

## 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 Federico Enriques, (avviso bando pubblicato sulla G.U. n. 30 del 14/04/2020) - Codice concorso 4323.

## CURRICULUM VITÆ

### PERSONAL INFORMATION Luca Motto Ros

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Gender Male | Date of birth November 10th, 1979 | Nationality Italian

### WORK EXPERIENCE

Sep 2017– Present **Associate professor**

University of Turin, Department of Mathematics

Sep 2014 – Sep 2017 **Tenure-track researcher (Ricercatore TD-B)**

University of Turin, Department of Mathematics

Oct 2010 – Sep 2014 **Assistant professor**

University of Freiburg (Germany), Department of Logic

Oct 2007 – Sep 2010 **Post-doc**

Kurt Gödel Research Center for Mathematical Logic, University of Vienna (Austria)

Jan 2004 – Dec 2006 **Ph.D. student in Mathematics (for the Engineering Sciences)**

Polytechnic of Turin (Italy), I Facoltà di Ingegneria

### EDUCATION AND QUALIFICATIONS

Habilitation **Italian national scientific qualification (full professor)**

2017 Sector 01/A1 – Mathematical logic, mathematics education and history of mathematics

Habilitation **German Habilitation and Venia Legendi (Fach Mathematik)**

2014 Awarded by Albert-Ludwigs-Universität Freiburg

- Habilitation** **Italian national scientific qualification** (associate professor)  
 2014 Sector 01/A1 – Mathematical logic, mathematics education and history of mathematics
- Ph.D. degree** **Ph.D. degree in Mathematics** (for the Engineering Sciences)  
 2007 Awarded by Polytechnic of Turin, supervisors: A. Andretta and R. Camerlo
- Degree** **Degree in Mathematics**  
 2003 Awarded by University of Turin, supervisor: A. Andretta

## AWARDS AND HONOURS

- 2020 **Logic Colloquim 2020: Invited plenary speaker**
- 2017 **Paolo Gentilini prize 2017**  
 awarded by AILA (Associazione Italiana di Logica e sue Applicazioni) to “an outstanding young researcher in the field of logic”
- 2015 **XX Congresso dell’UMI: Invited plenary speaker** (short talks)
- 2012 **Career reintegration research grant “Rita Levi Montalcini”**  
 awarded by the Italian Ministry of Education, University and Research (MIUR)
- 2007 **Special mention**  
 for the AILA prize for Ph.D. theses in logic
- 2003 **Medal for the best degree-thesis in mathematics**  
 awarded by the University of Turin

## SCHOLARSHIPS, FELLOWSHIPS, AND RESEARCH FUNDINGS

- 2017 **PRIN project** (PI of the unit of Turin)  
 funded by the Italian Ministry of Education, University and Research (MIUR).  
 Total funding: € 535.895,00
- 2015 **Visiting fellowship** of the Isaac Newton Institute for Mathematical Sciences (Cambridge)  
 Programme *Mathematical, Foundational and Computational Aspects of the Higher Infinite* (organizers: Professor J. Bagaria, Professor M. Dzamonja and Professor B. Löwe)
- 2012 **Career reintegration research grant “Rita Levi Montalcini”** (3 years)  
 awarded by the Italian Ministry of Education, University and Research (MIUR).  
 Total funding: € 189.373,00
- 2007 **Post-Doc Scholarship** (3 years)  
 awarded by the Kurt Gödel Research Center (*Chair*: S. D. Friedman) on behalf of the FWF  
 Wissenschaftsfonds - Austrian Science Fund
- 2004 **Ph.D. Scholarship** (3 years)  
 awarded by the Polytechnic of Turin

## RESEARCH PROJECTS

**Principal Investigator/Coordinator of a local unit** of the following projects:

**PRIN 2017 Mathematical Logic: models, sets, computability**

Progetto di Ricerca di Interesse Nazionale (Project Number 2017NWTM8R), funded by Italian Ministry of Education, University and Research (MIUR), role: PI of the local unit of Turin

*Total co-funding: € 535.895,00*

**Career Reintegration Research Grant New advances in Descriptive Set Theory**

Programma Giovani Ricercatori “Rita Levi Montalcini” 2012, funded by the Italian Ministry of Education, University and Research (MIUR), role: PI

*Total funding: € 189.373,00*

**Local Research Projects Progetti di Ricerca finanziati dall’Università di Torino (ex 60%)**

funded by the University of Turin, role: Coordinator of the logic group from 2014 to 2019

*Total funding: € 29.632,00*

Additionally, I was a **member of the research team** in the following projects:

**2007–2010 Austrian research project:** “*Inner and Outer models, Projective Sets*” (Project Nr. P 19898-N18), funded by FWF (Austria)

**2009 Exchange grant Austria-Russia:** “*Finitary and Infinitary Logic — FWF-RFBR Joint Seminar*” (Project Nr. AJS 328-N18), funded by FWF (Austria)

**2009–2010 Exchange grant Vienna-Prague:** “*Set Theory and its Applications*” (Project Nr. CZ 04/2009), funded by OeAD-GmbH ICM (Austria) and Czech Ministry of Education, Youth and Sports (Czech Republic)

**2009–2010 Exchange grant Vienna-Wrocław:** “*Forcing, Descriptive Set Theory and Equivalence Relations*” (Project Nr. PL 01/2009), funded by OeAD-GmbH ICM (Austria) and Polish Ministry of Science and Higher Education (Poland)

**2011–2013 PRIN2009** (Progetto di Ricerca di Interesse Nazionale): “*Models and sets*” (Project Nr. 2009WY32E8), funded by Italian Ministry of Education, University and Research (Italy)

## SELECTED PAPERS

**22 papers** published since 2009, including the following ones:

**2020** *A descriptive Main Gap Theorem*, accepted for publication on the **Journal of Mathematical Logic**, joint work with F. Mangraviti.

**2019** *Souslin quasi-orders and bi-embeddability of uncountable structures*, accepted for publication on the **Memoirs of the American Mathematical Society**, joint work with A. Andretta.

**2019** *Uncountable structures are not classifiable up to bi-embeddability*, **Journal of Mathematical Logic**, joint work with H. Mildenberger and F. Calderoni

**2018** *On isometry and isometric embeddability between ultrametric Polish spaces*, **Advances in Mathematics**, joint work with R. Camerlo and A. Marcone

**2018** *Universality of group embeddability*, **Proceedings of the American Mathematical Society**, joint work with F. Calderoni

- 2016 *The Hurewicz dichotomy for generalized Baire spaces*, **Israel Journal of Mathematics**, joint work with P. Lücke and P. Schlicht
- 2013 *On the structure of finite level and  $\omega$ -decomposable Borel functions*, **Journal of Symbolic Logic**
- 2013 *The descriptive set-theoretical complexity of the embeddability relation on models of large size*, **Annals of Pure and Applied Logic**
- 2013 *Invariantly universal analytic quasi-orders*, **Transactions of the American Mathematical Society**, joint work with R. Camerlo and A. Marcone
- 2012 *On the complexity of the relations of isomorphism and bi-embeddability*, **Proceedings of the American Mathematical Society**
- 2011 *Analytic equivalence relations and bi-embeddability*, **Journal of Symbolic Logic**, joint work with S. D. Friedman

The full list of my papers and publications can be found in **Annex A**.

## SELECTED TALKS AND CONFERENCES

Since 2007 I gave **more than 60** research talks, in most cases as **invited speaker** in international conferences (33 talks) or logic seminars of other universities (15 talks) such as:

- 2020 Fifth Workshop on Generalised Baire Spaces, *Bristol* (UK)
- 2019 15th International Workshop in Set Theory, *CIRM Luminy* (France)
- 2018 Set theory today: A conference in honor of Georg Cantor, *KGRC Vienna* (Austria)  
 KNAW Academy Colloquium “Generalised Baire Spaces”, *Amsterdam* (The Netherlands)  
 Descriptive set theory conference, *Bernoulli center (EPFL)*, Lausanne (Switzerland)
- 2017 14th International Workshop in Set Theory, *CIRM Luminy* (France)  
 XXVI incontro dell’AILA, *Padua* (Italy)
- 2016 Bonn Set Theory Workshop 2016, *HIM Bonn* (Germany)
- 2015 XX Congresso dell’Unione Matematica Italiana, *Siena* (Italy)
- 2014 INFTY Final Conference, *HIM Bonn* (Germany)  
 Set Theory Workshop, *Mathematisches Forschungsinstitut Oberwolfach* (Germany)
- 2013 6th Young Set Theory Workshop, *Oropa* (Italy)
- 2011 Logic Colloquium 2011 (special session: Set Theory), *Barcelona* (Spain)  
 RaTLCC 2011 — Ramsey Theory in Logic, Combinatorics and Complexity, *Bertinoro* (Italy)
- 2009 ESI Workshop on Large Cardinals and Descriptive Set Theory, *ESI Vienna* (Austria)
- 2008 Descriptive Set Theory in Paris, Institute of Mathematics of Jussieu, *Paris VI* (France)
- 2007 Set Theory Meeting in Amsterdam, *ILLC Amsterdam* (Holland)  
 Set Theory and its neighbours—Analysis and Set Theory II, *University College of London* (UK)

**Annex B** contains a full list of my talks (with more details). **Annex C** contains a list of conferences that I have attended.

## CONFERENCES ORGANIZATION

- Organizer**
- *Descriptive Set Theory Day in Torino*, University of Turin, 12.6.2018
  - *Workshop on Wadge Theory and Automata II*, University of Turin, Italy, 8.6.2018
  - *IIIM 2018 — Incontro Italiano Insiemi e Modelli 2018*, University of Turin, Italy, 21–23.2.2018
  - *Descriptive Set Theory in Turin*, University of Turin, Italy, 6–8.9.2017
  - *P.O.I Workshop in Pure and Descriptive Set Theory*, University of Turin, Italy, 25–26.9.2015
  - *Workshop on Wadge theory and automata*, University of Turin, Italy, 28.1.2015
  - *Set Theory Workshop in Freiburg*, University of Freiburg, Germany, 10–13.6.2014

- Program Committee**
- *8th Young Set Theory Workshop*, Israel Institute of Advanced Studies, Jerusalem, Israel, 25–30.10.2015

- Local Organizing Committee**
- *Meeting on Set Theory and Analysis*, University of Turin, Italy, 10–12.7.2006
  - *Syzygy 2005 — an international Italian Conference in Commutative Algebra and Algebraic Geometry*, Polytechnic of Turin, Italy, 18–20.2.2005

## OTHER SCIENTIFIC ACTIVITIES

- Referee for:** Transactions of the American Mathematical Society, Bulletin of the London Mathematical Society, Journal of Symbolic Logic, Fundamenta Mathematicae, Mathematical Logic Quarterly, Topology and its Applications, Logical Methods in Computer Science, Real Analysis Exchange, Thai Journal of Mathematics, Mathematical Structures in Computer Science, STACS 2010, ICLA 2009, CiE 2008

- Reviewer for:** Mathematical Reviews (MathSciNet), Zentralblatt, Österreichische Mathematische Gesellschaft

## STUDENTS

## Ph.D. degree

- Current:** Vittorio Bard (recursion theory), Claudio Agostini (generalized descriptive set theory)
- Former:**
- Filippo Calderoni, *A descriptive view of the bi-embeddability relation*, 2018
  - Filippo Cavallari, *Regular tree languages in the first two levels of the Borel hierarchy* (co-supervisor: prof. Jacques Duparc, Lausanne), 2018
- Prizes:** Calderoni's thesis was awarded the **Montagna Prize** by the AILA (Associazione Italiana di Logica e sue Applicazioni) and UMI (Unione Matematica Italiana) "for the best doctoral thesis in mathematical logic and its applications that has been defended in the period 2016–2018".

Cavallari's thesis was awarded the **Paul Bernays Award 2018** by the Swiss Society for Logic and Philosophy of Science (SSLPS) as an "outstanding contribution in the area of logic and philosophy of science".

## Master degree

- Current:** Salvatore Scamperti, Monica Barbero, Beatrice Pitton
- Former:**
- Fernando Damiani, *Sull'esistenza di insiemi proiettivi non misurabili* (co-supervisor: prof. C. Bernardi, Rome), University of Rome "La Sapienza", 2016/17
  - Francesco Mangraviti, *The isomorphism relation of classifiable theories*, University of Turin, 2016/17
  - Marco Ratti, *Borel reducibility and the isomorphism problem for separable  $C^*$ -algebras*, University of Turin, 2016/17
  - Riccardo Treglia, *From natural deduction to  $\lambda\mu$ -calculus, and two abstract machines* (co-supervisor: B. Accattoli, INRIA, Paris), University of Turin, 2016/17
  - Martina Iannella, *On the classification of wild proper arcs and knots*, University of Turin, 2017/18
- Prizes:** Mangraviti's thesis was awarded the **Premio AILA 3+2 2018** by the Associazione Italiana di Logica e sue Applicazioni (AILA) for the best Italian master thesis in logic.

## Bachelor degree

Current: Davide Leso (modal logic)

Former:

- Michael Lösch, *Determinacy of Borel-Games*, Albert-Ludwigs-Universität Freiburg, 2013/14
- Jakob Piribauer, *The Wadge hierarchy and the Steel-Van Wesep theorem*, Albert-Ludwigs-Universität Freiburg, 2013/14
- Marco Ratti, *La proprietà dell'insieme perfetto per gli insiemi analitici*, University of Turin, 2014/15
- Monica Barbero, *Equivalence among some classes of finite state automata on infinite words*, University of Turin, 2017/18

## TEACHING EXPERIENCES

2014 – Present

### University of Turin

Ph.D. (Mathematics) *Topics in descriptive set theory, Generalized descriptive set theory*

Master (Mathematics) *Topics in Mathematical Logic (Descriptive Set Theory), Elements of Mathematical Logic (master level)*

Bachelor (Mathematics) *Elements of Mathematical Logic (bachelor level)*

Bachelor (Computer science) *Discrete mathematics and logic*

Bachelor (Chemistry) *Mathematics II*

2010–2014

### Albert-Ludwigs-Universität Freiburg

Ph.D. (Mathematics) Oberseminar *Mengenlehre und Modelltheorie* (assistant)

Master (Mathematics) Courses: *Descriptive Set Theory, Axiomatische Mengenlehre* (assistant)  
Seminars: *Game Theory*,

Bachelor (Mathematics) Courses: *Mathematische Logik* (assistant),  
(Pro)Seminars: *Kombinatorik und Mengenlehre* (assistant), *Forcingtechniken* (assistant), *Einbettungen und bessere Quasiordnungen* (assistant), *Borelmengen und Hierarchien* (assistant), *Mengenlehre* (assistant)

Bachelor (Computer Science) Course: *Logik für Studierende der Informatik* (assistant)

2003–2007

### Polytechnic of Turin

Master (Computer Engineering) *Discrete Mathematics* (assistant)

Bachelor (Computer Engineering) *Mathematical Logic*

## SCIENCE COMMUNICATION AND OTHER TEACHING ACTIVITIES

Invited speaker

- “Da Rat-Man a Math-Man: la matematica di Comics&Science — Misterius” (together with the comics writer Leonardo Ortolani), a public conference addressed to a broad audience (about 350 participants) on popularization of mathematics, Turin, 20.4.2015.
- “Tre mattine all'università — Matematica” (student orientation activity of the Department of Mathematics of the University of Turin), Turin, 23–25.2.2016.
- “PorteAperte” (student orientation activity of the Department of Mathematics of the University of Turin), Turin, 21.3.2016.

Invited lecturer

- Series of four introductory lectures to logic at the University of Milano-Bicocca (together with Riccardo Camerlo), Milan, May 2016.
- Course on set theory at the “Scuola Estiva di Logica 2016”, Gargnano (Bs), 22–27.8.2016.
- “Bravinricerca” (addressed to high school students interested in scientific themes), Liceo Giolitti-Gandino, Bra (To), 17.3.2017.
- Series of four introductory lectures to logic at the University of Milano-Bicocca (together with Riccardo Camerlo), Milan, May 2019.
- Course “La logica del punto di vista matematico” at the “IANUA Summer School 2019”, Genoa, 11.7.2019.

## ADDITIONAL INFORMATION

Since 2015 I am serving as a member of the **Research Committee** of the Mathematics Department of the University of Turin.

I am currently a member of the following mathematical organizations:

ASL (*Association for Symbolic Logic*), ESTS (*European Set Theory Society*),  
AILA (*Associazione Italiana di Logica e sue Applicazioni*), UMI (*Unione Matematica Italiana*),  
INdAM (*Istituto Nazionale di Alta Matematica*, gruppo GNSAGA).



## Annex A: Papers and publications

### Published

1. *A new characterization of the Baire class 1 functions*, Real Analysis Exchange **34** (2008/2009), no. 1, 29–48 (20 pages).
2. *Borel-amenable Reducibilities for Sets of Reals*, Journal of Symbolic Logic **74** (2009), no. 1, 27–49 (23 pages).
3. *Baire reductions and good Borel reducibilities*, Journal of Symbolic Logic **75** (2010), no. 1, 323–345 (23 pages).
4. *A new proof of a theorem of Jayne and Rogers*, joint work with B. Semmes, Real Analysis Exchange **35** (2010), no. 1, 195–203 (9 pages).
5. *Beyond Borel-amenable: Scales and Superamenable Reductions*, Annals of Pure and Applied Logic **161** (2010), no. 7, 829–836 (8 pages).
6. *Game representations of classes of piecewise definable functions*, Mathematical Logic Quarterly **57** (2011), no. 1, 95–112 (18 pages).
7. *Analytic equivalence relations and bi-embeddability*, joint work with S. D. Friedman, Journal of Symbolic Logic **76** (2011), no. 1, 243–266 (24 pages).
8. *On the complexity of the relations of isomorphism and bi-embeddability*, Proceedings of the American Mathematical Society **140** (2012), no. 1, 309–323 (15 pages).
9. *Invariantly universal analytic quasi-orders*, joint work with R. Camerlo and A. Marcone, Transactions of the American Mathematical Society **365** (2013), no. 4, 1901–1931 (31 pages).
10. *Some observations on “A new proof of a theorem of Jayne and Rogers”*, joint work with M. Kačena and Brian Semmes, Real Analysis Exchange **38** (2012/2013), no. 1, 121–132 (12 pages).
11. *The descriptive set-theoretical complexity of the embeddability relation on models of large size*, Annals of Pure and Applied Logic **164** (2013), 1454–1492 (39 pages).
12. *On the structure of finite level and  $\omega$ -decomposable Borel functions*, Journal of Symbolic Logic **78** (2013), no. 2, 1257–1287 (31 pages).
13. *Bad Wadge-like reducibilities on the Baire space*, Fundamenta Mathematicae **224** (2014), no. 1, 67–95 (29 pages).
14. *Lipschitz and uniformly continuous reducibilities on ultrametric Polish spaces*, joint work with P. Schlicht, in: V. Brattka, H. Diener, and D. Spreen (Eds.), *Logic, Computation, Hierarchies*, Ontos Mathematical Logic **4**, de Gruyter, Berlin, Boston, 2014, pp. 213–258 (46 pages).
15. *Wadge-like reducibilities on arbitrary quasi-Polish spaces*, joint work with Philipp Schlicht and Victor Selivanov, Mathematical Structures in Computer Science **25** (2015), Special Issue 08, 1705–1754 (50 pages).
16. *The Hurewicz dichotomy for generalized Baire spaces*, joint work with P. Lücke and P. Schlicht, Israel Journal of Mathematics **216** (2016), no. 2, 973–1022 (50 pages).
17. *Can we classify complete metric spaces up to isometry?*, Bollettino dell'Unione Matematica Italiana **10** (2017), no. 3, 369–410 (42 pages).
18. *Universality of group embeddability*, joint work with F. Calderoni, Proceedings of the American Mathematical Society **146** (2018), no. 4, 1765–1780 (16 pages).
19. *On isometry and isometric embeddability between ultrametric Polish spaces*, joint work with R. Camerlo and A. Marcone, Advances in Mathematics **329** (2018), 1231–1284 (53 pages).
20. *Uncountable structures are not classifiable up to bi-embeddability*, joint work with H. Mildenberger and F. Calderoni, Journal of Mathematical Logic **20** (2020), no. 1, 2050001 (49 pages).
21. *Souslin quasi-orders and bi-embeddability of uncountable structures*, joint work with A. Andretta, accepted for publication on the Memoirs of the American Mathematical Society, 2019, (160 pages).
22. *A descriptive Main Gap Theorem*, joint work with F. Mangraviti, accepted for publication on the Journal of Mathematical Logic, 2020, (34 pages).
23. *Polish metric spaces with fixed distance set*, joint work with R. Camerlo and A. Marcone, accepted for publication on the Annals of Pure and Applied Logic (26 pages).



## Preprints

24. *Classification problems from the descriptive set theoretical perspective*, submitted (26 pages).

## Theses

1. *Metodi effettivi in teoria degli insiemi: la topologia di Gandy-Harrington*, degree thesis, University of Turin, 2003, advisor: A. Andretta (University of Turin);
2. *General reducibilities for sets of reals*, Ph.D. thesis, Polytechnic of Turin, 2007, advisors: A. Andretta (University of Turin) and R. Camerlo (Polytechnic of Turin);
3. *Hierarchies of complexity for sets, functions, and binary relations*, Habilitationsschrift (thesis for obtaining the German habilitation), Albert-Ludwigs-Universität Freiburg, 2014.

## Annex B: Talks and conferences

(in reverse chronological order)

### Invited talks at conferences and meetings

1. *A descriptive main gap theorem*, Fifth Workshop on Generalised Baire Spaces, Bristol, 4.2.2020;
2. *A descriptive main gap theorem*, SQuID 2019: a Short, Quite Informal Day in logic, Genoa, 18.12.2019;
3. *Towards the “right” generalization of descriptive set theory to uncountable cardinals*, 15th International Workshop in Set Theory, CIRM, Luminy, 26.9.2019;
4. *Quanti sono? Contare e classificare*, Educare alla razionalità: L'insegnamento della matematica e della logica nella scuola secondaria, Turin, 22.5.2019;
5. *Classical descriptive set theory, generalized descriptive set theory, and  $\mathcal{I}_0$* , Set theory today: A conference in honor of Georg Cantor, Kurt Gödel Research Center, Vienna, 11.9.2018;
6. *Generalized descriptive set theory under  $\mathcal{I}_0$* , KNAW Academy Colloquium “Generalised Baire Spaces”, Amsterdam, 23.8.2018;
7. *Polish metric spaces with fixed distance set*, Descriptive set theory conference, Bernoulli center (EPFL), Lausanne, 21.6.2018;
8. *Generalized descriptive set theory and classification*, 14th International Workshop in Set Theory, CIRM, Luminy, 11.10.2017;
9. *Borel reducibility and its relatives*, XXVI incontro dell'AILA, Padua, 27.9.2017;
10. *When Borel reducibility is not enough...*, SGSLPS 2017 Spring meeting on “Borel Reducibility of Equivalence Relations”, Lausanne, 29.5.2017;
11. *Generalized descriptive set theory and the classification of uncountable structures and non-separable spaces* (Tutorial), Bonn Set Theory Workshop 2016: Generalized Baire spaces, Hausdorff Research Institute for Mathematics (HIM), University of Bonn, 21–22.12.2016;
12. *On isometry and isometric embeddability between (ultra)metric Polish spaces*, Descriptive Set Theory in Paris, Institute of Mathematics of Jussieu, Pierre and Marie Curie University, Paris VI, 7.12.2015;
13. *On the classification of separable complete metric spaces up to isometry*, XX Congresso dell'Unione Matematica Italiana, University of Siena, 8.9.2015;
14. *The Hurewicz dichotomy for generalized Baire spaces*, Amsterdam Workshop on Set Theory 2014, Amsterdam, 3.11.2014;
15. *Towards a descriptive set theory for computer science*, INFTY Final Conference, Hausdorff Research Institute for Mathematics (HIM), University of Bonn, 4.3.2014;
16. *On the descriptive set-theoretical complexity of the embeddability relation between uncountable models*, Set Theory Workshop (ID 1403), Mathematisches Forschungsinstitut Oberwolfach, Germany, 15.1.2014;
17. *Lipschitz and uniformly continuous reducibilities*, Descriptive Set Theory in Paris, Institute of Mathematics of Jussieu, Pierre and Marie Curie University, Paris VI, 17.12.2013;
18. *Wadge-like reducibilities on arbitrary quasi-Polish spaces: a survey*, Seminar “Duality in Computer Science”, Leibniz-Zentrum für Informatik, Dagstuhl, Germany, 1.8.2013;
19. *On the invariant universality property*, Sy David Friedman's 60th Birthday Conference, Kurt Gödel Research Center, Vienna, 8.7.2013;
20. *On the complexity of the embeddability relation between uncountable models*, 6th Young Set Theory Workshop, Santuario di Oropa, Italy, 13.6.2013;
21. *On the structure of finite level and  $\omega$ -decomposable Borel functions*, Descriptive Set Theory in Paris, Institute of Mathematics of Jussieu, Pierre and Marie Curie University, Paris VI, 11.12.2012;
22.  *$\kappa$ -Souslin quasi-orders and definable cardinality*, Descriptive Set Theory in Paris, Institute of Mathematics of Jussieu, Pierre and Marie Curie University, Paris VI, 12.12.2011;
23. *Reduction games and reducibilities for sets of reals*, Seminar “Computing with Infinite Data: Topological and Logical Foundations”, Leibniz-Zentrum für Informatik, Dagstuhl, Germany, 13.10.2011;

24. *Quasi-ordini  $\kappa$ -Souslin*, XIX Congresso dell'Unione Matematica Italiana, Alma Mater Studiorum — Università di Bologna, September 15 2011 (selected as speaker of a 30-minutes-communication in the section of logic as best young Italian logician);
25. *The descriptive set theoretical complexity of the embeddability relation on uncountable models*, Logic Colloquium 2011, Barcelona, 13.7.2011;
26. *Embeddability as a “universal” quasi-order*, RaTLoCC 2011 — Ramsey Theory in Logic, Combinatorics and Complexity, Bertinoro, Italy, 27.5.2011;
27. *Variations on reducibilities for analytic equivalence relations*, Informal Meeting in Set Theory, University of Turin, 13.11.2010;
28. *Isomorphism and bi-embeddability*, Descriptive Set Theory in Paris, Institute of Mathematics of Jussieu, Pierre and Marie Curie University, Paris VI, 14.12.2009;
29. *A universality property for analytic equivalence relations and quasi-orders*, ESI Workshop on Large Cardinals and Descriptive Set Theory, ESI, Vienna, 23.6.2009;
30. *Analytic equivalence relations and bi-embeddability*, Descriptive Set Theory in Paris, Institute of Mathematics of Jussieu, Pierre and Marie Curie University, Paris VI, 15.12.2008;
31. *A dichotomy theorem for Borel reducibilities*, Set Theory Meeting in Amsterdam in August 2007, ILLC — University of Amsterdam, 13.8.2007;
32. *General Reducibilities for Sets of Reals*, Set Theory and its neighbours — Analysis and Set Theory II, University College of London, 20.4.2007;
33. *La complessità degli insiemi di reali: riduzioni Boreliane*, IIIM — Incontro Italiano Insiemi e Modelli, University of Turin, 4.4.2007.

## Invited research seminars in other universities

34. *A descriptive main gap*, Logic seminar, University of Münster, 7.6.2019;
35. *Ultrametric spaces, isometry, and isometry groups*, Oberseminar Mathematische Logik, Albert-Ludwigs-Universität, Freiburg im Breisgau, 17.5.2017;
36. *Ultrametric spaces, isometry, and isometry groups*, KGRC Seminar talks, University of Vienna, 30.03.2017;
37. *Sul problema dell'isomorfismo tra spazi di funzioni di Baire classe  $\alpha$* , University of Turin, 21.2.2014;
38. *Uniformly continuous and Lipschitz reducibilities on ultrametric Polish spaces*, Oberseminar Mathematische Logik, Rheinische Friedrich-Wilhelms-Universität, Bonn, 25.11.2013;
39. *Wadge-like reducibilities on ultrametric Polish spaces*, Seminarium Teoria Mnogości (Set Theory Seminar), University of Warsaw, 15.5.2013;
40. *The embeddability relation on models of size  $\kappa$  is (strongly) invariantly universal when  $\kappa^{<\kappa} = \kappa$* , Oberseminar Mathematische Logik, Rheinische Friedrich-Wilhelms-Universität, Bonn, 17.12.2012;
41. *Gerarchia di Wadge (e sue varianti) su spazi quasi-Polacchi*, University of Turin, 18.11.2011;
42. *Invariantly universal analytic quasi-orders*, KGRC Seminar talks, University of Vienna, 14.10.2010;
43. *Quasi-ordini analitici invariantemente universali*, Seminars of the DiMI, University of Udine, 3.6.2010;
44. *Quasi-ordini invariantemente universali*, University of Turin, 14.5.2010;
45. *Relazioni di equivalenza analitiche e bi-immersione*, Seminars of the DiMI, University of Udine, 22.4.2009;
46. *Analytic equivalence relations and bi-embeddability*, University of Turin, 28.11.2008;
47. *Degree-structures induced by good Borel reducibilities*, Seminar of the “Equipe d'Analyse Fonctionnelle”, Institute of Mathematics of Jussieu, Pierre and Marie Curie University, Paris VI, 20.5.2008;
48. *La complessità degli insiemi di reali: giochi e riduzioni*, Seminars of the DiMI, University of Udine, 19.12.2006.

## Other (contributed) talks and seminars

49. *Sulle relazioni di isometria e immersione isometrica tra spazi Polacchi (ultra)metrici*, Advanced seminars of the logic group, University of Turin, 2.3.2015–4.5.2015;

50. *Introduction to Wadge theory*, tutorial in preparation for the Workshop on Wadge theory and automata, University of Turin, 26.1.2015;
51. *All automorphisms of the Calkin algebra are inner (by I. Farah)*, wissenschaftlichen Vortrag for the German Habilitation, Albert-Ludwigs-Universität, Freiburg im Breisgau, 10.7.2014;
52. *The Hurewicz dichotomy for generalized Baire spaces*, AILA — XXV Incontro di Logica, Scuola Normale Superiore, Pisa, 14.4.2014;
53. *Bad Wadge-like reducibilities on the Baire space*, Oberseminar Mathematische Logik, Albert-Ludwigs-Universität, Freiburg im Breisgau, 5.2.2014;
54. *On the invariant universality property*, Mathematische Kolloquium, Vorstellungsvortrag for the German Habilitation, Albert-Ludwigs-Universität, Freiburg im Breisgau, 6.6.2013;
55. *Wadge-like reducibilities on arbitrary (quasi-)Polish spaces*, Oberseminar Mathematische Logik, Albert-Ludwigs-Universität, Freiburg im Breisgau, 5.12.2012;
56. *On an old question of Luzin concerning countably continuous Borel functions*, Oberseminar Mathematische Logik, Albert-Ludwigs-Universität, Freiburg im Breisgau, 23.5.2012;
57. *The descriptive set-theoretical complexity of the embeddability relation*, Oberseminar Mathematische Logik, Albert-Ludwigs-Universität, Freiburg im Breisgau, 7.12.2011;
58. *Sulla complessità delle relazioni di isomorfismo e bi-immersione*, AILA — XXIV Incontro di Logica, Bologna, 2.2.2011;
59. *On the complexity of the relations of isomorphism and bi-embeddability*, KGRC Seminar talks, University of Vienna, 28.1.2010;
60. *Analytic equivalence relations and bi-embeddability*, KGRC Seminar talks, University of Vienna, 4.12.2008;
61. *Good Borel reducibilities for sets of reals*, KGRC Seminar talks, University of Vienna, 17.4.2008;
62. *Una congettura di dicotomia per le riduzioni Boreliane*, AILA — XXIII Incontro di Logica, Genoa, 23.2.2008;
63. *Generalizations of Wadge degrees*, KGRC Seminar talks, University of Vienna, 11.10.2007;
64. *General Reducibilities for Sets for Reals*, contributed talk for the Logic Colloquium 2007, Wrocław, Poland, 15.7.2007.

## Annex C: Participation in conferences

(in reverse chronological order)

### Conferences with only invited scholars

1. *15th International Workshop in Set Theory*, CIRM (Luminy), France, 23–27.9.2019;
2. *14th International Workshop in Set Theory*, CIRM (Luminy), France, 9–13.10.2017;
3. *Descriptive Set Theory in Turin*, University of Turin, Italy, 6–8.9.2017;
4. *Current Trends in Descriptive Set Theory*, Erwin Schrödinger International Institute for Mathematical Physics, Vienna, Austria, 12–16.12.2016;
5. *Bonn Set Theory Workshop 2016: Generalized Baire spaces*, Hausdorff Research Institute for Mathematics (HIM), University of Bonn, Germany, 21–22.12.2016 (invited speaker for a tutorial);
6. *Descriptive Set Theory in Paris*, Institute of Mathematics of Jussieu, Pierre and Marie Curie University, Paris VI, France, 7–8.12.2015;
7. *Descriptive Set Theory in Paris*, Institute of Mathematics of Jussieu, Pierre and Marie Curie University, Paris VI, France, 8–9.12.2014;
8. *Set Theory Workshop (ID 1403)*, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany, 12–18.1.2014;
9. *Descriptive Set Theory in Paris*, Institute of Mathematics of Jussieu, Pierre and Marie Curie University, Paris VI, France, 16–17.12.2013;
10. *Duality in Computer Science*, Leibniz-Zentrum für Informatik, Schloss Dagstuhl, Germany, 29.7.2013–2.8.2013;
11. *Sy David Friedman's 60th Birthday Conference*, Kurt Gödel Research Center, Vienna, Austria, 8–12.7.2013;
12. *Descriptive Set Theory in Paris*, Institute of Mathematics of Jussieu, Pierre and Marie Curie University, Paris VI, France, 10–11.12.2012;
13. *Descriptive Set Theory in Paris*, Institute of Mathematics of Jussieu, Pierre and Marie Curie University, Paris VI, France, 12–13.12.2011;
14. *Computing with Infinite Data: Topological and Logical Foundations*, Leibniz-Zentrum für Informatik, Schloss Dagstuhl, Germany, 09–14.10.2011;
15. *RaTLoCC 2011 — Ramsey Theory in Logic, Combinatorics and Complexity*, University Residential Center, Bertinoro (Forlì-Cesena), Italy, 22–27.5.2011;
16. *Descriptive Set Theory in Paris*, Institute of Mathematics of Jussieu, Pierre and Marie Curie University, Paris VI, France, 13–14.12.2010;
17. *Descriptive Set Theory in Paris*, Institute of Mathematics of Jussieu, Pierre and Marie Curie University, Paris VI, France, 14–15.12.2009;
18. *Second European Set Theory Meeting: in honor of Ronald Jensen*, Mathematical Research and Conference Center, Będlewo, Poland, 5–10.7.2009;
19. *ESI Workshop on Large Cardinals and Descriptive Set Theory*, Erwin Schrödinger International Institute for Mathematical Physics, Vienna, Austria, 14–27.6.2009 (invited speaker);
20. *Descriptive Set Theory in Paris*, Institute of Mathematics of Jussieu, Pierre and Marie Curie University, Paris VI, France, 15–16.12.2008.

### Other conferences and meetings

21. *Fifth Workshop on Generalised Baire Spaces*, University of Bristol, England, 2–4.2.2020 (invited speaker);
22. *SQuID 2019: a Short, Quite Informal Day in logic*, University of Genoa, Italy, 18.12.2019 (invited speaker);

23. *XXI Congresso dell'Unione Matematica Italiana*, University of Pavia, Italy, 2–7.9.2019;
24. *Educare alla razionalità. L'insegnamento della matematica e della logica nella scuola secondaria*, University of Turin, Italy, 22–23.5.2019 (invited speaker);
25. *Set theory today: A conference in honor of Georg Cantor*, Kurt Gödel Research Center, Vienna, Austria, 10–14.9.2018 (invited speaker);
26. *Generalised Baire spaces*, Amsterdam, The Netherlands, 23–24.8.2018 (invited speaker);
27. *Descriptive set theory conference*, Bernoulli center (EPFL), Lausanne, Switzerland, 18–22.6.2018 (invited speaker);
28. *IIIM 2018 — Incontro Italiano Insieme e Modelli 2018*, University of Turin, Italy, 21–23.2.2018;
29. *XXVI incontro dell'AILA*, Padua, Italy, 25–28.9.2017 (invited speaker as winner of the Paolo Gentilini prize 2017);
30. *SGSLPS 2017 Spring meeting on "Borel Reducibility of Equivalence Relations"*, Lausanne, Switzerland, 29.5.2017 (invited speaker);
31. *P.O.I Workshop in Pure and Descriptive Set Theory*, University of Turin, Italy, 25–26.9.2015;
32. *XX Congresso dell'Unione Matematica Italiana*, University of Siena, Italy, 7–12.9.2015 (invited plenary speaker for a short talk);
33. *Workshop on Wadge theory and automata*, University of Turin, Italy, 28.1.2015;
34. *Amsterdam Workshop on Set Theory 2014 — Generalized Baire Space*, Amsterdam, The Netherlands, 3–4.11.2014 (invited speaker);
35. *Set Theory Workshop in Freiburg*, Freiburg im Breisgau, Germany, 10–13.6.2014;
36. *AILA — XXV Incontro di Logica*, Scuola Normale Superiore, Pisa, Italy, 14–17.4.2014;
37. *INFTY Final Conference*, Hausdorff Research Institute for Mathematics (HIM), University of Bonn, Germany, 4–7.3.2014 (invited speaker);
38. *6th Young Set Theory Workshop*, Santuario di Oropa, Italy, 10–14.6.2013 (invited speaker);
39. *XIX Congresso dell'Unione Matematica Italiana*, Mathematics Department, Alma Mater Studiorum — University of Bologna, Italy, 12–17.9.2011 (selected as speaker of a 30-minutes-communication in the section of logic as the best young Italian logician);
40. *Logic Colloquium 2011*, Barcelona, Spain, 11–16.7.2011 (invited speaker at the special session in Set Theory);
41. *AILA — XXIV Incontro di Logica*, Bologna, Italy, 2–4.2.2011;
42. *Informal Meeting in Set Theory*, University of Turin, Italy, 13.11.2010 (invited speaker);
43. *AILA — XXIII Incontro di Logica*, Genova, Italy, 20–23.2.2008;
44. *Set Theory Meeting in Amsterdam in August 2007*, ILLC — University of Amsterdam, the Netherlands, 13.8.2007 (invited speaker);
45. *Logic Colloquium 2007*, Wrocław, Poland, 14–19.7.2007;
46. *Set Theory and its neighbours — Analysis and Set Theory II*, University College of London, England, 20.4.2007 (invited speaker);
47. *IIIM — Incontro Italiano Insieme e Modelli*, University of Turin, Italy, 2–4.4.2007;
48. *Meeting on Set Theory and Analysis*, University of Turin, Italy, 10–12.7.2006;
49. *Syzygy 2005 — an international Italian Conference in Commutative Algebra and Algebraic Geometry*, Polytechnic of Turin, Italy, 18–20.2.2005.

Data: 14 maggio 2020

Luogo: Torino