

**MATTEO VIALE**

**ALLEGATO A****UNIVERSITÀ DEGLI STUDI DI MILANO**

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**Matteo Viale  
CURRICULUM VITAE****INFORMAZIONI PERSONALI (NON INSERIRE INDIRIZZO PRIVATO E TELEFONO FISSO O CELLULARE)**

COGNOME	VIALE
NOME	MATTEO
DATA DI NASCITA	12, 10, 1974

Data

7/5/2020

Luogo

Parigi (Francia)

## SUMMARY OF RESEARCH STRENGTHS AND RESEARCH INTERESTS

**Research activity.**

<b>Funding:</b>	<p>I have been twice the local coordinator of a Prin project (Prin 2009, 35.973 € — Prin 2012, 30.201 €). These are research projects funded by the Italian Ministry of Education to promote research activities in public universities and research centers.</p> <p>I got in 2010 a grant of 100.000€ by the Kurt Goedel Society for my researches in mathematical logic and in 2012 a grant of 50.000€ by the Compagnia di San Paolo which funded a 2-years post-doc position under my supervision.</p>
<b>Prizes:</b>	<p>I got in 2006 the prize for the <b>Sacks prize</b> for the best PhD thesis in Mathematical Logic awarded by the ASL (the Association for Symbolic Logic). I got in 2010 the <b>Fubini prize</b> awarded by the Istituto Guido Boella to fund the activities of young Italian mathematicians. I got in 2010 the <b>Kurt Gödel Research Prize Fellowship 2010</b>.</p>
<b>Publications:</b>	<p>I have 15 publications appearing in refereed journals and registered on the Mathscinet database. Many of my publications appeared on top mathematical journals: one on the <b>Journal of the American Mathematical Society</b>, one on <b>Transactions of the American Mathematical Society</b>, another on <b>Advances in Mathematics</b>.</p>

### Research interests.

My fields of specialization are Logic and Set Theory. My main research interest aims to explore to what extent the forcing method can be a powerful toolbox to prove theorems and solve certain type of mathematical problems (problems arising in the most abstract parts of several fields of mathematics such as: functional analysis, general topology, infinite combinatorics, category theory....). This reverses the usual point of view on forcing, which regards it as the most effective tool to prove the undecidability of certain mathematical problems. There are three main ingredients in this approach:

**Generic absoluteness results:** Generic absoluteness results transform consistency results in theorems.

More precisely they show the following:

For certain mathematical problems whose logical complexity is simple enough, if we are able to prove by means of forcing that it is not contradictory that the problem *can have* a certain solution, then we have actually proved that the problem *has* that solution.

My work contributed to this line of research with Publications 2, 4, 5.

**Forcing axioms:** These axioms are natural strengthening of the axiom of choice and of Baire category theorem and are extremely useful to provide at least one consistent solution to many mathematical problems in distinct and unrelated mathematical fields, a very short list of examples includes: the continuum problem in set theory, Whitehead problem on the characterization of free groups in group theory, the existence or not of outer automorphisms for the Calkin algebra in operator algebra. All the mentioned problems are undecidable on the basis of the standard axioms for set theory, i.e. ZFC.

My research contributed to explore the power of these axioms (see Publications 6, 7, 8, 9, 10, 11, 12).

**Relation between forcing and other fields of mathematics:** The forcing method (being rooted in a logical exploration of the consequences of Baire's category theorems) expresses in its own language concepts and facts which pertains to many other domains of mathematics; instructive examples of this phenomenon are the following:

- The study of the logical properties of complex numbers in forcing extensions (whatever that means to a person not proficient with the forcing method) amounts to study the commutative unital  $C^*$ -algebras with extremally disconnected spectrum (see publication 1).
- The notion of Grothendieck topos introduced in the seminal work of Grothendieck in algebraic geometry and category theory encompasses among its possible instantiations (modulo unessential restyling) the notion of boolean valued model which is at the base of the development of the forcing technology.

My latest publications 3, 1 contribute to this line of research.

During my Ph.D. and in the first years of my post-doctoral studies I centered my research on the combinatorial consequences of strong forcing axioms (see Publications 9, 10, 11, 12). A subsequent thread of research focussed on the analysis of the mutual relations existing between large cardinals and strong forcing axioms (see Publications 6, 7, 8). Later on I addressed the relation between forcing axioms and generic absoluteness results (see Publications 2, 4, 5). My current research is driven by the exploration of the relation between forcing and other mathematical fields, some preliminary results are already appearing (see 3, 1).

## CURRICULUM VITAE

## PERSONAL INFORMATION.

Family name, first name:	Viale, Matteo
Researcher ID:	ORCID: <a href="http://orcid.org/0000-0002-0876-4916">http://orcid.org/0000-0002-0876-4916</a>
Date of birth:	12/10/1974
Personal website:	<a href="http://www.logicatorino.altervista.org/matteo-viale">http://www.logicatorino.altervista.org/matteo-viale</a>

My work has already obtained *three major recognitions*: the **Sacks Prize 2006**, the **Fubini Prize 2010**, the **Kurt Gödel Research Prize Fellowship 2010**. I have been (and am) the PI in several research projects funded by national and international institutions. I have obtained the habilitation as *full professor* and *associate professor* in Mathematical Logic for the ASN of the Italian public university system.

## CURRENT POSITION.

<b>1/11/2014-now:</b>	Associate professor in Mathematical Logic, Department of Mathematics, University of Torino, (ITALY)
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## PAST POSITIONS.

<b>1/10/2008- 31/10/2014:</b>	Tenure track researcher in Mathematical Logic, Department of Mathematics, University of Torino, (ITALY)
<b>1/2/2007-31/8/2008:</b>	Post-doctoral fellow, Kurt Gödel Research Center in Mathematical Logic, University of Vienna (AUSTRIA)

## EDUCATION AND ACADEMIC TITLES.

<b>2020- 2029:</b>	Habilitation as <i>full professor</i> in Mathematical Logic for the ASN of the Italian university system for the field MAT/01.
<b>2012- 2020:</b>	Habilitation as <i>full professor</i> and <i>associate professor</i> in Mathematical Logic for the ASN of the Italian university system for the field MAT/01.
<b>2006:</b>	<i>Ph.D in Matematical Logic</i> , University Paris 7-Denis Diderot (FRANCE), and University of Torino (ITALY) Thesis advisors: Alessandro Andretta (Torino), Boban Velickovic (Paris 7) Thesis title <i>Applications of the proper forcing axiom to cardinal arithmetic</i> Grade: <i>très honorable avec félicitations</i>
<b>2001:</b>	<i>Master degree in Mathematics</i> , Department of Mathematics, University of Pisa (ITALY) Thesis advisor: Alessandro Berarducci Thesis title: <i>I tipi intersezione per il Lambda calcolo e la Logica modale</i> Grade: <i>Summa cum laude</i>

## PRIZES AND AWARDS.

- 2011:** *Kurt Gödel Research Prize Fellowship 2010 (100.000 €)* awarded by the **Kurt Gödel Society**:  
individual “research grant to support original research in, and areas surrounding, the Foundations of Mathematics”.
- 2010:** *Fubini prize 2010 (10.000 €)* awarded by the **Istituto Guido Boella**:  
“The Fubini Prize supports a young Italian mathematician (under 40 and resident in Italy or temporarily resident abroad) who has obtained results in the fields of pure or applied Mathematics and is recognized for his studies by the international scientific community”.
- 2006:** *2006 Sacks Prize* awarded by the **Association for Symbolic Logic**:  
“for the most outstanding doctoral dissertation in Mathematical Logic in 2006”.

## PUBLICATIONS.

- (1) A. Vaccaro, **M. Viale**, *Generic absoluteness and boolean names for elements of a Polish space*. Boll. Unione Mat. Ital. (2017), DOI: 10.1007/s40574-017-0124-2, no. 3, 293–219.
- (2) G. Audrito, **M. Viale**, *Absoluteness via Resurrection*. Journal of Mathematical logic 17 (2017), DOI: 10.1142/S0219061317500052, 36 pp.
- (3) M. Viale, *Forcing the truth of a weak form of Schanuel’s conjecture*. Confluentes Mathematici, 8 (2016), no. 2, 59 – 83.
- (4) M. Viale, *Category forcings,  $\text{MM}^{+++}$ , and generic absoluteness for the theory of strong forcing axioms*. Journal of the American Mathematical Society 29 (2016), no. 3, 675 – 728.
- (5) M. Viale, *Martin’s maximum revisited*. Archive for Mathematical Logic 55 (2016), no. 1-2, 295 – 317.
- (6) S. Cox, **M. Viale**, *Martin’s Maximum and tower forcing*. Israel Journal of Mathematics 197 (2013), no. 1, 347 – 376.
- (7) M. Viale, *Guessing models and generalized Laver diamond*. Annals of Pure and Applied Logic 163 (2012), no. 11, 1660 – 1678.
- (8) **M. Viale**, C. Weiß, *On the consistency strength of the proper forcing axiom*. Advances in Mathematics 228 (2011), no. 5, 2672 – 2687.
- (9) A. Sharon, **M. Viale**, *Some consequences of reflection on the approachability ideal*. Transactions of the American Mathematical Society 362 (2009), 4201 – 4212.
- (10) M. Viale, *A family of covering properties*. Mathematical Research Letters 15 (2008), no.2, 221 – 238.
- (11) M. Viale, *Forcing axioms, supercompact cardinals, singular cardinals combinatorics*. The Bulletin of Symbolic Logic 14 (2008), 99 – 113, no. 1.
- (12) M. Viale, *The Proper Forcing Axiom and the Singular Cardinal Hypothesis*. The Journal of Symbolic Logic 71 (2006), 473 – 479, no. 2.
- (13) M. Viale, *The cumulative hierarchy and the constructible universe of ZFA*. Mathematical Logic Quarterly 50 (2004), 99 – 103, no. 1.
- (14) S. Valentini, **M. Viale**, *A binary modal Logic for the intersection types of lambda-calculus*. Information and Computation 185 (2003), 211 – 232, no. 2.

## RESEARCH GRANTS.

- 2014:** PI of the Torino unity of the **2012-PRIN project** “Logica, Modelli e Insieme” (2012LZEBFL) (113.901 €) (**30.201 €** for the Torino local unity).  
Agency: *Italian Ministry of Education, University, and Research.*
- 2012:** PI of the **Junior PI Grant 2012**, (**50.000 €**).  
Agency: *University of Torino - Compagnia di San Paolo.*
- 2011:** PI of the **Kurt Gödel Research Prize Fellowship 2010** (**100.000 €**).  
Agency: *Kurt Gödel Society.*
- 2010:** PI of the Torino unity of the **2009-PRIN project** “Modelli e Insieme” (2009WY32E8-004) (140.092 €) (**35.973 €** for the Torino local unity).  
Agency: *Italian Ministry of Education, University, and Research.*

## SUPERVISION ACTIVITIES OF POST DOCTORAL FELLOWS AND STUDENTS.

- 2 Post-doctoral fellows:
  - Raphael Carroy: 1/12/2012 – 30/11/2013, 1/6/2014 – 31/5/2016, (currently Researcher (Rtd-A) in the Department of Mathematics of Torino University)
  - Daisuke Ikegami: 1/11/2013 – 31/3/2014, (currently associate professor in Shibaura Institute of Technology).
- Supervision of one PhD thesis: Giorgio Audrito, defense held in 2016, currently Post-Doc in the Computer Science Department of the University of Torino.
- Serving in the jury of 7 PhD defenses in Mathematical Logic or Philosophy of Mathematics: Edoardo Rivello – 2010 (University of Torino), Fausto Barbero – 2011 (University of Torino), Remi Strullu – 2012 (University of Paris 7), Giorgio Venturi – 2014 (SNS and University of Paris 7), Michele Sandrini – 2015 (State University of Milano), Silvia Steila – 2016 (University of Torino), Guillaume Geoffroy (University of Aix-Marseille). I collaborated to the supervision of the PhD thesis of Steila, Sandrini, and Venturi. Sandrini and Venturi defended a PhD thesis in Philosophy of Mathematics.
- Supervision of 10 Master thesis in Mathematics:
  - 2009 - Giorgio Venturi (University of Torino) **AILA prize 2009** for the best Italian master thesis in Logic. Currently associate professor in Logic and Philosophy of Mathematics in the *Centro di Lógica e de Epistemologia e História da Ciência* of the *Universidade Estadual de Campinas*, Campinas, Brasil.
  - 2011 - Giorgio Audrito (University of Torino). Currently Post-Doc researcher in the computer science department of the University of Torino, Italy.
  - 2013 - Fiorella Guichardaz (University of Torino). Defended in 2019 her PhD in Mathematics in the University of Freiburg (Germany).
  - 2014 - Giuseppe Moranarocca (University of Torino).
  - 2014 - Pietro Salmaso (University of Pisa and SNS).
  - 2015 - Francesco Parente (University of Pisa). **AILA prize 2016** for the best Italian master thesis in Logic. Currently Post-Doc in Mathematics in Tokio.
  - 2015 - Andrea Vaccaro (University of Pisa) **AILA prize 2016** for the best Italian master thesis in Logic. Defended his PhD in Mathematics in the University of Pisa in 2019. Currently Post-Doc in Ben Gurion University of the Negev.
  - 2018 - Vincenzo Giambrone (University of Torino) **AILA prize 2018** for the best Italian master thesis in Logic.
  - 2019 - Moreno Pierobon (University of Torino) Currently PhD student in Pisa University
  - 2020 - Daniele Truzzi (University of Torino)

**TEACHING.** I regularly teach a *master level* course in Set Theory (every year from 2008 to 2015) and a course on the fundamentals of first order logic in the undergraduate program in mathematics (every year since 2016). I occasionally teach *advanced courses* in the PhD program of my university (since 2012). I also teach regularly in the undergraduate program in mathematics basic courses in mathematical logic or calculus for first year students of computer science or chemistry.

I'm a member of the scientific council of the joint PhD program in Mathematics offered by the University of Torino and the Polytechnical University of Torino.



## SELECTED LIST OF INVITATION AS PLENARY SPEAKER IN MAIN INTERNATIONAL MEETINGS.

- 2019:** *Plenary speaker and tutorial speaker in the ESTC+YSTW 2019, ESTC+YSTW 2019, June 26 — July 5, Vienna, Austria.*
- 2018:** *Forcing as a tool to prove theorems, Logic Colloquium 2018, July 23 – 28 2018, Udine, Italy.*
- 2015:** *Problemi indecidibili in Matematica — Cosa può dire al riguardo la teoria degli insiemi?, XX congresso UMI, September 7 – 12 2015, Siena, Italy.*
- 2013:** *Generic absoluteness for models of strong forcing axioms, North American ASL annual meeting, May 8 – 11 2013, Waterloo, Canada.*
- 2011:** *Martin's maximum revisited: Woodin cardinals, forcing axioms,  $\Omega$ -Logic, 3rd European Set Theory Conference, July 4 – 7 2011, Edinburgh, United Kingdom.*
- 2008:** *Forcing axioms, supercompact cardinals, singular cardinal combinatorics, Logic Colloquium 2008, July 3 – 8 2008, Bern, Switzerland.*

## ORGANIZATION OF CONFERENCES.

- Member of the scientific committee of the **XXVII Incontro di Logica AILA**, (to be held in 2021 due To the Covid-19 crisis) Caserta (Italy).
- Member of the scientific committee of the **Logic Colloquium 2020**, (to be held in 2021 due To the Covid-19 crisis) Poznan (Poland).
- **Chair** of the organizing committee of the **Young Set Theory Workshop 2013**, 10 – 14 June 2013, Oropa (Italy).
- Member of the organizing committee of the **Young Set Theory Workshop 2012**, 30th April – 4th May 2012, CIRM Luminy (France).
- Member of the organizing committee of the workshop **RATLOCC 2011**, 22 – 27 May 2011, Bertinoro (Italy).
- Member of the scientific committee of the **Young Set Theory Workshop 2010**, 15 – 19 February 2010, Raach (Austria).

**OTHER SCIENTIFIC ACTIVITIES.** I served and serve as referee for the journals *Annals of Mathematics*, *Topology and its applications*, *Fundamenta Mathematicae*, *Israel Journal of Mathematics*, *Journal of Symbolic Logic*, *Bulletin of Symbolic Logic*, *Notre Dame Journal in Formal Logic*, *Bulletin of the London mathematical Society*, *Archive for Mathematical Logic*.

- Visiting researcher in the **Isaac Newton institute for Mathematical Sciences** for the thematic program: Mathematical, Foundational and Computational Aspects of the Higher Infinite, November 1st 2015 – December 18 2015, Cambridge, UK.
- Visiting researcher in the **Fields Institute for Research in Mathematical Sciences** for the thematic program: Forcing and its applications, 16 October 2012 – 18 November 2012, Toronto, Canada.
- Visiting researcher in the **Centro di Ricerca Matematica Ennio De Giorgi**, 15 May – 15 June 2009, invited by Lorenzo Carlucci on the grant “Exploring the Infinite, Phase I: Mathematics and Mathematical Logic”.

## MEMBERSHIPS OF SCIENTIFIC SOCIETIES.

- 2014 – 2020:** Member of the executive committee of the *Associazione Italiana Logica ed Applicazioni (AILA)*.

**LANGUAGES.** **Italian:** mother tongue. **English:** fluent, written and spoken. **Spanish:** fluent, written and spoken. **French:** fluent, spoken.

## PREPRINTS AND BOOKS IN PREPARATION.

- (1) G. Audrito, R. Carroy, S. Steila, **M. Viale**, *Iterated forcing, category forcings, generic ultrapowers, generic absoluteness*, book in preparation.
- (2) D. Ikegami, **M. Viale**, *Universally Baire subsets of  $2^\kappa$* , article in preparation.
- (3) D. Asperó, **M. Viale**, *Category forcings*, article submitted, provisional preprint available on arxiv: arXiv:1805.08732.
- (4) G. Venturi, **M. Viale**, *Model completeness for set theory*, article submitted, provisional preprint available on arxiv: arXiv:1909.13372.
- (5) F. Parente, **M. Viale**, *Saturation properties of models obtained by forcing.*, article in preparation.
- (6) M. Pierobon, **M. Viale**, *Sheaves, bundles, and boolean valued models.*, article in preparation.
- (7) **M. Viale**, *Tameness for Set theory I.*, article in preparation, provisional preprint available on arxiv: arXiv:2003.07114.
- (8) **M. Viale**, *Tameness for Set theory II.*, article in preparation, provisional preprint available on arxiv: arXiv:2003.07120.

## CONFERENCE PROCEEDINGS, REVIEWS, SURVEYS.

- G. Venturi, **M. Viale**, *New axioms in set theory*, Mat. Cult. Soc. Riv. Unione Mat. Ital., (I) 3 (2018), no. 3, 211–236.
- M. Viale, *Useful axioms*, Ifcolog Journal of Logics and their Applications, 4(10), 3427-3462, 2017.
- M. Viale, *On the mapping reflection principle MRP*, The Bulletin of Symbolic Logic 15(3), 322-325, 2009.
- M. Viale, *A covering property, PFA and SCH*, Oberwolfach Reports 2(4), 3137-3139, 2005.

## SELECTION OF INVITED TALKS IN INTERNATIONAL MEETINGS.

- *The Kaiser hulls of set theory*, XVe Atelier international de théorie des ensembles, 23 – 27 September 2019, CIRM-Luminy, France.
- *The model companions of set theory* Cantor meets Robinson, 12 – 15 December 2018, University of Campinas, Brazil.
- *Useful axioms* Workshop on Set-theoretical aspects of the model theory of strong logics , 26 – 30 September 2016, CRM, Barcelona, Spain.
- *Category forcing axioms and generic absoluteness for third order arithmetic* Independence Results in Mathematics and Challenges in Iterated Forcing, 2 – 6 November 2015, Norwich, UK.
- *Some results on generic absoluteness*, SLALM 2014, 28 – August 1 2014, Buenos Aires, Argentina.
- *Iterated forcing defined by means of Boolean algebras*, Winter school in Abstract Analysis - Section Set Theory and Topology – 2014 January 27 – February 2 2014, Hejnice, Czech Republic.
- *Absoluteness of the theory of  $MM^{+++}$* , Workshop on Iterated Forcing and Large Cardinals, November 12 – 16 2012, Fields Institute, Toronto, Canada.
- *Forcing with forcings*, Workshop on Forcing Axioms and their Applications, October 22 – 26 2012, Fields Institute, Toronto, Canada.
- *Martin's maximum revisited: Woodin cardinals, forcing axioms,  $\Omega$ -Logic. Part II*, Computational Prospects of Infinity II: Workshop on Set Theory, July 18 – 22 2011, IMS, Singapore.
- *Three Aspects of Gödel's Program: Supercompactness, Forcing axioms,  $\Omega$ -Logic*, New Trends in Logic, April 28 – 29 2011, Vienna, Austria.
- *On the notion of guessing model*, MFO Set Theory Workshop, January 9 – 15 2011, Oberwolfach, Germany.