Giorgio Audrito

Curriculum Vitae

Education and research

01/01/2016–31/12/2017	**Research assistant on *"Formal methods for the Internet of Things"***, *Università degli Studi di Torino*.
02/03/2016	**Ph.D. in Mathematics *(logic and set theory)***, *Università degli Studi di Torino*.
01/01/2015-31/12/2016	**Research assistant on *"Design and development of algorithms and data structures for compressed data, with applications"***, *Università degli Studi di Pisa*.
06/04/2011	**Master of Science in Mathematics**, *Università degli Studi di Torino*, grade 110/110 cum laude and honorable mention.
07/10/2008	**Bachelor's degree in Mathematics**, *Università degli Studi di Torino*, grade 110/110 cum laude.
14/07/2005	**Scientific PNI (National Plan for Informatics) High School Diploma**, *Liceo scientifico "M. Curie"*, Pinerolo, grade 100/100.

non-scientific education

2007–2011	**Diplomas in Composition, Piano, Organ and first grade in Violin**, *Conservatorio "G. Verdi"*, Torino.

PhD thesis

Title	*Generic large cardinals and absoluteness.*
Advisor	Matteo Viale
Abstract	The thesis develops on two different but connected topics. The first one concerns the issue of definability of generic large cardinal axioms. The novel notion of $\mathcal{C}$-system of filters is introduced, generalizing the standard definitions of extenders and towers and simplifying the classical treatment of the subject. The second one concerns how to obtain strong forms of generic absoluteness from forcing axioms of low consistency strength, the novel *iterated resurrection axioms*.

Master's thesis

Title	*Characterization of set-generic extensions.*
Advisor	Matteo Viale
Abstract	The thesis concerns the topic of definability of forcing extensions (theorems by Laver, Bukovsky, Friedman) and Ground Axiom by means of combinatoric properties, producing a model $\overline{M}^\kappa$ that is minimal with respect to some of this properties.

Bachelor's thesis

Title	*Non-linearity, Helmoltz theories and sound perception.*
Advisor	Guido Magnano
Abstract	The thesis develops Helmoltz theories on dissonance and non-linearity effects in the eardrum, finding a link between them and with the asymmetric shape of the eardrum.

Publications

peer-reviewed journals

- *Maximizing the Overall End-User Satisfaction of Data Broadcast in Wireless Mesh Networks.* Giorgio Audrito, Alan A. Bertossi, Alfredo Navarra, Cristina M. Pinotti. *Journal of Discrete Algorithms* 45C, pp. 14–25, Elsevier, 2017. DOI: 10.1016/j.jda.2017.07.002.

- *Absoluteness via Resurrection.* Giorgio Audrito, Matteo Viale. *Journal of Mathematical Logic* 17(2), World Scientific, 2017. DOI: 10.1142/S0219061317500052.

- *Generic Large Cardinals and Systems of Filters.* Giorgio Audrito, Silvia Steila, Matteo Viale. *Journal of Symbolic Logic* 82(3), pp. 860–892, Cambridge University Press, 2017. DOI: 10.1017/jsl.2017.27.

- *Enumeration of the adjunctive hierarchy of hereditarily finite sets.* Giorgio Audrito, Alexandru I. Tomescu, Stephan Wagner. *Journal of Logic and Computation* 25(3), pp. 943–963, Oxford University Press, 2015. DOI: 10.1093/logcom/exu062.

peer-reviewed proceedings

- *Aggregate Graph Statistics.* Giorgio Audrito, Ferruccio Damiani, Mirko Viroli. *to appear in HTML form on EPTCS online, ALP4IoT workshop, iFM conference*, 2017.

- *Resilient Blocks for Summarising Distributed Data.* Giorgio Audrito, Sergio Bergamini. *to appear in HTML form on EPTCS online, ALP4IoT workshop, iFM conference*, 2017.

- *Compositional Blocks for Optimal Self-Healing Gradients.* Giorgio Audrito, Roberto Casadei, Ferruccio Damiani, Mirko Viroli. *11th IEEE International Conference on Self-Adaptive and Self-Organizing Systems*, pp. 91–100, 2017. DOI: 10.1109/SASO.2017.18.

- *Optimally-Self-Healing Distributed Gradient Structures through Bounded Information Speed.* Giorgio Audrito, Ferruccio Damiani, Mirko Viroli. *International Conference on Coordination Languages and Models*, Lecture Notes in Computer Science 10319, pp. 59–77, Springer, 2017. DOI: 10.1007/978-3-319-59746-1_4.

- *Run-time Management of Computation Domains in Field Calculus.* Giorgio Audrito, Ferruccio Damiani, Mirko Viroli, Roberto Casadei. *IEEE International Workshops on Foundations and Applications of Self* Systems*, pp. 192–197, 2016. DOI: 10.1109/FAS-W.2016.50.

- *Optimal Skewed Allocation on Multiple Channels for Broadcast in Smart Cities.* Giorgio Audrito, Daniele Diodati, Cristina M. Pinotti. *IEEE International Conference on Smart Computing*, pp. 1–8, 2016. DOI: 10.1109/SMARTCOMP.2016.7501711.

- *The role of contests in changing informatics education, a local view.* Giorgio Audrito, G. Barbara Demo, Elio Giovannetti. *Olympiads in Informatics*, 2012.

books

- *Esplorazione dei solidi e oltre: fare geometria con gli Zometool.* Giorgio Audrito, Ubertino Battisti, Massimo Borsero, Alberto Raffero, Saverio Tassoni, Luisa Testa, edited by Ornella Robutti. *Ledizioni*, 2016. ISBN: 9788867054114.

- *Dispense di matematica olimpionica.* Andrea Astolfi, Giorgio Audrito, Alberto Carignano, Fabio Tanturri. *Quaderni di matematica dell'associazione subalpina Mathesis*, 2010. Available at: www.dmi.units.it/divulgazione/matCultSoc/olimpia10/gomut/dispense_olimpioniche.pdf

book chapters

- *Le olimpiadi di informatica in Italia.* Giorgio Audrito, Romeo Rizzi. In "Vedere la matematica... alla maniera di Mimmo Luminati", *ETS - Pisa*, 2015. ISBN: 9788846742797.

Lecture notes

- *A Boolean Algebraic Approach to Semiproper Iterations.* Matteo Viale, Giorgio Audrito, Silvia Steila. *arXiv:1402.1714*, 2014.
- *An introduction to forcing axioms, SRP and OCA.* Giorgio Audrito, Gemma Carotenuto. *arXiv:1412.3652*, 2012.

Future works

submitted

- *Engineering Resilient Collective Adaptive Systems by Self-Stabilisation.* Mirko Viroli, Giorgio Audrito, Jacob Beal, Ferruccio Damiani, Danilo Pianini. Second round of revisions, *ACM Transactions on Modeling and Computer Simulation*, 2017.
- *A Higher-order Calculus of Computational Fields.* Mirko Viroli, Giorgio Audrito, Ferruccio Damiani, Danilo Pianini, Jacob Beal. Second round of revisions, *ACM Transactions on Computational Logic*, arXiv:1610.08116, 2017.
- *Iterated forcing, category forcings, generic ultrapowers, generic absoluteness.* Matteo Viale, Giorgio Audrito, Silvia Steila, Raphaël Carroy. Submitted to *Perspectives in Logic*, 2017.

work in progress

- *SCAFI: a Scala implementation of higher-order field calculus.* Roberto Casadei, Mirko Viroli, Giorgio Audrito, Ferruccio Damiani.
- *Information Flow Statistics in Round-based Networks.* Giorgio Audrito.
- *Real-time Constraints over Aggregate Computing: the Potential Case.* Giorgio Audrito, Ferruccio Damiani, Mirko Viroli, Enrico Bini.
- *Pure Field Calculus: an Universal Language for Spatial Computing.* Giorgio Audrito, Ferruccio Damiani, Mirko Viroli.
- *Space-Time Turing Universality through Field Calculus.* Giorgio Audrito, Jacob Beal, Ferruccio Damiani, Mirko Viroli.
- *Recursive Solving of Parity Games with Memoization.* Giorgio Audrito, Romeo Rizzi.
- *Faster Polynomial Algorithms for Special Parity Games.* Giorgio Audrito, Romeo Rizzi.
- *Batch Incremental Cycle Detection.* Giorgio Audrito, Romeo Rizzi.
- *Iteration Strategies for Quasi-polynomial Solving of Parity Games.* Giorgio Audrito, Massimo Cairo, Romeo Rizzi.
- *Speeding Up Dynamic Programming with the Shuffled Monge Condition.* Giorgio Audrito, Paolo Ferragina, Raffaele Giancarlo, Rossano Venturini.

Honours and awards

2017	Best Paper of COORDINATION, with *Optimally-Self-Healing Distributed Gradient Structures through Bounded Information Speed*.
2008	First place in the national competition for scholarships *INdAM* for master's degree.
2005	First place in the national competition for scholarships *INdAM* for bachelor's degree.
2004–2005	Bronze medal at the *International Olympiads in Informatics*, both editions 2004 (Athens – GR) and 2005 (Nowi Sacz – PL).
2002–2005	Two gold medals, one silver medal and a honorable mention at the *Italian Mathematical Olympiads*, Cesenatico – IT.
2004–2005	Second place in the regional edition of the *Italian Physics Olympiads*, both years.

Teaching and popularization experiences

university teaching

2016/17– 2017/18	Adjunct Professor for the *Object-Oriented Programming* course. *Computer Science* major, Università del Piemonte Orientale (Vercelli). upobook.uniupo.it/personale/1486.
2017/18	Co-supervisor for the Bachelor thesis of Sergio Bergamini and Luca Serena. *Computer Science* major, Università degli Studi di Torino.
2016/17	Teaching assistant "articolo 76" for the *Informatics* course. *Mathematics for Finance and Insurance* major, Università degli Studi di Torino.
2011/12	Teaching assistant "articolo 33" for the *University Orientation* course for high-school students. *Computer Science* major, Università degli Studi di Torino.
2010/11	Teaching assistant "articolo 13" for the *University Orientation* course for high-school students. *Computer Science* major, Università degli Studi di Torino.

olympiads in informatics

2014–present	Organizer of the *OIS (Team Olympiads in Informatics)*, a national-level competition.
2013–present	Team leader at the *International Olympiads in Informatics*, ed. 2013 (Brisbane – AU), 2014 (Taipei – TW), 2015 (Almaty – KZ), 2016 (Kazan – RU), 2017 (Tehran – IR).
2006–present	Teaching assistant in national-level olympic informatics classes, Università di Pisa.
2017	Organizer of the first edition of the *IOIT (International Olympiads in Informatics in Teams)*, an international-level competition, Bologna – IT.

olympiads in mathematics

2014–2016	Lecturer and organizer for project PLSTO10 in *"Piano Lauree Scientifiche" (scientific degrees plan)*, a national program for scientific education in high schools.
2006–2014	Teacher in olympic mathematic classes, Associazione Subalpina Mathesis.

Conference organization

2017	Local Organization Co-Chair at iFM 2017 (`ifm2017.di.unito.it`), Torino – IT.
2017	AEC (Artifact Evaluation Committee) member at the OOPSLA track, SPLASH 2017 (`2017.splashcon.org`), Vancouver – CA.
2017	PC member at the ALP4IoT workshop, iFM 2017 conference, Torino – IT. `http://apice.unibo.it/xwiki/bin/view/ALP4IoT2016/WebHome`
2017	PC member at the eCAS workshop, SASO 2017 conference, Tucson – US. `ecas2017.apice.unibo.it`
2013	Local Organizer at the *Young Set Theory Workshop*, an international 5-days conference with around 90 participants.

Presentations

18/09/2017	*Aggregate Graph Statistics*, to be held at the *ALP4IoT* workshop, iFM, Torino – IT. `apice.unibo.it/xwiki/bin/view/ALP4IoT2016/WebHome`.
19/06/2017	*Optimally-Self-Healing Distributed Gradient Structures through Bounded Information Speed*, *COORDINATION* track, DisCoTec, Neuchâtel – CH. `2017.discotec.org/program`.
19/04/2017	*Memoization of Parity Games: a practical proposal*, *Seminari del Dipartimento di Informatica*, Verona – IT. `www.di.univr.it/?ent=seminario&id=3956`.
12/09/2016	*Run-time Management of Computation Domains in Field Calculus*, *eCAS* workshop, SASO, FAS*, Augsburg – DE. `http://apice.unibo.it/xwiki/bin/view/ECAS2016/Program`.
28/10/2015	*Systems of Filters*, poster, *Young Set Theory Workshop* conference, Jerusalem – IL.
08/09/2015	*Generic absoluteness and resurrection axioms*, *XX congresso dell'UMI*, Siena – IT. `umi.dm.unibo.it/congresso2015/programma`.
01/02/2015	*Resurrection axioms and generic absoluteness*, *Winterschool in Abstract Analysis*, Hejnice – CZ. `www.winterschool.eu/2015/program`.
18/08/2014	*Absoluteness via Resurrection*, *SetTop*, Novi Sad – RS. `www.dmi.uns.ac.rs/settop/2014/talks.html`.
15/04/2014	*Absoluteness via Resurrection*, *XXV incontro dell'AILA*, Pisa – IT. `ailapisa2014.weebly.com/programme.html`.
02/04/2014	*Dimostrabilità, assolutezza generica e assiomi di resurrezione*, seminar, *Seminari dei dottorandi*, Torino – IT. `www.mathematics-phdseminars.unito.it`.

Languages written and spoken

Italian	Mother tongue	
English	Advanced	*self-assessed european level C1.*
French	Intermediate	*self-assessed european level B1.*
Spanish	Basic	*self-assessed european level A2.*

Computer skills

Advanced	C/C++	Google Test *framework (test-driven development)*, openmp *API (parallel programming)*, sdsl-lite *library (succinct data structures)*, Bazel *tool (automated building and testing)*, doxygen *tool (documentation)*.
	Python, Bash	sqlalchemy *library (database management)*, django *framework (web sites and applications)*, pygtk/pygobject *library (graphical user interface)*.
	Java	JUnit *framework (test-driven development)*, Swing *library (graphical user interfaces)*, javadoc *tool (documentation)*.
	Protelis/Scafi	Alchemist *toolchain (simulator for pervasive computing)*.
	Maple	*symbolic calculations, data plotting and interpolation.*
Intermediate	Html, Javascript	AngularJS, Bootstrap *(web site design)*.
	Pascal	*didactic programming and algorithm design.*
Basic	Matlab, Statistica	*linear algebra and statistical computations.*
	Scheme	*batch image processing language for* GIMP.
	AviSynth	*video-processing scripting language.*