

Agnese Barbensi

Hooke Research
Fellow

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University

- July 2020- **Hooke Research Fellow**, *University of Oxford*.
- 2017-2020 **Research Assistant in Algebraic and Topological Approaches for Genomic Data in Molecular Biology**, *University of Oxford*.
- 2017-2020 **DPhil**, *University of Oxford*, leave to supplicate: 17 June 2020.
- Supervisors Prof. Dorothy Buck, Prof. Heather A. Harrington, Prof. Marc Lackenby.
- Title Knot theory and entanglement in biopolymers
- 2013–2016 **Laurea Magistrale (M.S.)**, *University of Pisa*, 110/110 *cum Laude*.
- Advisor Prof. Paolo Lisca, <http://www.dm.unipi.it/~lisca/>
- Title Trisections of 4-manifolds
- 2009–2013 **Laurea Triennale (B.S.)**, *University of Pisa*, 100/110.
- Advisor Prof. Bruno Martelli, <http://www.dm.unipi.it/~martelli/>
- Title The Lickorish-Wallace Theorem

Publications and preprints

- 2017 **The Reidemeister graph is a complete knot invariant**, joint work with D. Celoria, *Algebraic & Geometric Topology*, DOI: 10.2140/agt.2020.20.643
- 2018 **Double branched covers of knotoids**, joint work with D. Buck, H. A. Harrington, M. Lackenby, accepted by *Communications in Analysis and Geometry*, arXiv:1811.09121
- 2019 **Grid diagrams as tools to investigate knots space and topoisomerases-mediated simplification of DNA topology**, joint work with D. Celoria, H. A. Harrington, A. Stasiak and D. Buck, *Science Advances*, DOI: 10.1126/sciadv.aay1458
- 2019 **f -distance of knotoids and protein structure**, joint work with D. Goundaroulis, submitted, arXiv:1909.08556
- 2020 **DPhil thesis: Knot theory and entanglement in biopolymers**

Workshops and conferences attended

- June 2016 "ECSTATIC 2", Imperial College in London.
- Oct. 2016 "4-manifolds and knot concordance", Max Plank Institute, Bonn.
- Jan. 2017 "Winter school workshop", Newton Institute, Cambridge.
- Feb. 2017 "3-manifold workshop", Newton Institute, Cambridge.
- June 2017 "Swissknots", Bern.
- Sep. 2017 "EMBO Workshop, DNA topoisomerases and DNA topology", Le Diableretes (**selected poster**).
- Nov. 2017 "The Geometry and Topology of Knotting and Entanglement in Proteins", Oaxaca, (**invited speaker**).
- June 2018 "Topology in dimensions 3, 3.5 and 4", University of California Berkeley.

- Aug. 2018 "Genome Biophysics: Integrating Genomics and Biophysics to Understand Structural and Functional Aspects of Genomes", Santa Cruz (**selected poster**).
- Dec. 2018 "Twisted and quantum knot invariants", Durham.
- Feb. 2019 "EUTOPIA: First meeting of the European Topology interdisciplinary Initiative", Trento (**selected speaker**).
- May 2019 "KaBin", Trondheim (**selected speaker**).
- June 2019 "Oxbridge "Woolly Owl" Applied Maths Meeting ", Oxford (**invited speaker**).
- Aug. 2019 "LMS Durham symposium, Pseudoholomorphic Curves and Gauge Theory in Low-Dimensional Topology", University of Durham (**invited speaker**).
- Sep. 2019 "LS² satellite meeting, DNA topology and topoisomerases in genome dynamics", Le Diableretes (**selected speaker**).
- Sep. 2019 "EMBO Workshop, DNA topology and topoisomerases in genome dynamics", Le Diableretes (**selected speaker**).
- Sep. 2019 "TDA 2019, Spires: from theory to applications and back", Oxford (**invited speaker**).
- Dec. 2019 "Complexity Cluster Workshop", Keble College, Oxford (**invited speaker**).
- Jan. 2019 "Joint Mathematics Meeting ", Denver, Colorado (**invited speaker for a special session**).
- Apr 2020 "British Mathematics Colloquium / British Applied Mathematics Colloquium ", Glasgow, UK (**invited speaker for the Topology session, cancelled due to Covid19 pandemic**).
- Sep 2020 "British Topology Meeting ", Durham, UK (**invited speaker, cancelled due to Covid19 pandemic**).

Institutional visits

- Feb. 2019 SISSA, Trieste.
- May 2019 & July 2019 Université de Lausanne.
- June 2020 University of Glasgow, cancelled due to Covid19 pandemic.

Held seminars

- Applications of \mathcal{R} -graphs to DNA modelling, Oaxaca, Nov. 2017
- DNA topology, Oxford, 2018
- DNA topology: Teoria dei Nodi applicata al DNA, Pavia, 2018
- The Reidemeister graph is a complete knot invariant, Oxford/Warwick, 2018
- Grid diagrams as tools to investigate knots space and the unknotting function of type II topoisomerases, Trento/Sissa (Trieste) 2019
- Double branched cover of knotoids, gong talk at Kabin, Trondheim, 2019
- Knotty molecules, Oxbridge "Woolly Owl" Applied Maths Meeting, Oxford, 2019
- Double branched cover of knotoids and applications to proteins, Durham, 2019
- Grid diagrams as tools to investigate knots space and the unknotting function of type II topoisomerases, Les Diableretes/Oxford, 2019
- Double branched cover of knotoids, f -distance and applications to proteins, Keble College/Mathematical Institute, Oxford, 2019, & Denver, Colorado, 2020, & University of Bologna (seminar held online due to Covid19 pandemic), 2020

Research:

DNA topology, knot theory, low dimensional topology, protein entanglement.

Teaching

- Student Counselor, University of Pisa, 2015/2016
- Teaching assistant for Topology and Groups, University of Oxford, Michaelmas term 2018
- Topology tutoring, New College, University of Oxford, Hilary term 2019 & 2020
- Non-stipendary Lecturer, St. Catherine's college, University of Oxford, Oct2019-June2020

Awards

- 3 minutes thesis competition, 2nd prize, University of Oxford, 2018
- Member of the winning team at the Oxbridge "Woolly Owl" Applied Maths Meeting competition, Oxford, June 2019

Computer skills

Languages Matlab, Python, SCGE, L^AT_EX, C, Html.

Platforms Linux, OSX, windows.

Programs available online at <http://poisson.phc.dm.unipi.it/~celoria/#programs>