

Giacomo Tendas

CONTACT INFORMATION

Ph.D. Student in Mathematics at Macquarie University
e-mail: giacomo.tendas@mq.edu.au
Telephone: 0422 932 093
City: Sydney, Australia
Address: 12 Wally's Walk, Macquarie University, 2109
Nationality: Italian
Date of Birth: 25 November 1993
Place of Birth: Oristano (Italy)

EDUCATION

2019 -

Postgraduate Student in Pure Mathematics, at Macquarie University.

Ph.D. in Mathematics (expected in August 2022).

- Dissertation Topic: Enriched Accessible Categories.
- Supervisor: A/Professor Stephen Lack.

2018 - 2019

Postgraduate Student in Pure Mathematics, at Macquarie University.

Master of Research in Mathematics, High Distinction, April 2019.

- Title: Enriched Regular Theories.
- Dissertation Topic: Regular and exact categories were first introduced by Michael Barr in 1971; since then, the theory has developed and found many applications in algebra, geometry, and logic. In particular, a small regular category determines a certain theory, in the sense of logic, whose models are the regular functors into \mathbf{Set} . In 1986 Barr showed that each small and regular category can be embedded in a particular category of presheaves; then in 1990 Makkai gave a simple explicit characterization of the essential image of the embedding, in the case where the original regular category is moreover exact. More recently Prest and Rajani, in the additive context, and Kuber and Rosicky, in the ordinary one, described a duality which connects an exact category with its (definable) category of models. Considering a suitable base for enrichment, we define an enriched notion of regularity and exactness, and prove a corresponding version of the theorems of Barr, of Makkai, and of Prest-Rajani/Kuber-Rosicky.
- Supervisor: A/Professor Stephen Lack.

2015/2016 - 2016/2017

Graduate Student in Pure Mathematics, at the University of Pisa.

Master Degree in Mathematics, 110/110 cum laude, 15 December 2017

- Master Dissertation: Strongly Preserved Formulas in Topoi.
- Dissertation Topic: We study which kind of high-order formulas are preserved by the inverse image of geometric morphisms between elementary topoi. We start by the fact that EFPL formulas, obtained with the least-fixed-point technique from geometric formulas, are preserved.
- Supervisor: Professor Andreas Blass.

2012/2013 - 2014/2015

Bachelor Student in Mathematics, at the University of Pisa.

Bachelor Degree in Mathematics, 110/110 cum laude, 16 October 2015

- Bachelor Dissertation: ∂ -Ramsey Theorem and a van der Corput Lemma.
- Dissertation Topic: Following an article by Anush Tserunyan, we define a notion of differentiation for subsets of a fixed semigroup and isolate the class of filters that respect this notion. The filters in this class include all those for which the van der Corput lemma was known (like the filter IP^* , the density filter over \mathbb{N} , all idempotent ultrafilters, etc.), and the main result is a van der Corput lemma for this filters, which thus generalizes all its previous instances. This is done via proving a Ramsey theorem for graphs on the semigroup with edges between the semigroup elements labelled by their ratios.
- Supervisor: Professor Mauro Di Nasso.

2007/2008 - 2011/2012

High School Student at the Scientific Lyceum “Mariano IV”, Oristano

High School Diploma, 100/100, July 2012.

**GRADUATE
COURSEWORK AND
CONTENTS**

Year 2015/2016

- ❑ **Mathematical Analysis I** (30/30)
Contents: Functional Analysis, Spectral Theory for Compact Operators, Sobolev Spaces, Applications to PDEs.
- ❑ **Elements of Algebraic Topology** (30/30, cum laude)
Contents: Simplicial, Singular and Cellular Homology, Cohomology.
- ❑ **Differential Topology** (30/30, cum laude)
Contents: Transversality, Cobordism, Morse Theory, Handle Decomposition, h-Cobordism.
- ❑ **Algebra** (30/30, cum laude)
Contents: Commutative Algebra, Dimension Theory, Homological Algebra, Derived Categories.
- ❑ **Model Theory** (30/30)
Contents: Theories, Lowenheim-Skolem Theorems, Saturated Models, Prime Models, Indiscernibles.
- ❑ **Complexity Theory** (30/30)
Contents: Finite Model Theory, Ehrenfeucht-Fraisse Games, Turing Machines, Complexity Classes.
- ❑ **Set Theory** (30/30)
Contents: Boolean Algebras, Forcing, Generic Model, Jech-Sochor Theorem, Suslin Trees.

Year 2016/2017

- ❑ **Geometry** (28/30)
Contents: Differential Geometry, De Rham Cohomology, Basic Riemannian Geometry.
- ❑ **Elements of Complex Analysis** (30/30, cum laude)
Contents: Complex Analysis in One and Several Variables, Dolbeault Complex, Nullstellensatz, Domain of Holomorphy.
- ❑ **3-Manifolds** (30/30, cum laude)
Contents: Hyperbolic Space, Prime Decomposition of 3-manifolds, Incompressible Surfaces, Surface Bundles, The Geometrisation Conjecture.
- ❑ **Knot theory** (30/30, cum laude)
Contents: Links, Alexander and Markov Theorems, Prime Decomposition, Alexander-Conway Polynomial, Lickorish-Wallace and Kirby Theorems.
- ❑ **Statistics** (30/30, cum laude)
Contents: Statistical Modelling, Neyman-Fisher Theorem, Maximum Likelihood Estimation, Fisher Information, Gauss-Markov Theorem, Neyman-Pearson Theory, Behrens-Fisher Problem, Bayesian statistics.
- ❑ **Algebraic Topology** (30/30, cum laude)
Contents: Spectral Sequences, Serre Theorem for Fibrations, Arrangements of Hyperplanes, Isomorphisms between $A(A)$, $R(A)$ and $H^*(M(A))$, Coxeter Groups, Discrete Morse Theory.

Courses taken at the Scuola Normale Superiore (Pisa)

- ❑ **Scheme Theory** (27/30)
Contents: Presheaves, Sheaves, Locally Ringed Spaces, Schemes, Projective Space, Closed/Flat/Etale/Proper and Smooth Morphisms, Cohomology, Divisors, Class Group.

LANGUAGES

Italian: Mother Tongue.
English: Fluent (TOEFL IBT 98).

TEACHING EXPERIENCE

<i>Session 1</i>	<i>2019</i>	Small Group Teaching Activity - MATH135, Macquarie University.
<i>Session 2</i>	<i>2019</i>	Small Group Teaching Activity - MATH135, Macquarie University.
<i>Session 2</i>	<i>2019</i>	Marking Tests - MATH135 and DMTH137, Macquarie University.

PUBLICATIONS

- ❑ Stephen Lack and Giacomo Tendas. Enriched regular theories. *Journal of Pure and Applied Algebra*, Volume 224, Issue 6, June 2020, 106268. Available at: <https://doi.org/10.1016/j.jpaa.2019.106268>.