BOGDAN ICHIM

CURRICULUM VITAE

– **ADDRESS**

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– **EDUCATION**

– **Ph.D. in Mathematics** (December 2004), Carl von Ossietzky Universität, Oldenburg, Germany.
– **M.Sc. in Algebra** (February 2001), Faculty of Mathematics and Computer Science, University of Bucharest, Romania.
– **Candidate for B.Sc. in Computer Science** (September 1999 – June 2001), Faculty of Automatic Control and Computer Science, Politechnica University of Bucharest, Romania.
– **B.Sc. in Mathematics** (June 1999), Faculty of Mathematics and Computer Science, University of Bucharest, Romania.

– **ACADEMIC POSITIONS**

2008 – present : **Scientific Researcher III**, Simion Stoilow Institute of Mathematics, Romanian Academy, Bucharest, Romania.
2005 – 2009 : **Wissenschaftliche Mitarbeiter**, Institut für Mathematik, Osnabrück Universität, Germany.
2002 – 2004 : **Wissenschaftliche Hilfskraft**, Institut für Mathematik, Carl von Ossietzky Universität, Oldenburg, Germany.
2001 – 2008 : **Assistant Researcher**, Simion Stoilow Institute of Mathematics, Romanian Academy, Bucharest, Romania.

– **RESEARCH GRANTS (PRINCIPAL INVESTIGATOR)**

  – Romanian National Authority for Scientific Research (CNCS - UEFISCDI)
    Young Research Team Grant PN-II-RU-TE-2012-3-0161
    period 01.05.2013 – 30.11.2015 / value 645,833 RON.
  – Romanian National Authority for Scientific Research (UEFISCSU)
    Career Integration Grant PN-II-RU-RP-2008-12-01
    period 01.07.2009 – 30.06.2011 / value 510,000 RON.

– **RESEARCH GRANTS (CO–INVESTIGATOR)**

  – Romanian National Authority for Scientific Research (CNCS - UEFISCDI)
    Ideas Grant PN-II-ID-PCE-2011-3-1023
    period 01.01.2012 – 31.12.2014 / value 1,500,000 RON.
  – Romanian National Authority for Scientific Research (UEFISCSU)
    Young Research Team Grant PN-II-RU-TE-2010-2-46
    period 01.08.2010 – 31.07.2013 / value 750,000 RON.
  – Deutsche Forschungsgemeinschaft (DFG)
    Grant Ref. BR688/17-1
    period 01.01.2007 – 31.12.2008 / value 120,000 EUR.
  – Deutsche Forschungsgemeinschaft (DFG)
    Grant Ref. BR688/16-1
    period 01.01.2005 – 31.12.2006 / value 60,000 EUR.

– **HONORS AND AWARDS**

  – German Academic Exchange Service (DAAD) Graduate Scholarship
    period 01.04.2004 – 31.12.2004 / value 3,600 EUR.
  – von Schad'schen Stiftung Graduate Scholarship, Germany
    period 01.04.2004 – 31.12.2004 / value 3,600 EUR.
  – Carl von Ossietzky Universität Graduate Scholarship, Germany
    period 01.10.2001 - 31.03.2004 / value 18,600 EUR.
  – University of Bucharest Travel Grant, Romania
    period 01.05.2000 - 31.05.2000 / value 1,000 USD.
  – University of Bucharest Undergraduate Scholarship, Romania
    period 01.10.1995 – 30.06.1999.
  – Member of the Romanian big team for the International Mathematical
    Olympiad, 1995.
  – II-nd prise at the Romanian Mathematical Olympiad, 1995.
  – Honor Student, Vasile Alecsandri College, Galati, Romania, 1994.
  – III-rd prise at the Romanian Mathematical Olympiad, 1994.

– PEER REVIEWED JOURNAL PAPERS

(1) B. Ichim, L. Katthän and J. J. Moyano-Fernández. *How to compute the Stanley depth of a module.* Mathematics of Computation (2016), available online at http ://www.ams.org/journals/mcom/0000-000-00/S0025-5718-2016-03106-3/.

(2) W. Bruns, B. Ichim and C. Söger. *The power of pyramid decompositions in Normaliz.* Journal of Symbolic Computation **74** (2016), 513 – 536.

(3) B. Ichim, L. Katthän and J. J. Moyano-Fernández. *Lcm-lattices and Stanley depth : a first computational approach.* Experimental Mathematics **25** (2016), 46 – 53.

(4) B. Ichim, L. Katthän and J. J. Moyano-Fernández. *The behavior of Stanley depth under polarization.* Journal of Combinatorial Theory, Series A **135** (2015), 332 – 347.

(5) B. Ichim and A. Zarojanu. *An algorithm for computing the multigraded Hilbert depth of a module.* Experimental Mathematics **23** (2014), 322 – 331.

(6) B. Ichim and J. J. Moyano-Fernández. *How to compute the multigraded Hilbert depth of a module.* Mathematische Nachrichten **287** (2014), 1274 – 1287.

(7) W. Bruns, R. Hemmecke, B. Ichim, M. Köppe and C. Söger. *Challenging computations of Hilbert bases of cones associated with algebraic statistics.* Experimental Mathematics **20** (2011), 25 – 33.

(8) W. Bruns and B. Ichim. *Normaliz : Algorithms for Affine Monoids and Rational Cones.* Journal of Algebra **324** (2010), 1098 – 1113.

(9) B. Ichim and T. Römer. *The canonical module of a toric face ring.* Nagoya Mathematical Journal **194** (2009), 69 – 90.

(10) B. Ichim and T. Römer. *On toric face rings.* Journal of Pure and Applied Algebra **210** (2007), 249 – 266.

(11) W. Bruns and B. Ichim. *On the coefficients of Hilbert quasipolynomials.* Proceedings of the American Mathematical Society **135** (2007), 1305 – 1308.

(12) B. Ichim and U. Vetter. *Length Formulas for the homology of generalized Koszul complexes.* Revue Roumaine de Mathématique Pures et Appliquées **52** (2007), 177 – 199.

(13) B. Ichim and U. Vetter. *Koszul Bicomplexes and generalized Koszul complexes in projective dimension one.* Communications in Algebra **34** (2006), 4131 – 4156.

– PAPERS SUBMITTED TO PEER REVIEWED JOURNALS

(14) B. Ichim, L. Katthän and J. J. Moyano-Fernández. *Stanley depth and the lcm-lattice.* Preprint http ://arxiv.org/abs/1405.3602.

(15) B. Ichim and J. J. Moyano-Fernández. *On the score sheets of a round-robin football tournament* Preprint http ://arxiv.org/abs/1512.00533.

– PEER REVIEWED CONFERENCE PROCEEDINGS

(16) B. Ichim and A. Zarojanu. *An introduction to Hilbert depth.* Proceedings of ICMS-50 2014, Chişinau (2014), 86 – 89.

(17) V. Almendra and B. Ichim. *Introduction to jNormaliz 1.0.* Proceedings of ISCOPAM, Iaşi (2011), 81 – 86.

(18) W. Bruns, B. Ichim and C. Söger. *Introduction to Normaliz 2.5.* Lecture Notes in Computer Science **6327** (2010), 209 – 212.

(19) W. Bruns and B. Ichim. *Introduction to Normaliz 2.2.* Proceedings of IC-TAMI 2009, Alba Iulia (2009), 113 – 132.

(20) B. Ichim and U. Vetter. *Generalized Koszul complexes.* Analele Ştiinţifice ale Universităţii Ovidius Constanţa, Seria Matematică **14** (2006), 61 – 72.

– PAPERS IN PREPARATION FOR SUBMISSION

(21) *On the behavior of the size of a monomial ideal* (with A. Zarojanu).

– THESES

(1) *Generalised Koszul Complexes.* Ph. D. Thesis, Carl von Ossietzky Universität, Oldenburg, Germany (2004).

(2) *Stanley – Reisner Rings.* M.Sc. Thesis, University of Bucharest, Romania (2001).

(3) *Solutions of the Yang – Baxter Equation.* B.Sc. Thesis, University of Bucharest, Romania (2001).

– **MATHEMATICAL SOFTWARE**

- **Normaliz 2**

The software Normaliz is a key part or was integrated in several computational systems like : Macaulay2, Polymake, Singular, CoCoA, Regina, SageMath, GAP, SecDec. According to http ://www.swmath.org/software/630 it has been quoted 56 times in articles published and indexed in Zentralblatt MATH. Normaliz 2, versions 2.0 – 2.1 were completely written in C++ by me and I have participated in the development of Normaliz 2, versions 2.2 – 2.12. This laid the foundation on which the still ongoing development of Normaliz under the GNU General Public License (version 3) is based. Available at https ://www.normaliz.uni-osnabrueck.de/.

(1) W. Bruns, B. Ichim, Tim Römer and Christof Söger. Normaliz 2.12. An update of Normaliz 2.11, adds internal parallelization of large simplicial cones and faster linear algebra (2014).

(2) W. Bruns, B. Ichim, Tim Römer and Christof Söger. Normaliz 2.11. An update of Normaliz 2.10, adds input types for semiopen cones, inhomogeneous systems and polyhedra (2014).

(3) W. Bruns, B. Ichim and Christof Söger. Normaliz 2.10 An update of Normaliz 2.9, adds corrections in the exchange of data between Normaliz and NmzIntegrate (2013).

(4) W. Bruns, B. Ichim and Christof Söger. Normaliz 2.9. An update of Normaliz 2.8, improves volume computations and includes NmzIntegrate 1.0 (2013).

(5) W. Bruns, B. Ichim and Christof Söger. Normaliz 2.8. A major upgrade of Normaliz 2.7, adds arbitrary $\mathbb{Z}$-gradings to Normaliz and improves the performance considerably (2012).

(6) W. Bruns, B. Ichim and Christof Söger. Normaliz 2.7. A major upgrade of Normaliz 2.5, unites the former norm64 and normbig in a single executable normaliz and h-vector computation are considerably improved (2011).

(7) W. Bruns, B. Ichim and Christof Söger. Normaliz 2.5. A major upgrade of Normaliz 2.2, with the addition of new algorithms, new graphical interface and parallel processing (2010).

(8) W. Bruns and B. Ichim. Normaliz 2.2. An update of Normaliz 2.1, containing mainly changes to the command line done by Christof Söger (2009).

(9) W. Bruns and B. Ichim. Normaliz 2.1. An update of Normaliz 2.0, with the addition of the dual algorithm (2009).

(10) W. Bruns and B. Ichim. Normaliz 2.0. A totally new C++ implementation of the program Normaliz (2008).

- **jNormaliz**

  jNormaliz is a graphical interface for the software Normaliz. The interface is written in Java. That allowed us to combine the good portability (on different operating systems) of the graphical elements provided by Java with the computational advantages of the C++ implementation of Normaliz. jNormaliz, version 1.0 was written in collaboration with V. Almendra, while jNormaliz, versions 1.1 − 1.7 were completely written by me. Available at http ://www.home.uni-osnabrueck.de/wbruns/normaliz/.

  (11) V. Almendra and B. Ichim. jNormaliz 1.7, a Java GUI for the program Normaliz 3.0 (2015).

  (12) V. Almendra and B. Ichim. jNormaliz 1.6, a Java GUI for the program Normaliz 2.12 (2014).

  (13) V. Almendra and B. Ichim. jNormaliz 1.5, a Java GUI for the program Normaliz 2.11 (2014).

  (14) V. Almendra and B. Ichim. jNormaliz 1.4, a Java GUI for the program Normaliz 2.9 (2013).

  (15) V. Almendra and B. Ichim. jNormaliz 1.2, a Java GUI for the program Normaliz 2.8 (2012).

  (16) V. Almendra and B. Ichim. jNormaliz 1.1, a Java GUI for the program Normaliz 2.7 (2011).

  (17) V. Almendra and B. Ichim. jNormaliz 1.0, a Java GUI for the program Normaliz 2.5 (2010).

- **Hdepth**

  Hdepth is an experimental tool for computing the multigraded Hilbert depth of a module, implemented in CoCoA. Hdepth, version 1.0 was written in collaboration with A. Zarojanu. Available at
  https ://dl.dropboxusercontent.com/s/urhrasy5ntgbwzf/Hdepth.htm.

  (18) B. Ichim and A. Zarojanu. Hdepth 1.0. First implementation of an algorithm for computing the multigraded Hilbert depth of a module.

- **Sdepth**

  Sdepth is a program for computing the Stanley depth of a module, which is a factor of two ideals. It was completely written in C++ by me. Test versions are available on request.

  (19) B. Ichim. Sdepth 1.0. A C++ implementation of an algorithm for computing the Stanley depth. Work in progress.

– MATHEMATICAL SOFTWARE DOCUMENTATION

(1) V. Almendra and B. Ichim. *User Manual for jNormaliz, versions 1.0, 1.1, 1.2, 1.4, 1.5, 1.6, 1.7.* Included in the corresponding jNormaliz package.

(2) W. Bruns, B. Ichim, Tim Römer and Christof Söger. *User Manual for Normaliz, versions 2.11, 2.12.* Included in the corresponding Normaliz package.

(3) W. Bruns, B. Ichim and Christof Söger. *User Manual for Normaliz, versions 2.5, 2.7, 2.8, 2.9, 2.10.* Included in the corresponding Normaliz package.

(4) W. Bruns and B. Ichim. *User Manual for Normaliz, versions 2.0, 2.1, 2.2.* Included in the corresponding Normaliz package.

– SELECTED INVITED CONFERENCE PRESENTATIONS

– B. Ichim. *On the score sheets of a round-robin football tournament.* International meeting on numerical semigroups with applications, Levico Terme, Italy, 2016.

– B. Ichim. *How to compute the Stanley depth of a module?* Joint Meeting of the American Mathematical Society, the European Mathematical Society and the Portuguese Mathematical Society, Porto, Portugal, 2015.

– B. Ichim. *How to compute the multigraded Hilbert depth of a module?* Joint Meeting of the American Mathematical Society and the Romanian Mathematical Society, Alba-Iulia, Romania, 2013.

– B. Ichim. *Introduction to Normaliz 2.9.* Seventh Meeting for Mathematicians in Segovia (YMIS 13), Segovia, Spain, 2013.

– B. Ichim. *Introduction to Normaliz 2.7.* Third International Conference on Matrix Methods in Mathematics and Applications (MMMA 2011), Moscow, Russia, 2011.

– B. Ichim. *Introduction to Normaliz 2.5.* Third International Congress on Mathematical Software (ICMS 2010), Kobe, Japan, 2010.

– B. Ichim. *How to compute the Hilbert polynomial?* Commutative Algebra and its Interactions with Algebraic Geometry, Luminy, France, 2008.

– B. Ichim. *On toric face rings.* Conference on Homological and Combinatorial Aspects in Commutative Algebra, Busteni, Romania, 2007.

– B. Ichim. *On the coefficients of Hilbert quasipolynomials.* Commutative Algebra and its Interactions with Algebraic Geometry, Luminy, France, 2006.

– B. Ichim and B. Hovinen. *Free divisors from plane curves.* Minnowbrook Workshop on Commutative Algebra, Minnowbrook, USA, 2005.

– B. Ichim and U. Vetter. *Generalized Koszul complexes.* Workshop on Cohen-Macaulay Rings and Related Structures, Constanta, Romania, 2005.

– SELECTED CONTRIBUTED CONFERENCE PRESENTATIONS

– B. Ichim. *On the score sheets of a round-robin football tournament.* Second Normaliz Workshop, Osnabrück, Germany, 2016.

– B. Ichim. *On Hilbert decompositions.* Second Mini-Workshop IMAC – SIN-GACOM in La Plana : Topics in Monoid Theory and its applications, Castellón, Spain, 2015.

– B. Ichim. *How to compute the Stanley depth of a module ?* The Eighth Congress of Romanian Mathematicians, Iasi, Romania, 2015.

– B. Ichim. *Recent results in computational voting theory.* First Mini-Workshop IMAC – SINGACOM in La Plana : Trends in Commutative Algebra, Castellón, Spain, 2014.

– B. Ichim and A. Zarojanu. *An introduction to Hilbert depth.* Third Conference of Mathematical Society of Moldova (IMCS-50), Chisinau, Moldova, 2014.

– B. Ichim. *Introduction to Normaliz 2.8.* The 20th National School on Algebra, Mangalia, Romania, 2012.

– B. Ichim. *Introduction to Normaliz 2.7.* The Seventh Congress of Romanian Mathematicians, Brasov, Romania, 2011.

– B. Ichim. *Introduction to jNormaliz.* International Student Conference on Pure and Applied Mathematics (ISCOPAM), Iasi, Romania, 2010.

– B. Ichim. *Introduction to Normaliz 2.2.* The Sixth International Conference on Theory and Applications in Mathematics and Informatics (ICTAMI 2009), Alba-Iulia, Romania, 2009.

– **SELECTED OTHER PRESENTATIONS**

– B. Ichim. *How to compute the Stanley depth of a module ?* Mathematics Seminar, Universidad Jaume I de Castellón, Spain, 2015.

– B. Ichim. *An algorithm for computing the multigraded Hilbert depth of a module.* Mathematics Seminar, Osnabrück Universität, Germany, 2013.

– B. Ichim. *How to compute the multigraded Hilbert depth of a module ?* Mathematics Seminar, Universidad de Valladolid, Spain, 2013.

– B. Ichim. *How to compute the multigraded Hilbert depth of a module ?* Mathematics Seminar, Osnabrück Universität, Germany, 2012.

– B. Ichim. *Challenging computations of Hilbert quasipolinomials.* Mathematics Seminar, Universität Rostock, Germany, 2012.

– B. Ichim. *Challenging computations of Hilbert bases.* Mathematics Seminar, Rikkyo University, Tokyo, Japan, 2010.

– B. Ichim. *Introduction to Normaliz 2.0.* Mathematics Seminar, Technische Universität Berlin, Germany, 2008.

– B. Ichim. *On Hilbert quasipolynomials.* Mathematics Seminar, University of Bucharest, Romania, 2008.

– B. Ichim. *On toric face rings.* Mathematics Seminar, Università di Genova, Italy, 2006.

– B. Ichim. *Properties of toric face rings.* Mathematics Seminar, Universität Duisburg-Essen, Germany, 2006.

– B. Ichim. *Koszul complexes in projective dimension one.* Mathematics Seminar, Osnabrück Universität, Germany, 2004.

– **LANGUAGES**

Reading, writing and speaking competence in English and German. Reading competence in French, Italian and Spanish.

– **SKILLS**

Programming Languages : C, C++, JAVA, PASCAL, x86 ASM.

– **LIST OF COURSES**

I have offered a course in Computer Algebra at Scoala Normala Superioara Bucharest (see `www.imar.ro/~snsb/`) in the period 2010 – 2011. This is a top–quality master program organized by the Simion Stoilow Institute of Mathematics. I was in charge of exercises solving sessions for the following courses :
  – Mathematik II, Prof. Tim Römer. Winter 2008/2009, Osnabrück Universität, Germany.
  – Einführung in die Algebra, Prof. Oliver Röndigs. Summer 2008, Osnabrück Universität, Germany.
  – Körper und Galois Theorie, Prof. Winfried Bruns. Winter 2007/2008, Osnabrück Universität, Germany.
  – Zahlentheorie, Prof. Winfried Bruns. Summer 2007, Osnabrück Universität, Germany.
  – Differentialgleichungen, Prof. Heinz Spindler. Winter 2006/2007, Osnabrück Universität, Germany.
  – Einführung in die Algebra, Prof. Winfried Bruns. Summer 2006, Osnabrück Universität, Germany.
  – Lineare Algebra, Prof. Winfried Bruns. Winter 2005/2006, Osnabrück Universität, Germany.
  – Vektoranalysis, Prof. Heinz Trapp. Summer 2005, Osnabrück Universität, Germany.
  – Lineare Algebra, Prof. Udo Vetter. Winter 2004/2005, Carl von Ossietzky Universität, Oldenburg, Germany ;

– **STUDENT SUPERVISION**

  – Andrei Zarojanu (PhD, co-supervising with Dorin Popescu), 2011 – 2014 ;
    Contributions to the study of Stanley's conjecture on monomial ideals

– **RESEARCH ASSISTANT SUPERVISION**

  – Andrei Zarojanu, 2015 – present ;
    working on algorithms for computing Hilbert series and Hilbert polynomials.

– **THESIS EXAMINER**

  – Andrei Zarojanu (December 2014, PhD Defense)

– **SERVICE**

  – Co-organizer of the 20th National School on Algebra, September 2012,
    Mangalia, Romania.
  – Co-organizer of the Special Session on Commutative Algebra in Honor of
    Prof. Dorin Popescu, 2nd Workshop for Young Researchers in Mathematics,
    May 2012 Constanta, Romania.
  – Co-organizer of the 19th National School on Algebra, September 2011, Bu-
    charest, Romania.
  – Co-organizer of the 18th National School on Algebra, September 2010, Bu-
    charest, Romania.

– **PROFESSIONAL AFFILIATIONS AND ACTIVITIES**

  A. Referee : Journal of Symbolic Computation ; Journal of Algebra ; Glasgow
     Mathematical Journal.
  B. Referee for The Executive Agency for Higher Education, Research, Deve-
     lopment and Innovation Funding (UEFISCDI, 2015 - present).