Alessandro Berarducci

Curriculum, 7 Dic. 2015

Personal

Birth: Roma, Italy, 11th June, 1958. Nationality: Italian.
Office: Dipartimento di Matematica, Largo Bruno Pontecorvo 5, 56127 Pisa.
Ph. 050-2213261, Fax: /224.
E-mail: berardu at dm.unipi.it URL: http://www.dm.unipi.it/~berardu/

Scientific interests

Primary: Mathematical Logic, Model Theory, o-Minimality.
Sec: Models of Arithmetics, Modal Logic, λ-calculus, Topology.

Education

1983 Laurea in Mathematics, Università di Roma "La Sapienza".

1989 Ph.D. in Mathematics, University of California at Berkeley.

Grants

2015, Leverhulme Grant VP2-2013-055, Queen Mary Univ. London
1989, Research Grant, Ist. Naz. di Alta Matematica "F. Severi"

Positions

2001 - today	Full Professor	University of Pisa
1992 - 2001	Associate Professor	University of Pisa
1990-92	Researcher	University of L'Aquila
1984-89	TA, Associate, RA	Univ. of California at Berkeley

Editorial activity

2008-present	Editorial Board	Journal of Logic and Analysis
2013	Coordinating Editor	Journal of Symbolic Logic
2008-13	Editorial Board	Journal of Symbolic Logic
2015	Coordinator Logic sessione	XX Congresso UMI, Siena 7-12 Sett.
2011	Program Committee	WoLLIC 2011, Univ. of Pennsylvania
2011	Coordinator Logic session	XIX Congresso UMI, Bologna
2007-08	Editorial Board	Logic and Analysis
2008	Program Commitee	Logic Colloquium 2008, Bern

Research projects

2014-17: Italian PRIN 2012, "Models and Sets", Local coordinator.
2011-13: PRIN 2009 "Models and Sets", Participant.
2008-10: PRIN 2007 "Model Theory, Set Theory and applications".
2006-08. Part. to DGICYT (MTM2005-02865), Grupo espagñol Geometra algebraica y analítica real.
2004-06: PRIN 2004 "Logical Methods in Algebra, Analysis and Geometry".
2002-04: PRIN 2002 "Model Theory and Set Theory, their interactions and applications".
1998-2000: PRIN 1998 "Teorie assiomatiche per i Fondamenti di Matematica, Informatica e altre scienze; modelli e applicazioni".
2001, 1998. Part. to HI2000-0127 and HI19970122, Acción Hispano-Italiana of the Spanish Ministry of Science (DGES).

Teaching

Calculus, Discrete Mathematics, Logic (Assistant, Berkeley). Mathematical Logic, Mathematical methods for computer science (L'Aquila). Computability and Complexity, Logic, Model Theory, Basic Set Theory, Advanced Set Theory, Arithmetic (Pisa, Math. Dept.) Discrete Mathematics, Methods for Computer Science (CS Dept.). Lambda calculus (Siena 1994).

Scientific activities

2015 Invited talk: "Compact domination, o-minimal homotopy and Pillay's conjecture", Lancashire Yorkshire Model Theory Seminar, 7th meeting, Dec 5th, Preston `http://personalpages.manchester.ac.uk/staff/Marcus.Tressl/events/LYMoTS.php`

2015 LTCC intensive course (8 hours): "Logic meets topology: model theory, o-minimality, definable groups". 3-4 June, London Taught Course Center, University College London. `http://www.ltcc.ac.uk/courses/Intensives/Intensives_home.php`

2015 Leverhulme Lecture: "Ordered differential fields, Logarithmic-exponential power series and Conway's surreal numbers", 1 June, University of East Anglia, Pure Maths Research Seminars,`https://www.uea.ac.uk/mathematics/news-and-events/pure-seminars`

2015 Leverhulme Lecture: "Groups and Spaces in the o-minimal category", 21 Apr. Queen Mary Univ. London, Geometry

and Analysis Seminar, http://www.maths.qmul.ac.uk/seminars/groups-and-spaces-o-minimal-category

2015 Leverhulme Lecture: "Topology of abelian groups in the o-minimal category", 30 March, Queen Mary University of London, School of Mathematical Sciences

2015 Invited talk "Hardy type derivations on the surreal numbers", 19 Feb. University of Oxford, Mathematical Institute, Logic Seminar, https://www.maths.ox.ac.uk/node/13708

2015 Leverhulme Lecture: "Conway's surreal numbers and Transseries". 17 Feb., Queen Mary University of London, School of Mathematical Sciences

2015 Invited talk, "Hardy Fields, Surreal Numbers, Derivations". University of Leeds, Department of Pure Mathematics, Logic Seminar, 4 Jan., https://www1.maths.leeds.ac.uk/pure/logic/seminar.html

2015 Invited talk, Surreal derivations. Logic seminar, University of Manchester, School of Mathematics, 28 Jan., http://www.maths.manchester.ac.uk/our-research/events/seminars/logic/surreal-derivations.htm

2013 Pisa, Seminario di Algebra, Topologia e Combinatoria, Talk "Covers of definable groups", 21 Oct.

2013 Madrid. Talk within the Joint UAM-ICMAT Seminar "Algebra and Combinatorics", Sept. 13.

2013 Oberwolfach. Talk at the workshop "Model Theory: Groups, Geometry, and Combinatorics", 6-12 Jan.

2012 Lyon. Visit 17-25 Apr. and talk at the "Séminaires et Groupes de travail Mathématiques".

2012 Oxford, Math. Inst. Invited talk "Discrete subgroups of locally definable groups", Logic Seminar, 2 Feb.

2011 Münster, Inst. Math. Logik. Talk "Locally definable groups in o-minimal structures", 8 Dec.

2011 Oléron (France). Partecipation to the conference "Recent Developments in Model Theory", June 5-11.

2011 Paris, École Normale Supérieure. Talk at the seminar "Géométrie et Théorie des Modèles", May 6.

2010 Gödel Centre of the University of Wien, 14-18 June. Invited professor.

2010 Oberwolfach. Talk at the workshop "Model Theory: Around Valued Fields and Dependent Theories", Jan. 3-9.

2009 Leuven. 2nd Belgian Math. Soc. - London Math. Soc. Invited talk at the logic session.

2009 Durham. Talk at the LMS Symposium "New Directions in the Model Theory of Fields", July 20-30.

2009 Lisbon. Research center CMAF, 10-16 March. Visit and seminar.

2007 Perugia. International Meeting UMI - DMV, June 18-22. Invited speaker at the session "model theory and applications".

2006 Leeds. Meeting "Around o-minimality", March 11-13. Invited talk.

2005 Bristol. Invited speaker at the British Logic Colloquium, Sept. 1-3.

2005 Lyon. Invited speaker at the "Colloquium on o-minimality", March 21-23.

2005 Pisa. Coorganizer of the XXII Incontro AILA, 10-13 Feb.

2004 Torino. Plenary speaker at the Logic Colloquium 2004.

2004 Oberwolfach. Partecipation to the workshop "Model Theory and Complex Analytic Geometry", July 18-24.

2004 Pisa. Contributed talk at the meeting: "Models of Arithmetic and Analysis", June 25-26. Title: Definable groups in o-minimal structures".

2004 Banff Centre, Alberta. Tutorial on o-minimality at the BIRS Workshop "Interactions between model theory and geometry", March 13-18.

2003 Udine. Talk on "On the field of real numbers with the exponential function", 12 Dec.

2003 Paris. Talk on "Effective o-minimality of the real exponential field and related structures" within the "Séminaire général de Logique", 23 June.

2003 Lyon, Claude Bernard University Lyon 1. Talk on "Effective o-minimality of the real exponential field 12 June 2003.

2003 Paris, Partecipation to the "Rencontre Internationale de Théorie des Modèles", Institut Henri Poincaré, June 6-7.

2003 Cesenatico. Talk on "Assiomatica della Geometria Elementare e dei Numeri Reali", XIX Edizione nazionale delle Olimpiadi di matematica, May 9-11.

2002 Ravello (Italy). Partecipation to the "Euro-Conference in Model Theory and Applications", May 27 - June 1.

2001 Pontignano (Siena, Italy). XXI meeting of Mathematical Logic, 30 Oct.-3 Nov. 2001. Contributed talk on "Some results and problems on definable sets in o-minimal structures".

2001 Viareggio, 18^o Convegno sulla didattica della matematica, Collegio Colombo, 6-7-8 Sept. Conference on "Questioni di decidibilità nell'ambito della geometria elementare".

2000 6th Barcellona logic meeting, July 5–8. Talk on "o-minimal fundamental group, homology, and manifolds".

1999 5th Barcellona logic meeting, June 16-19. Talk on "Intersection theory for o-minimal manifolds".

1999 Udine, XIX Incontro di Logica, 6-9 Oct. Conference on: "Euler characteristic of o-minimal manifolds and groups".

1998 (Jan. - June) Berkeley. On leave at the "Mathematical Science Research Institute". Special semester in model theory. Talk on "Factorization in transfinite power series", Feb. 1998.

1997 Perugia. Contributed talk at the GNSAGA meeting, Nov. 6–8.

1996 Donostia-San Sebastian. Tutorial on Models of Arithmetics at the Logic colloquium'96, July 9-15.

1995 Firenze. Contributed talk at the "10-th International Congress of Logic, Methodology and Philosophy of Science", Aug. 1995.

1994-95 Siena. Doctorate course on lambda calculus at the Department of Mathematics.

1994 Copenhagen. Cycle of lectures on lambda calculus at the Summer School "Folli" of the European community, Aug. 1994.

1994 Wien. Conference at the meeting "Proof Theory, Complexity, Metamathematics", April 5-8.

1993 Keele, England. Logic Colloquium (ASL), July 20 - 29. Contributed Talk.

1991 (Sept. - Dec.) Oxford, Department of Mathematics. Invitation by A. Wilkie.

1991 Amsterdam. Talk at the Department of Mathematics, Jan 23. Invitation by D. De Jongh.

1990 Cortona. Invited lectures at the INDAM meeting "Metodi effettivi in algebra e logica", Oct. 8–12.

1990 Luminy, Marseille. Talk at the CIRM Conference "Logic and Computer Science", June 25-29.

1990 San Diego, California. Talk at the Workshop on "Proof Theory, Arithmetic and Complexity". June 18–22.

1990 (Jan.-Mar.) Oxford, Department of Mathematics. Invitation by A. Macintyre.

1989 Roma. Dipartimento di Matematica G. Castelnuovo. Invitation by C. Bernardi. Talk Dec. 7.

1989 Kosĭce. Talk at the Conference "Foundations of Logic and Computer Science". Sept. 4–6.

1989 Berlin. ASL Logic Colloquium, July 25 – Aug 1. Contributed talk.

Students

Graduate level: (Doctoral and post-doc)
T. Servi (doct. Scuola Normale Superiore 2007), A. Fornasiero (postdoc Pisa 2003-07), A. Conversano (doct. Siena 2009), M. Mamino (doct. SNS 2010), V. Mantova (doct. SNS 2013), D. Pitteloud (postdoctoral work 1998-99).

Master level: (Laurea program/Laurea specialistica/Laurea Magistrale)
Laurea program: C. Zervos (1997), C. Antola (1998), V. Scianni (Siena 1998), A. Fornasiero (1999), E. Monteleone (2000), M. Viale (2000), S. Trioni (2001), T. Servi (2001), M. Bacci (2001), L. Dimaggio (2002), M. Liuni (2002), F. Cozzi (2002), I. Matteucci (2003), M. Mamino (2004), A. Conversano (2004). Laurea specialistica: A. Martini (2006), U. Grandi (2008 co-directed), L. Malatesta (2010), Laurea Magistrale: G. Iarlori (2011). L. Sili (2013).

Three years program: (Laurea triennale)
P. Battiston (2008), L. Lorenzo (2011). M. Borassi (2011), L. Lami (2011), R. Mennuni (2013), A. Achille (2013), R. Mennuni (2013), F. Parente (2013), T. Santoli (2013), M. Busonero (present), L. Marangio (present), I. Di Liberti (present),

Other levels (Tesine):
G. Bonazza, (1996) R. Chirivì, Cogliati, (1997) De Felice, P. Di Martino, A. Faggionato (1997), A. Pescini, M. Sorella, (1999), C. Burgmeier (1999),

A. Pratelli (2000), A. Nerli (2000), M. Sechi (2002), G. Guidi (2002), L. Barbieri (2002), L. Luzzi (2003).

Publications

[45] A. Berarducci and V. Mantova. *Surreal numbers, derivations and transseries*. To appear in: Journal of the European Mathematical Society. arXiv:1503.00315 (2015)

[44] A. Berarducci and C. Toffalori. *Le direzioni della logica in italia: la teoria dei modelli*. In H. Hosni, G. Lolli; C. Toffalori, eds., *Le Direzioni della Ricerca Logica in Italia*, 43-83. Scuola Normale Superiore, Pisa, crm series edn. (2015).

[43] A. Berarducci and M. Mamino. *Groups definable in two orthogonal sorts*. Israel Journal of Mathematics, 208(1): 413-441 (2015). doi:10.1007/s11856-015-1205-5 arXiv:1304.1380, 1–18 (2013)

[42] E. Baro and A. Berarducci. *Topology of definable abelian groups in o-minimal structures*. Bulletin of the London Mathematical Society, 44(3):473–479 (2012). doi:10.1112/blms/bdr108

[41] A. Berarducci, M. J. Edmundo, and M. Mamino. *Discrete subgroups of locally definable groups*. Selecta Mathematica, 19(3): 719-736 (2013). doi:10.1007/s00029-013-0123-9

[40] A. Berarducci, P. Majer, and M. Novaga. *Infinite paths and cliques in random graphs*. Fundamenta Mathematicae, 216(2):163–191 (2012). doi:10.4064/fm216-2-6

[39] A. Berarducci. *La verità matematica da Kant a Gödel*. In I. Gabbani, editor, *Matematica, cultura e societa' 2007-2008*, 231–254. Scuola Normale Superiore, Pisa, crm series edn. (2011). ISBN 978-88-7642-382-6

[38] A. Berarducci and M. Mamino. *On the homotopy type of definable groups in an o-minimal structure*. Journal of the London Mathematical Society, 83(3):563–586 (2011). doi:10.1112/jlms/jdq080

[37] A. Berarducci, M. Mamino, and M. Otero. *Higher homotopy of groups definable in o-minimal structures*. Israel Journal of Mathematics, 180(1):143–161 (2010). doi:10.1007/s11856-010-0098-6

[36] A. Berarducci, Y. Peterzil, and A. Pillay. *Group covers, o-minimality, and categoricity*. Confluentes Mathematici, 02(04):473–496 (2010). doi:10.1142/S1793744210000259

[35] A. Berarducci. *Cohomology of groups in o-minimal structures: acyclicity of the infinitesimal subgroup.* Journal of Symbolic Logic, 74(3):891–900 (2009). doi:10.2178/jsl/1245158089

[34] A. Berarducci, D. Dikranjan, and J. Pelant. *Products of straight spaces.* Topology and its Applications, 156(7):1422–1437 (2009). doi:10.1016/j.topol.2008.12.024

[33] A. Berarducci and A. Fornasiero. *O-Minimal cohomology: Finiteness and invariance results.* Journal of Mathematical Logic, 09(02):167–182 (2009). doi:10.1142/S0219061309000859

[32] A. Berarducci. *O-minimal spectra, infinitesimal subgroups and cohomology.* Journal of Symbolic Logic, 72(4):1177–1193 (2007). doi:10.2178/jsl/1203350779

[31] A. Berarducci, M. J. Edmundo, and M. Otero. *Corrigendum to: Transfer methods for o-minimal topology.* Journal of Symbolic Logic, 72(3):1079–1080 (2007). doi:10.2178/jsl/1191333858

[30] A. Berarducci, D. Dikranjan, and J. Pelant. *Local connectedness and extension of uniformly continuous functions.* Topology and its Applications, 153(17):3355–3371 (2006). doi:10.1016/j.topol.2005.04.016

[29] A. Berarducci. *Zero-groups and maximal tori.* In D. Z. EDITORS A. ANDRETTA, K. KEARNES, editor, *Lecture Notes in Logic, 29 Logic Colloquium 2004*, 33–45 (2005). ISBN 9780521884242

[28] A. Berarducci, D. Dikranjan, and J. Pelant. *An additivity theorem for uniformly continuous functions.* Topology and its Applications, 146-147:339–352 (2005). doi:10.1016/j.topol.2003.05.007

[27] A. Berarducci, M. Otero, Y. Peterzil, and A. Pillay. *A descending chain condition for groups definable in o-minimal structures.* Annals of Pure and Applied Logic, 134(2-3):303–313 (2005). doi:10.1016/j.apal.2005.01.002

[26] A. Berarducci and M. Otero. *An additive measure in o-minimal expansions of fields.* The Quarterly Journal of Mathematics, 55(4):411–419 (2004). doi:10.1093/qmath/hah010

[25] A. Berarducci and T. Servi. *An effective version of Wilkie's theorem of the complement and some effective o-minimality results.* Annals of Pure and Applied Logic, 125(1-3):43–74 (2004). doi:10.1016/j.apal.2003.08.001

[24] A. Berarducci and M. Otero. *Transfer methods for o-minimal topology.* Journal of Symbolic Logic, 68(3):785–794 (2003). doi:10.2178/jsl/1058448438

[23] A. Berarducci, D. Dikranjan, and J. Pelant. *Functions with distant fibers and uniform continuity.* Topology and its Applications, 121(1-2):3–23 (2002). doi:10.1016/S0166-8641(01)00105-5

[22] A. Berarducci, D. Dikranjan, and J. Pelant. *Uniform quasi components, thin spaces and compact separation.* Topology and its Applications, 122(1-2):51–64 (2002). doi:10.1016/S0166-8641(01)00132-8

[21] A. Berarducci and M. Otero. *o-Minimal Fundamental Group, Homology and Manifolds.* Journal of the London Mathematical Society, 65(2):257–270 (2002). doi:10.1112/S0024610701003015

[20] A. Berarducci and C. Böhm. *Rewriting Techniques and Applications*, vol. 2051 of *Lecture Notes in Computer Science*. Springer Berlin Heidelberg, Berlin, Heidelberg (2001). ISBN 978-3-540-42117-7, 15–30 . doi:10.1007/3-540-45127-7

[19] A. Berarducci and M. Otero. *Intersection theory for o-minimal manifolds.* Annals of Pure and Applied Logic, 107(1-3):87–119 (2001). doi:10.1016/S0168-0072(00)00027-0

[18] A. Berarducci. *Factorization in generalized power series.* Transactions of the American Mathematical Society, 352(2):553–577 (1999). doi:10.1090/S0002-9947-99-02172-8

[17] A. Berarducci and M. Dezani-Ciancaglini. *Infinite λ-calculus and types.* Theoretical Computer Science, 212(1-2):29–75 (1999). doi:10.1016/S0304-3975(98)00135-2

[16] A. Berarducci and B. Intrigila. *Linear recursive relations are Δ_0-definable.* In A. CANTINI, E. CASARI, and P. MINARI, editors, *Logic and foundations of mathematics*, 67–81. Kluwer Academic Publisher (1999). ISBN 9780792356592

[15] A. Berarducci, D. Dikranjan, M. Forti, and S. Watson. *Cardinal invariants and independence results in the poset of precompact group topologies.* Journal of Pure and Applied Algebra, 126(1-3):19–49 (1998). doi:10.1016/S0022-4049(96)00149-1

[14] A. Berarducci. *Infinite lambda-calculus and non-sensible models.* In A. Ursini and P. Aglianò, editors, *LOGIC AND ALGEBRA, Lecture*

Notes in Pure and Applied Mathematics Series/180, 339–378. Marcel Dekker, Inc. (1996). ISBN 9780824796068

[13] A. Berarducci and B. Intrigila. *Church-Rosser lambda-theories, Infinite lambda-terms and consistency problems*. In W. Hodges, M. Hyland, C. Steinhorn, and J. Truss, editors, *Logic: from Foundations to Applicatios*, chap. 2, 33–58 (1996). ISBN 0 19 853862 6

[12] A. Berarducci and M. Otero. *A Recursive Nonstandard Model of Normal Open Induction*. The Journal of Symbolic Logic, 61(4):1228–1241 (1996)

[11] A. Berarducci and P. D'Aquino. Δ_0*-complexity of the relation* $y = \Pi_{i \leq n} F(i)$. Annals of Pure and Applied Logic, 75(1-2):49–56 (1995). doi:10.1016/0168-0072(94)00055-8

[10] A. Berarducci and C. Böhm. *A self interpreter of lambda-calculus having a normal form*. In E. Börger, G. Jäger, H. Kleine Büning, S. Martini, and M. M. Richter, editors, *Computer Science Logic: 6th Workshop, CSL'92, San Miniato, Italy, September 28 - October 2, 1992. Selected Papers*, vol. 702 of *Lecture Notes in Computer Science*, 85–99. Springer Berlin Heidelberg, Berlin, Heidelberg (1993). ISBN 978-3-540-56992-3. doi:10.1007/3-540-56992-8

[9] A. Berarducci and D. Dikranjan. *Uniformly approachable functions and spaces*. Rendiconti dellIstituto di Matematica dellUniversità di Trieste. An International Journal of Mathematics, 25:23–53 (1993)

[8] A. Berarducci and B. Intrigila. *On the cop number of a graph*. Advances in Applied Mathematics, 14:389–403 (1993). doi:10.1006/aama.1993.1019

[7] A. Berarducci and B. Intrigila. *Some new results on easy lambda-terms*. Theoretical Computer Science, 121(1-2):71–88 (1993). doi:10.1016/0304-3975(93)90084-7

[6] A. Berarducci and R. Verbrugge. *On the provability logic of bounded arithmetic*. Annals of Pure and Applied Logic, 61(1-2):75–93 (1993). doi:10.1016/0168-0072(93)90199-N

[5] A. Berarducci and M. V. Zilli. *Generalizations of Unification*. Journal of Symbolic Computation, 16(5):479–491 (1993). doi:10.1006/jsco.1993.1059

[4] A. Berarducci and B. Intrigila. *Combinatorial principles in elementary number theory*. Annals of Pure and Applied Logic, 55(1):35–50 (1991). doi:10.1016/0168-0072(91)90096-5

[3] A. Berarducci. *The Interpretability Logic of Peano Arithmetic*. Journal of Symbolic Logic, 55(3):1059–1089 (1990)

[2] A. Berarducci. Σ_0^n*-interpretations of modal logic*. Bollettino U.M.I., 7(3-A):177–184 (1989)

[1] C. Böhm and A. Berarducci. *Automatic synthesis of typed* Λ*-programs on term algebras*. Theoretical Computer Science, 39:135–154 (1985). doi:10.1016/0304-3975(85)90135-5