

UNIVERSITÀ DEGLI STUDI DI MILANO

Procedura di selezione per la chiamata a professore di I fascia da ricoprire ai sensi dell'art. 18, comma 1, della Legge n. 240/2010 per il settore concorsuale 01/A1 - LOGICA MATEMATICA E MATEMATICHE COMPLEMENTARI, (settore scientifico-disciplinare MAT/01 - LOGICA MATEMATICA) presso il Dipartimento di Matematica Federigo Enriques, (avviso bando pubblicato sulla G.U. n. 30 del 14/04/2020) - Codice concorso 4323

Cognome	Di Nasso
Nome	Mauro
Data Di Nascita	26/07/1963

Curriculum vitae

Aggiornato al 5/5/2020

Employments:

Associate Professor, Department of Mathematics, University of Pisa, Italy, starting December 2014.

Adjunct professor ("Ricercatore"), Department of Mathematics, University of Pisa, Italy, October 2002 – December 2014 (tenured in 2005).

High school tenured professor, Liceo Scientifico, Viareggio (Italy), 1999-2000 and 1992-1993 & Liceo Classico, Viareggio (Italy), 1994-1995. [National competition won for a permanent position as Secondary School Professor in "Mathematics and Physics", 1993; National competition won for a permanent position as a Secondary School teacher in "Mathematics", 1992.]

Education and titles:

National Scientific Habilitation as Full Professor, 2020.

National Scientific Habilitation as Full professor, 2014.

Ph.D. in Mathematics, University of Siena (Italy), October 1995. Thesis title: "*Stratified nonstandard universes*", advisors: M. Forti and F. Montagna.

M.A. ("Laurea") in Mathematics, University of Pisa (Italy), graduated magna cum laude, July 1990. Thesis title: "*Direct limits of structures and nonstandard models of analysis*", advisor M. Forti.

Research interests:

Mathematical logic and its applications, nonstandard analysis, Ramsey theory, additive

combinatorics, ultrafilters, foundational theories.

Appointments:

Member of the Editorial Board of “*Journal of Logic and Analysis*”, starting 2009.

Member of the Editorial Board of the Journal: “*Logic and Analysis*”, Springer, 2007-2008 (journal discontinued in 2008).

Secretary of AILA (Italian Association of Logic and its Applications), 2005-2011.

Publications:

1. *Translation invariant filters and van der Waerden's Theorem*, chapter in “Combinatorial and Additive Number Theory III” (M.B. Nathanson, ed.), Proceedings in Mathematics & Statistics 297, Springer, 2020.
2. Book: *Nonstandard Methods in Ramsey Theory and Combinatorial Number Theory* (with I. Goldbring and M. Lupini), Lecture Notes in Mathematics vol. 2239, 206 pp., Springer, 2019.
3. Book: *How to Measure the Infinite: Mathematics with Infinite and Infinitesimal Numbers* (with V. Benci), 348 pp., World Scientific Publishing Co., 2019.
4. *Abstract densities and ideals of sets* (with R. Jin), Acta Arithmetica, vol. 184 (2018), 301-313.
5. *Idempotent ultrafilters without Zorn's Lemma* (with E. Tachtsis), Proceedings of the America Mathematical Society, vol. 146 (2018), 397-411.
6. *Ramsey properties of nonlinear Diophantine equations* (with L. Luperi Baglini), Advances in Mathematics, vol. 324 (2018), 84-117.
7. *Fermat-like equations that are not partition regular* (with M. Riggio), Combinatorica, vol. 38 (2018), 1067-1078.
8. *Intersections of sets of distances*, Integers, vol. 16 (2016), A85, pp. 18.
9. *A monad measure space for logarithmic density* (with I. Goldbring, R. Jin, S. Leth, M.Lupini, K. Mahlburg), Monatshefte für Mathematik, vol. 181 (3) (2016), 577-599.
10. *High density piecewise syndeticity of product sets in amenable groups* (with I. Goldbring, R. Jin, S. Leth, M.Lupini, K. Mahlburg), Journal of Symbolic Logic, vol. 81 (2016), 1555-1562.
11. *Approximate polynomial structure in additively large sets* (with I. Goldbring, R. Jin, S. Leth, M.Lupini, K. Mahlburg), Integers, vol. 16 (2016), A49, pp. 11.

12. *Hypernatural numbers as ultrafilters*, chapter in "Nonstandard Analysis for the Working mathematician" (P.A. Loeb and M. Wolff, eds.), 2nd edition, Springer, 2015.
13. *Intersections of shifted sets*, The Electronic Journal of Combinatorics, vol. 22 issue 2 (2015), pp. 7.
14. *Finite embeddability of sets and ultrafilters* (with A. Blass), Bulletin Polish Acad. Sci. Math. 63 (2015), 195-206.
15. *A taste of nonstandard methods in combinatorics of numbers*, chapter in "Geometry, Structure and Randomness in Combinatorics" (J. Matousek, J. Nešetřil and M. Pellegrini, eds.), CRM Series, vol. 18, Scuola Normale Superiore, Pisa, 2015.
16. *High density piecewise syndeticity of sumsets* (with I. Goldbring, R. Jin, S. Leth, M. Lupini, K. Mahlburg), Advances in Mathematics. Vol. 278 (2015), 1-33.
17. *Some applications of numerosities in measure theory* (with V. Benci and E. Bottazzi), Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl., vol. 26 (2015), 1-11.
18. *On a sumset conjecture by Erdős*. (with I. Goldbring, R. Jin, S. Leth, M. Lupini, K. Mahlburg), Canadian Journal of Mathematics, vol. 67 (2015), 795-809.
19. *Iterated hyper-extensions and an idempotent ultrafilter proof of Rado's theorem*. Proceedings of the American Mathematical Society, vol. 143 (2015), 1749-1761.
20. *Nonstandard analysis and the sumset phenomenon in arbitrary amenable groups* (with M. Lupini), Illinois Journal of Mathematics, vol. 58 (2014), 11-25.
21. *Elementary numerosity and measures*. (with V. Benci and E. Bottazzi), Journal of Logic and Analysis, vol. 6 (2014), pp. 14.
22. *An elementary proof of Jin's Theorem with a bound*, The Electronic Journal of Combinatorics, vol. 21 issue 2 (2014), pp. 7.
23. *Embeddability properties of difference sets*, Integers, vol. 14 (2014), A27, pp. 24.
24. *Quasi-selective ultrafilters and asymptotic numerosities* (with A. Blass and M. Forti), Advances in Mathematics, vol. 231 (2012), 1462-86.
25. *Fine asymptotic densities for sets of natural numbers*, Proceedings of the American Mathematical Society, vol. 138 (2010), 2657-65.
26. *Numerosities of point sets over the real line* (with M. Forti), Transactions of the American Mathematical Society, vol. 362 (2010), 5355-71.
27. *A Euclidean measure of size for mathematical universes* (with V. Benci and M. Forti), Logique et Analyse, vol. 197 (2007), 43-52.
28. *An Aristotelian notion of size* (with V. Benci and M. Forti), Annals of Pure and Applied Logic, vol. 143 (2006), 43-53.
29. *The eightfold path to nonstandard analysis* (with V. Benci and M. Forti), in "Nonstandard

- Methods and Applications in Mathematics” (N.J. Cutland, M. Di Nasso and D.A. Ross, eds.), Lecture Notes in Logic vol. 25, ASL, AK Peters, 2006, 3-44.
30. *Hausdorff ultrafilters* (with M. Forti), Proceedings of the American Mathematical Society, vol. 134 (2006), 1809-1818.
 31. *Ultrafilter semirings and nonstandard submodels of the Stone-Cech compactification of the natural numbers* (with M. Forti), in “Logic and its Applications” (A. Blass and Y. Zhang, eds.), AMS Contemporary Mathematics, vol. 380 (2005), 45-51.
 32. *Topological and nonstandard extensions* (with M. Forti), Monatshefte für Mathematik, vol. 144 (2005), 89-112.
 33. *Hausdorff nonstandard extensions* (with V. Benci and M. Forti), Bol. Soc. Parana. Mat. (new series), vol. 20 (2002), 9-20.
 34. *A purely algebraic characterization of the hyperreal numbers* (with V. Benci), Proceedings of the American Mathematical Society, vol. 133 (2005), 2501-2505.
 35. *Alpha-theory: an elementary axiomatics for nonstandard analysis* (with V. Benci), Expositiones Mathematicae, vol. 21 (2003), 355-386.
 36. *Numerosities of labelled sets: a new way of counting* (with V. Benci), Advances in Mathematics, vol 173 (2003), 50-67.
 37. *On the ordering of the nonstandard real line* (with M. Forti), in “Logic and Algebra”, AMS Contemporary Mathematics, vol. 302 (2002), 259-273.
 38. *Nonstandard analysis and an application to the symmetric group on the natural numbers* (with Y. Zhang), in "Logic and Algebra", AMS Contemporary Mathematics, vol. 302 (2002), 249-258.
 39. *Combinatorial principles in nonstandard analysis* (with K. Hrbacek), Annals of Pure and Applied Logic, vol.119 (2003), 265-293.
 40. *A ring homomorphism is enough to get nonstandard analysis* (with V. Benci), Bulletin of the Belgian Mathematical Society, vol. 10 (2003), 1-10.
 41. *Nonstandard analysis by means of ideal values of sequences*, in “Reuniting the Antipodes - Constructive and Nonstandard Views of the Continuum” (P. Schuster, U. Berger and H. Osswald, eds.), Synthese Library, Kluwer Academic Publishers, vol. 306 (2001), 63-73.
 42. *On the foundations of nonstandard mathematics*, Mathematica Japonica, vol. 50 n.1 (1999), 131-160.
 43. *The generic filter property in nonstandard analysis*, Annals of Pure and Applied Logic, vol. 111 (2001), 23-37.
 44. *An axiomatic presentation of the nonstandard methods in mathematics*, Journal of Symbolic Logic, vol. 67 (2002), 315-325.
 45. *Pseudo-superstructures as nonstandard universes*, Journal of Symbolic Logic, vol.63

(1998), 222-236.

46. *Linearly stratified models for the foundations of nonstandard set theory*, Mathematical Logic Quarterly, vol. 44 (1998), 138-142.
47. **ZFC: an axiomatic *approach to nonstandard methods*, Comptes Rendus Académie Sciences Paris, t. 324, Serie I, (1997), 963-967. [Erratum: t. 325, Serie I, (1997), p.5]
48. *Hyperordinals and nonstandard alpha-models*, in “Logic and Algebra” (A. Ursini and P. Agliano', eds.), Lecture Notes in Pure and Applied Mathematics, vol.180 (1996), Marcel Dekker, New York, 457-475.

Expository papers:

- *I fondamenti dell'analisi nonstandard (Italian)*, chapter in “Analisi nonstandard per le scuole superiori, IX Giornata di Studio”, Atti del Convegno 2019, Matematicamente.it.
- *Il Teorema di Hindman sull'esistenza di insiemi infiniti con somme monocromatiche (Italian)*, chapter in “Il Teorema più bello” (L. Modica and C. Petronio eds.), Pisa University Press, 2018.
- *Metodi e modelli nonstandard (Italian)* (with M. Forti), chapter in “Le Direzioni della Logica in Italia vol. 2” (H. Hosni, G. Lolli, C. Toffalori eds.), Collana analitica, Edizioni ETS.
- *Un'introduzione all'analisi con infinitesimi (Italian)*, chapter in “Analisi nonstandard per le scuole superiori, V Giornata di Studio”, Atti del Convegno 2015, Matematicamente.it.
- *I numeri infinitesimi e l'analisi nonstandard (Italian)*, Archimede, vol. 1 (2003), 13-22.

Editor:

Book: (jointly with V. Bergelson, A. Blass, R. Jin) “*Ultrafilters across Mathematics*”, Contemporary Mathematics, vol. 530, AMS, 2010, pp. 200.

Book: (jointly with N.J. Cutland and D.A. Ross) “*Nonstandard Methods and Applications in Mathematics*”, AK Peters, 2006, pp. 262.

Invited talks in congresses and workshops (selection):

- *Alpha-Theory: an elementary axiomatics for the use of infinitesimal and infinite numbers*, Advances and Challenges in Nonlinear Analysis and Beyond! (On the occasion of Vieri Benci's 70th birthday), Università di Bari, September 25, 2019.
- *Ultrafilters as nonstandard points: some new applications in Ramsey Theory*, AMS

Sectional Meeting – Special session “Applications of Ultrafilters and Nonstandard Methods”, University of Hawaii, Honolulu, March 23, 2019.

- *L'analisi nonstandard* (Italian), Abraham Robinson: commemoration in the centenary of his birth, Accademia delle Scienze di Torino, October 16, 2018.
- *Nonstandard Methods and Ultrafilters in Ramsey Theory*, Workshop “Ramsey Theory and Computability”, Notre Dame University Global Gateway, Rome, July 11, 2018.
- *Generalized notions of asymptotic density*, CANT 2018 - Combinatorial and Additive Number Theory, CUNY Graduate Center, New York, May 23, 2018.
- *Nonstandard Natural Numbers in Combinatorics and Ramsey Theory*, IIIM 2018 “Incontro Italiano Insiemi e Modelli”, Università di Torino, February 22, 2018.
- *Nonstandard Natural Numbers in Ramsey Theory*, Model Theory and Combinatorics Workshop, Institut Henri Poincare, Paris, February 1, 2018.
- *Nonstandard Integers and Ramsey Theory of Diophantine Equations*, International Congress “Ultrafilters, Ramsey Theory and Dynamics”, Université de Lyon, November 24, 2017.
- *Nonstandard methods in combinatorics*, XXVI Incontro AILA (Meeting of the Italian Association of Logic and Applications), Padova, September 28, 2017.
- *Hypernatural Numbers in Ramsey Theory*, International Workshop “Nonstandard Methods in Combinatorial Number Theory”, American Institute of Mathematics, San Jose, August 15, 2017.
- *Ultrafilters and nonstandard methods in combinatorics of numbers*, C.O.M.FORT. 2015 (Congress in honor of Marco Forti), Pisa, May 22, 2015.
- *Applications of nonstandard analysis in combinatorics of numbers*, XXV Incontro AILA (Meeting of the Italian Association of Logic and Applications), Pisa, April 16, 2014.
- *An elementary proof of Jin's theorem*, Atelier de travail (workshop) "Les densities et leurs applications", Université Jean Monnet, St-Etienne, July 8, 2013.
- *Applications in combinatorial number theory of iterated nonstandard extensions and idempotent ultrafilters*, CANT 2013 - Combinatorial and Additive Number Theory, CUNY Graduate Center, New York, May 24, 2013.
- *Hypernatural numbers, idempotent ultrafilters, and a proof of Rado's theorem*, ULTRA-COMBINATORICS, Centro di Ricerca Matematica “E. De Giorgi”, Pisa, January 25, 2013.
- *Nonstandard methods in combinatorics of numbers: a few examples*, RaTLoCC 2011 - Ramsey Theory in Logic, Combinatorics and Complexity, Bertinoro - Italy, May 27, 2011.
- *Nonstandard integers in combinatorics of numbers*, XXIV Incontro AILA (Meeting of the Italian Association of Logic and Applications), Bologna, February 2, 2011.
- *Numerosities: a possible way to refine Cantor's cardinalities*, International Congress “Logic

and Mathematics”, York, UK, August 4, 2009.

- *Beyond cardinality: is there a measure for the size of infinite sets where “the whole is larger than the part”?*, 3rd Sino-French Mathematics Conference, Sun Yat-sen University, Guang-Zhou (Canton), December 1, 2008.
- *Numerosities and special ultrafilters*, 10th International workshop in Set Theory, C.I.R.M. - Luminy, September 23, 2008.
- *Numerosities and fine densities for subsets of natural numbers*, XXIII AILA Meeting, Genoa, February 20, 2008.
- *Euclidean measures of sets*, International Congress "Leonhard Euler and Modern Combinatorics", St. Petersburg, June 4, 2007.
- *Ultrafilters and nonstandard models in combinatorial number theory*, IIM 2007 - Incontro Italiano Insiemi e Modelli, Turin, April 3, 2007.
- *Set theory and nonstandard analysis*, International Congress "Set Theory and Analysis", Turin, July 11, 2006.
- *Different paths to nonstandard analysis*, International Congress "Non Standard Mathematics", Aveiro, Portugal, July 5-10, 2004.
- *A purely algebraic characterization of the hyperreals of nonstandard analysis*, International Congress: "Logic, algebra and geometry", St. Petersburg Dept. of Steklov Math. Institute - Euler International Math. Institute - Russian Academy of Science, St. Petersburg, Russia, June 3, 2004.
- *Topological and nonstandard extensions*, AMS Joint Mathematics Meeting – Special session on “Nonstandard Methods”, Phoenix, Arizona, January 8, 2004.
- *Topological and nonstandard extensions and their connections with special ultrafilters*, International Conference "Logic and its Applications in Algebra and Geometry", University of Michigan, Ann Arbor, April 11-13, 2003.
- *Counting the infinite*, Meeting of the Contact Group in Mathematical Logic, University of Mons, Belgium, May 2001.
- *A nonstandard set theory where all sets have nonstandard extensions*, Conference on "Nonstandard Set Theories and Related Topics", City College/CUNY, New York, December 1-2, 2000.
- *A constructive use of nonwellfounded sets for the foundations of nonstandard analysis*, Meeting of the Contact Group in Mathematical Logic, University of Louvain-la-Neuve, Belgium, May 1996.

Invited seminars/colloquia (selection):

- *Nonstandard Models in Combinatorics: a new proof of van der Waerden's Theorem*,

Mathematical Logic Seminars, Università della Campania “L. Vanvitelli”, May 20, 2019.

- *Nonstandard methods in Ramsey Theory*, Seminars of the University of Oslo, Norway, April 4, 2019.
- *Nonstandard methods in Ramsey Theory*, Mathematical Logic Seminars, Albert Ludwigs University of Freiburg, January 30, 2019.
- *Nonstandard methods in Ramsey Theory*, Combinatorics Seminar, University of Cambridge, October 24, 2018.
- *Nonstandard natural numbers in Ramsey Theory*, Logic and Set Theory Seminar, California University at Irvine, May 30, 2018.
- *Nonstandard natural numbers in Ramsey Theory*, Caltech Seminar, Pasadena, May 29, 2018.
- *Ramsey properties of nonlinear Diophantine equations*, University of Turin, May 9, 2017.
- *Hindman's Theorem: a beautiful result in combinatorics of numbers*, Conferenza MathLab, University of Turin, May 8, 2017.
- *Combinatorics of numbers and nonstandard analysis*, Universität Wien Seminar, April 21, 2016.
- *Ultrafilters and nonstandard methods in combinatorics of numbers*, Set Theory Seminars & Models of PA, CUNY Graduate Center, New York, June 18, 2015.
- *Logica e numeri* (Italian), Giornata di Dipartimento Ingegneria dell'Informazione e Scienze Matematiche, Università di Siena, June 15, 2015.
- *Nonstandard Natural Numbers in Combinatorics*, Università Napoli II, Caserta, March 5, 2015.
- *Applications in combinatorial number theory of iterated nonstandard extensions and idempotent ultrafilters*, CUNY Graduate Center, New York, May 24, 2013.
- *Numerosities: A possible way to refine Cantor's cardinalities where the whole is larger than the part*, Colloquium of the Mathematics Department, College of Science, Swansea University, March 22, 2013.
- *Numerosities: a possible way to refine Cantor's cardinalities*, Philosophy Department, University of Florence, February 17, 2012.
- *Nonstandard analysis in combinatorics of numbers: some examples*, Mathematics seminar - University of Northern Colorado, Greeley, October 4, 2011 & Model Theory Seminar, Graduate Center of CUNY, New York, October 14, 2011.
- *Numerosities: a possible way to refine Cantor's cardinalities*, Colloquium of the Mathematics Department, College of Charleston, October 7, 2011.

- *Model theory and nonstandard analysis* (series of seminars, jointly with V.Benci), Summer School in Logic - AILA (Italian Association of Logic and its Applications), Gargnano, August 29-September 4, 2010.
- *Beyond cardinality: are there measures of sets where the whole is larger than the part?*, University of Ghent, Belgium, June 28, 2007.
- *Beyond cardinality: are there measures of sets where the whole is larger than the part?*, Mathematics Colloquium, University of Hawaii, Honolulu, September 28, 2007.
- *Numeri infinitesimi ed infiniti: una introduzione critica all'analisi nonstandard* (italian), Universita' di Napoli II - Caserta, November 30, 2006 and Universita' di Napoli "Federico II", December 1, 2006.
- *The foundations of nonstandard analysis: a critical introduction*, Mathematics Seminars, University of Turin, May 9, 2005.
- *I numeri infinitesimi e l'analisi nonstandard* (italian), Olympics of Mathematics, XXI Italian Final Competition, Cesenatico, May 6, 2005.
- *A new way of counting infinite sets*, Mathematics Colloquium, Sun Yat-sen University, Guang-Zhou (Canton), China, December 10, 2004.
- *Infinitely small and infinitely large numbers*, Mathematics Seminars, Sun Yat-sen University, Guang-Zhou (Canton), China, November 30, 2004.
- *Numerosities: a new way of counting*, The University of Michigan Mathematics Colloquium, Ann Arbor, April 8, 2003.
- *Numerosities: a new way of counting*, Logic Workshop at Graduate Center/CUNY, New York, April 4, 2003.
- *Combinatorial principles in nonstandard analysis*, Logic Workshop at Graduate Center/CUNY, New York, November 17, 2000.
- *Nonstandard analysis by axiomatic method*, Bilgi University, Istanbul, May 2000.
- *An elementary presentation to nonstandard analysis*, University of Parma (Italy), April 1999.
- **ZFC: an axiomatic approach to nonstandard methods in mathematics*, Logic Workshop at Graduate Center/CUNY, New York, March 13, 1998.
- *Foundations for the use of infinitesimal numbers in mathematics*, Seminars in Logic, Philosophy Department, University of Florence, Italy, April 1997.

Contributed talks (selection):

Nonstandard Models and Ramsey Theory of Numbers, International congress: "Model Theory and

Applications”, Mons, January 17, 2017.

Nonstandard analysis in combinatorics of numbers and an application about a conjecture of Erdős, XX Congresso - Unione Matematica Italiana, Siena, September 8, 2015

Nonstandard integers, idempotent ultrafilters, and partition regularity of Diophantine equations, Ramsey Theory Conference, University of Denver, May 27, 2014.

Research visits:

- Department of Mathematics, University of Oslo, invited by T. Lindstrom, April 3-6, 2019.
- Department of Mathematics, University of Hawaii, invited by D.A. Ross, Department of Mathematics, March 17 - April 2, 2019.
- Mathematisches Institut, Albert-Ludwigs University of Freiburg, invited by M. Pizarro, January 29 - February 2, 2019.
- Department of Pure Mathematics and Mathematical Statistics, University of Cambridge, invited by I. Leader, October 24-27, 2018.
- Department of Mathematics, University of California at Irvine, invited by I. Goldbring, May 30-June 1, 2018.
- Department of Mathematics, Caltech, Pasadena, invited by M. Lupini, May 26-29, 2018.
- Department of Mathematics, Universität Wien, Austria, invited by L. Luperi Baglini, April 20-24, 2016.
- AIM - American Institute of Mathematics, SQuaRE program on “Nonstandard methods in Number Theory”, AIM Research Conference Center, San Jose - June 2015.
- AIM - American Institute of Mathematics, SQuaRE program on “Nonstandard methods in Number Theory”, AIM Research Conference Center, Palo Alto - August 2014.
- AIM - American Institute of Mathematics, SQuaRE program on “Nonstandard methods in Number Theory”, AIM Research Conference Center, Palo Alto - June 2013.
- Graduate Center, Sun Yat-sen University, Guang-zhou, Canton, China, invited by Y. Zhang, October 2011.
- Graduate Center, Sun Yat-sen University, Guang-zhou, Canton, China, invited by Y. Zhang, November-December 2008.
- University of Hawaii - Department of Mathematics, Honolulu, USA, invited by D. Ross, Fall Semester 2007.
- Graduate Center, Sun Yat-sen University, Guang-zhou, Canton, China, invited by Y. Zhang, November-December 2004.
- City College of CUNY (City University of New York), USA, invited by K. Hrbacek, Fall Semester 2000.

- Caltech (California Institute of Technology), Pasadena, USA, invited by W.A.J. Luxemburg, June 1998.
- City College of CUNY (City University of New York), USA, invited by K. Hrbacek, academic year 1997-1998.

Awards and Fellowships:

Research fellowship “Assegno di ricerca”, Department of Applied Mathematics, University of Pisa, Italy, 2000-2002.

PSC-CUNY Research Award (joint research with K. Hrbacek), City University of New York; title of the research project: “Combinatorial Principles in Nonstandard Analysis”, 2000-2001.

Italian National Council of Research (CNR) Fellowship, 1998-1999.

Italian National Council of Research (CNR) Fellowship. Program developed at the City College/CUNY, New York, 1997-1998.

Post-doctoral Research Fellowship, University of Siena, Italy, 1996-1997.

NATO Advanced Study Institute, Research School on “Nonstandard Analysis and its Applications”, Edinburgh, UK, June-July 1996.

Grants:

FFABR grant (Fondo Finanziamento Attività di Ricerca di Base), funded by the Italian Ministry of Research, 2017-2018.

Participant in the following PRIN grants (“Research Projects of Relevant National Interest”) funded by the Italian Ministry of Research:

2019-2021: PRIN 2017, project entitled: “Mathematical logic: models, sets, computability”.

2014-2017: PRIN 2012, project entitled: “Logic, models, and sets”.

2011-2013: PRIN 2009, project entitled: “Models and sets”.

2008-2010: PRIN 2007, project entitled: “Model theory, set theory, and applications”.

2004-2006: PRIN 2004, project entitled: “Logical methods in algebra, analysis and geometry”.

2002-2004: PRIN 2002, project entitled: “Models theory and set theories, their interactions and applications”.

1998-2000: PRIN 1998, project entitled: “Mathematical logic and its connections with algebra, geometry and analysis”.

Teaching and Didactics:

Courses taught in the USA:

MATH 244 (Multivariable calculus up to Green's and Stokes' theorems) and MATH 302 (Introduction to differential equations), Hawaii University, Honolulu, 2007-2008 (Fall semester).

MATH 392 (Vector calculus and linear algebra) and MATH 100 (pre-Calculus), City College/CUNY, New York, 2000-2001 (Fall semester).

MATH 90 and MATH 100 (pre-Calculus), City College/CUNY, New York, 1997-1998 (Spring semester). Report on the observation of my classes by the Mathematics Department Executive Committee of The City College/CUNY, New York: ranked “excellent”.

PhD course:

Infinite and infinitesimal numbers: from numerosities to nonstandard analysis, Course for Graduate Students, Sun Yat-sen University, Guang-Zhou (Canton), China, November-December 2005.

Courses taught in Italy:

Linguaggio e metodi della matematica (Discrete Mathematics), Geometria (Linear Algebra), Elementi di teoria degli insiemi (Introduction to Axiomatic Set Theory), Ultrafiltri e metodi nonstandard (Ultrafilters and Nonstandard Methods in Combinatorics), Logica matematica (Mathematical Logic), Teoria dei modelli (Model Theory), Analisi I (Calculus - assistant), Analisi II (Multivariable Calculus – assistant).

Courses taught at Secondary Schools in Italy:

Introductory algebra, trigonometry, pre-calculus, Calculus, basics of physics, introductory algebra, probability (in 1999-2000, 1994-1995, 1992-1993, 1987-88).

Secondary school didactics (Italian):

Conferenza per insegnanti: *Metodi nonstandard nel calcolo sublime: infinitesimi ed infiniti tra filosofia e matematica*, Liceo “Piccolomini”, Siena, 12 Febbraio, 2020.

Conferenziere invitato: *I fondamenti dell'analisi nonstandard*, “IX Giornata Nazionale di Analisi Nonstandard” (convegno per insegnanti di scuola superiore), Università di Verona, 5 Ottobre, 2019.

Membro del Comitato Scientifico: “VIII Giornata Nazionale di Analisi Nonstandard” (convegno per insegnanti di scuola superiore), Dipartimento di Matematica e Informatica “U. Dini”, Università di Firenze, 6 Ottobre, 2018.

Lezione: *Un invito alla logica*, Master “Didattica della Matematica e nuove tecnologie: dalla teoria alla pratica”, Università di Pisa, 13 Giugno, 2018.

Lezione: *L'analisi nonstandard*, Master “Didattica della Matematica e nuove tecnologie: dalla teoria alla pratica”, Università di Pisa, 1 Febbraio, 2017.

Responsabile Scientifico: “VI Giornata Nazionale di Analisi Nonstandard” (convegno per

insegnanti di scuola superiore), Complesso San Michele, Lucca, 1 Ottobre, 2016.

Conferenziere invitato: *Un'introduzione all'analisi con infinitesimi*, “V Giornata di Analisi Nonstandard” (convegno per insegnanti di scuola superiore), Università di Verona, 10 Ottobre, 2015.

Conferenza: *Numeri infiniti e numeri infinitesimi*, Liceo Scientifico “Dini”, Pisa, 14 Maggio, 2015.

Corso di aggiornamento per insegnanti di scuola superiore: *Sulla didattica della logica matematica* – 6 ore, Liceo “Dini”, Pisa, Gennaio-Maggio 2015.

Students:

Ph.D. Thesis (“tesi di dottorato”):

1. Lorenzo Luperi Baglini: *Hyperintegers and nonstandard techniques in combinatorics of numbers* (University of Siena, Italy), 2012.

Master Theses (“tesi magistrali”):

1. Giacomo Bertolucci: *Finite colorings, partition regularity, and families of large sets*, 2019
2. Giacomo Tendas: *Strongly Preserved Formulas in Topoi* (joint advisor with A. Blass), 2017.
3. Florian Yusuf Ali: *Nonstandard analysis and partition regularity of Diophantine equations* (Université Paris VII), 2017.
4. Luigi Marangio: *Arithmetic progressions in a set of positive density*, 2017.
5. Pietro Porqueddu: *Gowers' Ramsey Theorem*, 2017.
6. Francesco di Baldassarre: *Non-elementary methods in combinatorial number theory, Roth's and Sarkozy's Theorems*, 2016.
7. Maria Riggio: *Partition regularity of nonlinear Diophantine equations*, 2016.
8. Martino Lupini: *Recurrence and Szemerédi's theorem*, 2010.
9. Lorenzo Luperi Baglini: *A new method of counting the infinite* (“Un nuovo modo di contare l'infinito” - italian), 2008.
10. Michiel De Smet: *Nonstandard models and sequential extensions of the real numbers* (University of Ghent, Belgium), 2007.

Three Year Program Theses (“Tesi triennali”):

1. Roberto Riccardi: *Il teorema di van der Waerden polinomiale*, 2019.
2. Gabriele Farnesi: *Limiti lungo ultrafiltri in spazi di Hilbert e applicazioni alla teoria combinatoria dei numeri*, 2019.
3. Maria Clara Ragosta: *Il Lemma di regolarità di Szemerédi e il Teorema di Roth*, 2018.
4. Alessandra Boscolo: *Gli ultrafiltri idempotenti, dagli insiemi ai modelli*, 2016.
5. Fabio Brau: *Insiemi di Bohr, teoremi di Folner e Kriz, e alcune applicazioni*, 2015.
6. Giacomo Tendas: *Il Teorema Delta-Ramsey e un lemma di van der Corput*, 2015.
7. Alessio Melosi: *Una dimostrazione elementare del teorema di Furstenberg-Sarkozy*, 2015.
8. Isabella Panaccione: *Gruppi amenabili*, 2015.
9. Marta Lemmi: *Alcune proprietà degli insiemi di distanze*, 2015.
10. Francesco Di Baldassarre: *Il teorema di immersione di Jin*, 2012.
11. Pietro Porqueddu: *Alcune proprietà degli insiemi centrali*, 2012.
12. Pietro Salmaso, *Una dimostrazione combinatoria del teorema denso di Hindman*, 2011.
13. Nicolo' Neroni, *Il Teorema di Deuber*, 2011.
14. Alessandra Caraceni, *The crossing number inequality* (Colloquio Scuola Normale Superiore), 2010.
15. Alessandro Maserati, *Il Teorema di Jin, dalla densità di Banach agli insiemi di Bohr a tratti*, 2010.
16. Alex Cardelli: *Il Teorema di Sarkozy-Furstenberg, una dimostrazione ergodica*, 2009.
17. Daniela Quaranta: *L'ipotesi dei cardinali singolari, un risultato recente*, 2009.
18. Nicolo' Staiti: *Sull'assolutezza*, 2008.
19. Nina Petersen: *Applications of ultrafilters to combinatorial number theory* (NTN University, Trondheim, Norvegia), 2007.
20. Davide Maffioli: *Il Teorema di Jin*, 2007.
21. Nicola Picoco: *Alcune applicazioni di metodi logici in teoria combinatoria dei numeri*, 2007.
22. Mattia Talpo: *Due dimostrazioni alternative nella teoria di Ramsey* (Colloquio Scuola Normale Superiore), 2007.
23. Umberto Grandi: *Completezza logica della geometria elementare e teoria dei campi reali chiusi*, 2006.

24. Lorenzo Luperi Baglini: *Una classe di modelli della teoria dei campi reali chiusi con esponenziazione*, 2006.
25. Abramo Bertucco: *Estensione della densita' asintotica e studio delle loro proprieta' mediante ultrafiltri*, 2006.
26. Nicola Lanaro: *Il teorema di Hahn-Banach e il paradosso di Banach-Tarski*, 2006.
27. Eleonora Guerrini: *Il teorema di Bernstein-Robinson*, 2004.
28. Tiziano Casavecchia: *Applicazione degli ultrafiltri alla teoria di Ramsey*, 2003.

Referee:

Advances in Mathematics, American Mathematical Monthly, Annals of Pure and Applied Logic, Archive in Mathematical Logic, Australasian Journal of Combinatorics, Bulletin de la Societe Mathematique de Belgique, Calcolo, Central European Journal of Mathematics, Contemporary Mathematics of the AMS, Electronic Journal of Combinatorics, European Journal of Combinatorics, , Journal of Logic and Analysis, Journal of Symbolic Logic, Lecture Notes in Mathematics, Monatshefte für Mathematik, Semigroup Forum, Studia Logica.
Reviewer for the Executive Board of the Austrian Science Fund.

Organizer:

International Meetings:

1. (Jointly with L. Luperi Baglini) International Conference ULTRAMATH 2020 “Ultrafilters across Mathematics”, Math. Dept. of the University of Pisa, June 1-6, 2020. → Postponed to June 7-12, 2021.
2. (Jointly with L. Carlucci, N. Galesi, and W. Gasarch) International Conference RaTLoCC18 “Ramsey Theory in Logic, Combinatorics, and Complexity”, Bertinoro, Centro Residenziale Universitario, July 15-20, 2018.
3. (Jointly with L. Luperi) International workshop “Ramsey Theory of Equations and Related Topics”, Math. Dept. of the University of Pisa, February 16-17, 2018.
4. (Jointly with I. Goldbring and M. Lupini) International workshop “Nonstandard Methods in Combinatorial Number Theory”, American Institute of Mathematics, San Jose (USA), August 14-18, 2017.
5. International workshop SWIP 2017 “Set Theory Workshop in Pisa”, Math. Dept. Of the University of Pisa, June 13, 2017.
6. (Jointly with I. van den Berg) Special Session “Logic and Analysis”, Logic Colloquium 2013, Evora (Portugal), July 22-27, 2013.
7. International workshop ULTRACOMBINATORICS “Applications of ultrafilters in

- combinatorial number theory and related topics”, Centro di Ricerca Matematica "E. De Giorgi", Pisa, January 24-25, 2013.
8. International workshop on “Infinite Combinatorics”, Centro di Ricerca Matematica "E. De Giorgi", Pisa, June 28, 2010.
 9. International Conference ULTRAMATH 2008 “Applications of ultrafilters and ultraproducts in mathematics”, Math. Dept. of the University of Pisa, June 1-7, 2008.
 10. International Conference NSM 2006 “Nonstandard Methods and Applications in Mathematics”, Math. Dept. of the University of Pisa, May 25-31, 2006.
 11. International Conference MARIAN 2004 - “Nonstandard Models of Arithmetic and Analysis”, Math. Dept. of the University of Pisa, June 25-26, 2004.
 12. (jointly with A. Berarducci, N.J. Cutland and D.A. Ross) International Conference NS 2002 “Nonstandard Methods and Applications in Mathematics”, Math. Dept. of the University of Pisa, June 10-16, 2002.
 13. (jointly with K. Hrbacek) Conference “Nonstandard Set Theory and Related Topics”, The City College of CUNY, New York, December 1-2, 2000. (Sponsored by MAMLS - Mid-Atlantic Mathematical Logic Seminar).

Italian Meetings:

(jointly with G. Lenzi and V. Tortorelli) “C.O.M.FORT 2015” - Conference in honor of Marco Forti on the occasion of his retirement, May 22-23, 2015.

(jointly with M. Forti) Meeting “Il tutto e' maggiore della parte?”, Centro di Ricerca Matematica “E. De Giorgi”, Pisa, May 6, 2009.

(jointly with M. Forti) Meeting “Matematica straordinaria: alcuni teoremi inaspettati”, Domus Galilaeana, Pisa, December 12, 2008.

(jointly with V. Benci e M. Forti) Meeting “L'infinito in matematica: aspetti storici, scientifici e filosofici”, Domus Galilaeana, Pisa, April 22, 2005.

(jointly with A. Berarducci, M. Forti and E. Moriconi) Conference “XXII Incontro AILA” (Meeting of the Italian Association of Logic and Applications), Math. Dept. of the University of Pisa, February 10-13, 2005.

(jointly with V. Benci e M. Forti) Meeting “L'infinito in matematica, fisica e filosofia”, Domus Galilaeana, Pisa, March 26, 2004.

Meeting “Il metodo assiomatico da Euclide a Gödel”, Domus Galilaeana, Pisa, June 13, 2003.

(jointly with V. Benci and M. Forti) Meeting “I numeri infinitesimi: aspetti storici, filosofici, scientifici e didattici di una grande controversia”, Domus Galilaeana, Pisa, November 15, 2002.

6 Maggio, 2020.