Popescu Dorin-Mihail

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Education

- *Faculty of Mathematics*, University of Bucharest, 1964-1969
- **PhD**, University of Bucharest, 1974

Employment

- 1969-1970: Asistant Professor, *Faculty of Mathematics*, University of Bucharest.
- 1979-1990: Senior researcher III, *National Institute for Scientific and Technical Creation*, Mathematics department
- 1990-present: Senior Researcher II, then Senior Researcher I at the [Institute of Mathematics of the Romanian Academy](#)
- Since October 1, 1991: Associate Professor, and since 1993 Professor, *Faculty of Mathematics*, Bucharest University, with half position Senior Researcher I at the [Institute of Mathematics](#)

Research interest

- Commutative Algebra
- Algebraic Geometry

Scientific awards

- First prize for research (1973, Atena) of *Balkanic Mathematics Union*
- Prize of the *Romanian Academy*, 1979

Additional information

- 1980-1981: *NSF* fellowship at the *Institute for Advanced Study*, Priceton, USA
- 1990-1991: *Humboldt* fellowship at *Essen University* which was extended with 6 months in 1992 at *University of Osnabrück*, Abteilung Vechta

- 1993-1997: each year 6 months, visiting professor at *Sonderforschungsbereich 170 Gottingen*, *Universität Kaiserslautern* and *Universität Essen*.

Scientifical Research

The main result of D. Popescu is the so called *General Néron Desingularization* which says that a morphism of Noetherian rings is regular iff it is a filtered inductive limit of smooth finite type algebras (see [27], [28], [39]). This result has the following two consequences:

1. An excellent Henselian local ring has the Artin approximation property (in brief AP) [28].
2. A regular local ring containing a field is a filtered inductive limit of regular local rings essentially of finite type over **Z** [34].

1. is a positive answer of a conjecture of **M. Artin** and it gives in particular the approximation on nested subrings which was required by mathematicians working in singularity theory [28].
2. is a partial answer to a conjecture of **Swan** and proves the **Bass-Quillen** conjecture in the equal characteristic case (that is a finitely generated projective module of a polynomial ring over a regular local ring containing a field is free [34]) using the **Lindel**'s results.
Another result of D. Popescu (with **G. Pfister**) says that every noetherian local ring, which has AP has also the strong approximation property (see [12]). A very easy proof applying the *General Néron Desingularization* is given in [28].
Other results of D. Popescu are in the theory of maximal **Cohen-Macaulay** modules (in brief MCM). Some of them show the **Brauer-Thrall** Conjectures for MCM in some cases of unequalcharacteristic [38], [40], [41]. Others extend **Knörrer**'s *Periodicity Theorem* in characteristic 2 (with **Pfister**) [46], or give an algorithm to describe the MCM modules over a singularity of type $f(X)+Y\_1^{s\_1}+...+Y\_r^{s\_r}$ if you know the MCM modules over f (see some joint papers [47], [48], [51]-[53], [55]-[57]).
Recently D. Popescu has some results in *Combinatorics in Commutative Algebra*. Together with **J. Herzog** an extension of **Green**'s theorem concerning the **Hilbert** functions is proved. As a consequence it shows some partial positive answers to some conjectures of **Eisenbud-Green-Harris** in the **Cayley-Bacharach** theory and the *Higher Castelnuovo Theory* ([50], [54]). Also the **Betti** numbers of some monomial ideals (*p*-stable) are computed [58] and it is shown that the **Pardue** conjecture holds in such cases.

List of publications

Articles

1. *Quelques applications de la decomposition triangulaire*, Publ. Dept. Math. Lyon 3-4 (1967), 63-68

2. *On the algebraic categories*, Rev Roum. Math.Pures et Appl., 13 (1968), 337-342 (with **G. Georgescu**)
3. *Les faisceaux d'une théorie*, C.R.Acad. Sc.Paris, 269 (1969), 380-382
4. *Sur les catégories des (t,T)-faisceaux*, C.R. Acad. Sci. Paris, 269 (1969), 413-415
5. *Deux extensions des ensembles preordonnes*, Rev. Roum. Math. Pures et Appl., 15 (1970), 569-572 (with **N. Manolache**)
6. *Some remarks on complete cogenerated categories*, Rev. Roum. Math. Pures et Appl., 15 (1970), 1027-1033
7. *Monoconuri proiective si epiconuri inductive* Std. Cerc. Mat., 22 (1970), 641-647 (in Romanian)
8. *Catégories de faisceaux*, J. of Alg., 18 (1971), 343-365
9. *Les faisceaux d'une classe des morphismes*, C.R. Acad. Sci. Paris, 272 (1971), 101-103
10. *Cofaisceaux d'une catégorie*, C.R. Acad. Sci. Paris, 272 (1971), 299-302
11. *A strong approximation theorem over discrete valuation rings*, Rev. Roum. Math. Pures et Appl., 20(1975), 659-692
12. *Die strenge Approximationseigenschaft lokaler Ringe* Inventiones Math. 30 (1975), 145-174 (with **G. Pfister**)
13. *Some algorithmic methods in the theory of local complete rings*, Bull. Math. de la Soc. Math. de la Roumaine, 22 (70) no. 1 (1978), 61-69
14. *Algebraically pure morphisms*, Rev. Roum. Math. Pures et Appl., 24 (1979), 947-977
15. *Die Approximation von Primidealen* Bull. de l'Acad. Polonaise Sci., 27 (1979), 771-778 (with **G. Pfister**)
16. *A remark on two-dimensional local rings with the property of approximation*, Math. Z., 173 (1980), 235-240
17. *Approximation properties and existential completeness for ring morphisms*, Manuscripta Math. 33 (1981), 227-282 (with **S. Basarab**, **V. Nica**)
18. *On three dimensional local rings with the property of approximation*, Rev. Roum. Math. Pures et Appl., 26 (1981), 301-307 (with **G. Pfister**)
19. *Some extensions of Néron's p-desingularization and approximation*, Rev. Roum. Math. Pures et Appl., 26 (1981), 1299-1304 (with **M. Cipu**)
20. *Global form of Néron's p-desingularization and approximation*, Proceedings *Week of Algebraic Geometry*, Bucharest, June 30-July 6 (1980), Teubner Texte Band 40, Leipzig, 1981
21. *On Zariski's Uniformization Theorem*, in *Algebraic Geometry*, Bucharest 1982, Proceedings, Springer Lect. Notes in Math., 1056, Berlin, 1984
22. *Ultraproducts and big Cohen-Macaulay modules*, Std. Cerc. Mat., 36 (1984), 424-428 (with **C. Mateescu**)
23. *A desingularization theorem of Néron type*, Ann. Univ. Ferrara, 30 (1984), 63-76 (with **M. Cipu**)
24. *General Néron desingularization*, Nagoya Math. J., 100 (1985), 97-126
25. *A structure theorem on formally smooth morphisms in positive characteristic*, J. of Alg., 100 (1986), 436-455 (with **V. Nica**)

26. *Some structure theorems for valuation rings*, Rev. Roum. Math. Pures et Appl. 31 (1986), 577-582
27. *General Néron desingularization and Approximation*, Nagoya Math. J., 104 (1986), 85-115
28. *Artin approximation theory and applications*, Analele St. ale Univ. Iasi, 31 (1985 supliment), 11-14
29. *A certain desingularization Theorem*, Analele St. Univ. Iasi, 31 (1985 supliment), 20-22 (with **M. Cipu**)
30. *Ultraproducts and Hochster's modifications* Analele St. Univ. Iasi, 31 (1985 supliment), 26-27 (with **C. Mateescu**),
31. *On the structure of formally smooth morphisms*, Analele St. Univ. Iasi, 31 (1985 supliment), 33-34 (with **V. Nica**)
32. *Algebraic extensions of valued fields*, J.of Alg., 108 (1987), 513-533
33. *Algebrization of deformations of exceptional couples*, Rev. Roum.Math. Pure et Appl., 33 (1988), 251-260 (with **M. Roczen**)
34. *Polynomial rings and their projective modules*, Nagoya Math. J., 113 (1989), 121-128
35. *Flatness in non-Noetherian ring theory*, Rev. Roum. Math. Pures et Appl., 34 (1989), 839-854.
36. *Immediate extensions of filtered rings*, Annali di Ferrara, 35 (1989), 35-57 (with **W. Morariu**)
37. *Indecomposable Cohen-Macaulay modules and the Brauer-Thrall Conjectures*, Proceedings of the Algebra Conference 9-10 June 1988, Brasov
38. *Indecomposable Cohen-Macaulay modules and irreducible maps*, Compositio Math. 76 (1990), 277-294 (with **M. Roczen**)
39. *Letter to the Editor, General Néron desingularization and approximation*, Nagoya Math. J., 118 (1990), 45-53
40. *Indecomposable Cohen-Macaulay modules and their multiplicities*, Trans. AMS., 323 (1991), 369-387
41. *The second Brauer-Thrall conjecture*, Manuscripta Math. 71 (1991), 375-383 (with **M. Roczen**)
42. *Liftings of finite injective dimension modules*, Analele Univ.Bucuresti, XL (1991), 65-75
43. *Indecomposable generalized Cohen-Macaulay modules*, Trans. AMS, 342 (1994), 107-136 (with **M. Cipu**, **J. Herzog**)
44. *Relative liftings*, J. of pure and Appl. Alg., 108, n. 3 (1996)
45. *Maximal Cohen-Macaulay modules over isolated singularities*, J. of Alg., 178 (1995), 710-732
46. *Deformations of maximal Cohen-Macaulay modules*, Math. Z., 223 (1996), 309-332 (with **G. Pfister**)
47. *Maximal Cohen-Macaulay modules and their deformations*, Analele Stiintifice Constanta, v II (1994), 112-119
48. *Thom-Sebastiani problems for maximal Cohen-Macaulay modules*, Math. Ann., 309 (1997), 677-700 (with **J. Herzog**)

49. *Infinitesimal module deformations in the Thom-Sebastiani problem*, Archiv der Math. 69, 1997, 196-208 (with **F. Enescu** and **G. Pfister**)
50. *Hibert functions and generic forms* Compositio Math. 113 (1998), 1-22 (with **J. Herzog**)
51. *Maximal Cohen-Macaulay modules over singularities of type X^t+Y^3*, Revue Roum. Math. Pures et Appl., 42, no. 7-8 (1997), 591-619 (with **B. Martin** and **G. Pfister**)
52. *Special Cohen-Macaulay modules over singularities of type $X^{3r}+Y^3$*, Analele Stiintifice Constanta, 5, no. 2 (1997)
53. *A family of Cohen-Macaulay modules over singularities of type X^t+Y^3*, Preprint, Kaiserslautern, 1997, to appear in Commun. Algebra (with **G. Pfister**)
54. *Variations on Green Theorem concerning the Hilbert functions*, Preprint IMAR 16/1997, Bucharest
55. *Steps in the classification of Cohen-Macaulay modules over singularities of type X^t+Y^3*, Preprint, Bucharest 1997, to appear in Algebras and Representation Theory, 1999 (with **V. Ene**)
56. *Free resolutions for deformations of maximal Cohen-Macaulay modules*, Preprint, Edinburgh, 1998 (with **L. O'Carroll**)
57. *On a Theorem of Knörrer concerning Cohen-Macaulay modules*, Preprint, Edinburgh, 1998 (with **L. O'Carroll**)
58. *Betti numbers for p-stable ideals*, Preprint, Bielefeld, 1998 (with **V. Ene** and **G. Pfister**)
59. *Combinatorics in Algebra and Geometry*, Preprint, Bucharest, 1998

Monographs and textbooks

1. *Die Approximationseigenschaft lokaler Ringe* Lect. Notes in Math. 634 (1978), Springer, Berlin (with **H. Kurke**, **T. Mostowski**, **G. Pfister**, **M. Roczen**),
2. *Henselian rings and Artin approximation property* Univ. Bucharest Press, 1979 (in Romanian, with **V. Nica**)
3. *Elements of finite group theory* Ed. Stiintifica si Enciclopedica, Bucharest 1986 (in Romanian, with **C. Vraciu**)

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