 1) the joint work with Jürgen Herzog from *Compositio Math.*, 1998, where they give a partial answer to conjectures of Eisenbud–Green–Harris from Cayley–Bacharach’s theory and Castelnuovo’s theory based on a bound they prove of the Hilbert function of a homogeneous K -algebra modulo the ideal generated by a generic form; 2) the joint work with Jürgen Herzog from 2001 in which they prove the Pardue conjecture on the explicit formula of the regularity of principal-Borel ideals; 3) a joint work with Jürgen Herzog and Ngô Viêt Trung from 2002 in which they study extensively the Castelnuovo–Mumford regularity of the Rees algebra; 4) several positive cases of Stanley’s conjecture in a series of papers, several of them with some of his Ph.D. students, written in the period 2006–2015. This challenging conjecture turned out to be false in general by a counterexample given by Art Duval, Bennet Goeckner, Caroline Klivans and Jeremy Martin in April 2015 and, combined with the invitation of participating in the special semester “Artin Approximation and Infinite Dimensional Geometry” held at CIRM, Luminy, Marseille in spring 2015, determined Dorin Popescu to return to his first love in mathematics, approximation theory.

Dorin's overall excellent and prolific scientific research, which at the moment is resumed by more than 110 scientific papers and 10 books, was highly appreciated and brought him many invited talks at prestigious international conferences or at foreign universities. He gave invited talks, among others, at MIT, Berkeley, UCLA, Salt Lake City, Urbana-Champaign (USA), Montreal (Canada), Kyoto, Nagoya (Japan), Genova, Ferrara, Catania, Cortona (Italy), Barcelona (Spain), Bordeaux, Luminy, Grenoble (France), Max-Planck Institut Bonn, Bochum, Essen, Stuttgart, Köln, Berlin, Cottbus, Göttingen, Bielefeld, Kaiserslautern, Oldenburg, Oberwolfach, Osnabrück (Germany). Due to his remarkable scientific results Dorin has benefited from many research fellowships and grants. Undoubtedly, in a chronological short list one cannot skip: the NSF fellowship of 6 month, in 1980–1981, at the Institute for Advanced Study Princeton (USA), the Humboldt fellowship of 1 year at University of Essen, in 1990–1991, which was extended with 6 months in 1992 at the University of Osnabrück, and with another 6 months in two equal periods in 1999 and 2002 at the University of Essen, and he was also a recipient of a Marie Curie Intra-European Fellowship (MEIF-CT-2003-501046) from August 2004 to July 2005 at the University of Essen. Last but not least, his papers “rewarded” him with: the First prize for research of Balkan Mathematics Union (Athens, 1973), the “Simion Stoilow” prize of the Romanian Academy in 1979, and the title of Doctor Honoris Causa of Ovidius University, Constanța in 2007.

Dorin's life after 1990 is similar to a globetrotter. He has spent a lot of time abroad for doing research, but he didn't forget his role as a professor at the faculty. He had supervised so far 12 students, eight in Romania and other four in Pakistan at the Abdus Salam School of Mathematical Sciences. In addition to this, he had generously supported financially (from his Romanian grants) not only his Ph.D students but also several members of the commutative algebra seminar. Due to his constant help and the respect gained by Dorin in the mathematical community all of his Ph.D students benefited of research visits abroad and also won fellowships since they had an extra pedigree: they were labeled Dorin's students. Dorin's respect for “good tradition”, his leadership and initiative for supporting, creating and enlarging the commutative algebra group from Romania made possible, despite many obstacles not necessarily of financial nature, that today we are lucky to have: 1) a commutative algebra seminar, named after the late Professor Nicolae Radu (another transcendental figure of the Romanian commutative algebra) who initiated it, held weekly on Tuesday from 12-14 in the hall 120 of the faculty, and 2) the National School on Algebra which this year, the 70th of Dorin, reached its 25th edition. This last event was started in 1986 at the initiative of Nicolae Radu, Dorin Popescu and Mirela Ștefănescu and became a respected international event in the last decade.

Dorin's personality and leadership exceeded his field of research partly due to his direct way of speaking what he thinks. These qualities gained him a term, 2004–2008, as the president of the Romanian Mathematical Society (SSMR). During this term he also served as vice-president of the Mathematical Society of South Eastern Europe (MASSEE), in the period 2004–2007. His arrival as a president of the society coincided with a hard time for its scientific publication, *Bulletin Mathématique de la Société des Sciences Mathématiques de Roumanie*. Dorin has put up a lot of efforts and energy from the very beginning in supporting this journal and had a significant contribution in “raising” its standard.

Dorin's actions throughout his professional career were always guided by the same principles he applied in the day-by-day life. These principles are based on the basic rules of

hard-work and fairness, whose absence make nothing important achievable and any important achieved thing non valuable. He tried to spread this academical behaviour among his students in the best way possible, his example. We thank him and wish him many happy returns together with his dear ones, productive work on his favourite mathematical topics and the best of health.

03.11.2017

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