Celeste Damiani

Postdoc at Istituto Italiano di Tecnologia

Istituto Italiano di Tecnologia (Genova)
Data Science & Computation Facility
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Personal Information

Title	Doctor in Mathematics
Birth	11/01/1987, Trieste, Italy
Qualifications	Abilitazione Scientifica Nazionale 01/A2 - Geometria e Algebra, 2a Fascia (exp.: 01/06/2033)
	Fellow of the Higher Education Academy (UK)
Memberships	Aderente INDAM - GNSAGA

Research interests

I am currently working at IIT on a MISE funded project focused on the creation of machine learning processes for clinical and omics data, with the aim of improving disease prediction and patients' stratification.

I am also interested in geometric topology and geometric group theory, more specifically in the fields of braid groups and braid groups generalisations, and knot theory.

At the interface between the two areas above, I am interested in harnessing the advantages of Topological Data Analysis tools in machine learning pipelines.

Employment history

2022 - pres.	**Postdoc**, *Istituto Italiano di Tecnologia, Genova* MISE project in Machine learning for clinical and omics data
2022 - 2024	**Honorary Research Fellow**, *WIPH, Queen Mary University of London*
2021 - 2023	**Visiting Research Fellow at WMG**, *University of Warwick*
2020 - 2022	**Postdoctoral Data Scientist**, *WIPH, Queen Mary University of London* CRUK EDx project "An Artificial Intelligence System for Real-time Risk Assessment at Mammography Screening (Mammo AI)" (reference C49757/A28689)
2018 – 20	**Research Fellow**, *University of Leeds* Leverhulme funded project "Emergent Physics From Lattice Models of Higher Gauge Theory"
2018	**Visiting researcher**, *Universität Regensburg* Independent research on knotted surfaces in a 4-dimensional space-time
2016–18	**JSPS Postdoctoral Fellow**, *OCAMI, Osaka City University* Collaborative and individual research as part of the Knot Theory Research Team of the OCAMI.
2014–16	**Teaching assistant and Science Communicator**, *Université de Caen Normandie*

Education

2020 – 23	**Postgraduate Certificate in Academic Practice (PGCAP)**, *Queen Mary University of London*, Leading to Fellowship of the HE Academy with reference: PR268272
2013–16	**Ph.D. in Mathematics**, *Université de Caen Normandie*, Mention très honorable
title	*The topology of loop braid groups: applications and remarkable quotients*
advisor:	Paolo Bellingeri; supervisor *(encadrant scientifique)*: Emmanuel Wagner
2010–13	**Master of Science in Mathematics**, *Università degli Studi di Trieste*
2006–10	**Bachelor of Science in Mathematics**, *Università degli Studi di Trieste*

MISCELLANEOUS

Jan 2024 **Participant at the workshop: "Fundamentals of Accelerated Computingwith CUDA Python"**, *NVIDIA DLI*

Nov 2023 **Participant at the workshop: "Introduction to MATLAB on HPC systems at Cineca"**, *Cineca, Casalecchio di Reno*

Sept 2021 **Facilitator and participant of the Data Study Group project "Using machine learning to improve sleep habits in Dementia patients"**, *The Alan Turing Institute*

PUBLICATIONS AND PREPRINTS (REVERSE CHRONOLOGICAL)

On wen knots, *Preprint, arXiv:2403.03917, 2024*
C. Damiani, S. Satoh

Congruence subgroups of braid groups and crystallographic quotients. Part I, *Preprint, arXiv:2401.15748, 2024*
P. Bellingeri, C. Damiani, O. Ocampo, C. Stylianakis

Are better AI algorithms for breast cancer detection also better at predicting risk? A paired case-control study, *Breast Cancer Res 26, 25, 2024.doi:10.1186/s13058-024-01775-z*, IF(2022): 7.4
R. Santeramo, C. Damiani , J. Wei, G. Montana, A. R. Brentnall

An optimization framework to guide the choice of thresholds for risk-based cancer screening, *npj Digit. Med. 6, 223, 2023. doi:10.1038/s41746-023-00967-9.*, IF(2022): 15.2
A. R. Brentnall, E. Atakpa, H. Hill, R. Santeramo, C. Damiani, J. Cuzick, G. Montana, S. Duffy

Evaluation of an AI model to assess future breast cancer risk, *Radiology, 307(5):e222679, 2023. doi:10.1148/radiol.222679.*, IF(2022): 19.7
C. Damiani, G. Kalliatakis, M. Sreenivas, M. Al-Attar, J. Rose, C. Pudney, E. F. Lane, J. Cuzick, G. Montana, and A. R. Brentnall

Generalisations of Hecke algebras from loop braid groups, *Pac. J. Math., 323(1):31–65, 2023. doi:10.2140/pjm.2023.323.31.*, IF(2022): 0.6
C. Damiani, P. P. Martin, and E. C. Rowell

On a canonical lift of Artin's representation to loop braid groups, *J. Pure Appl. Algebra, 225(12):22, 2021. Id/No 106760. doi:10.1016/j.jpaa.2021.106760.*, IF: 0.83
C. Damiani, J. Faria Martins, and P. P. Martin

On the group of ring motions of an h-trivial link, *Topology and its Applications, 264:51 – 65, 2019. doi:https://doi.org/10.1016/j.topol.2019.06.004.*, IF: 0.53
C. Damiani and S. Kamada

A Markov's theorem for extended welded braids and links, *Osaka J. Math., 56(2):255–268, 2019. URL: https://projecteuclid.org/euclid.ojm/1554278423.*, IF: 0.47
C. Damiani

Towards a version of Markov's theorem for ribbon torus-links in $\mathbb{R}^4$, *In Knots, low-dimensional topology and applications. Knots in Hellas, International Olympic Academy, Greece, July 2016. Papers of the international conference, Ancient Olympia, Greece, July 17–23, 2016, pages 309–328. Cham: Springer, 2019.*
C. Damiani

Alexander invariants of ribbon tangles and planar algebras, *J. Math. Soc. Japan, 70(3):1063–1084, 2018. doi:10.2969/jmsj/75267526.*, IF: 0.50
C. Damiani and V. Florens

A journey through loop braid groups, *Expo. Math., 35(3):252–285, 2017. doi:10.1016/j.exmath.2016.12.003.*, IF: 0.74
C. Damiani

Unrestricted virtual braids, fused links and other quotients of virtual braid groups, *J. Knot Theory Ramifications, 24(12):1550063, 23, 2015. doi:10.1142/S0218216515500637.*, IF: 0.48
V. G. Bardakov, P. Bellingeri, and C. Damiani

SEMINARS

2024 **(expected) TBD**, *Algebra & Geometry Seminar*, Università di Genova

(expected) TBD, *DataShape seminar*, Inria Saclay Centre

(expected) The relation between congruence braid groups and crystallographic braid groups, *Glasgow Geometry & Topology seminar*, University of Glasgow

2023 **Generalizzazioni delle algebre di Hecke dai gruppi di trecce di cerchi**, *Seminario di algebra e geometria del DMG*, Università di Trieste

Trecce, trecce di cerchi, e altri motion groups, *Seminario di Geometria*, Università di Camerino

Loop Braid Groups and generalisations of Hecke Algebras, *Seminario di Algebra e Geometria*, Università di Bologna

2022 **An AI System for Risk Assessment at Mammography Screening**, *Statistics and Data Science Seminar*, Queen Mary University of London

An AI System for Risk Assessment at Mammography Screening, *Human Technopole - Centre of Computational Biology*, Milan

Generalisations of Hecke Algebras from Loop Braid Groups, *Glasgow G&T seminar*

2021 **Généralisations des algèbres de Hecke à partir des groupes de tresses de cercles + Un système de IA pour la détection précoce du cancer du sein**, *Séminaire Teich Marseille*

An AI System for assessing breast density, *Statistics and Data Science (SDS) seminar*, Queen Mary University of London

Generalisations of Hecke Algebras from Loop Braid Groups, *CUNY Representation Theory Seminar*

2020 **Generalisations of Hecke Algebras from Loop Braid Groups**, *[K-OS] Knot online seminar*

Towards a breast density age predictor, *Centre for Cancer Prevention statistics meeting*, Queen Mary University of London

Alexander invariants of ribbon tangles, *Algebra seminar*, University of Leeds

2019 **Loop braid groups and a new lift of Artin's representation**, *Pure Maths Seminar*, University of Leicester

Loop braid groups and a new lift of Artin's representation, *BLOC meeting*, City, University of London

The ring motion group of an H-trivial link, *Topology seminar*, University of Sheffield

Le groupe de mouvements d'un entrelacs H-trivial, *Séminaire Géométrie, Dynamique et Topologie*, Aix-Marseille Université

2018 **A journey through loop braid groups**, *Geometry and Topology seminar*, Luxembourg

Some remarkable quotients of virtual braid groups, *Algebra seminar*, University of Leeds

A journey through loop braid groups, *Geometry and Topology seminar*, Regensburg

2017 **A journey through loop braid groups**, *Maths - String Theory seminar*, Kavli IPMU, Tokyo

A journey through loop braid groups, *Topology working seminar*, Osaka University

Vers un théorème de Markov pour entrelacs dans $\mathbb{R}^4$, *Séminaire d'algèbre et géométrie*, Université de Caen Normandie

Invariants d'Alexander pour enchevêtrements ruban, *Séminaire de Topologie*, Paris - Jussieu

Braid groups, Hecke Algebras, and welded braid groups, *Working Seminar*, Osaka City University

2016 **Invariants d'Alexander pour enchevêtrements ruban**, *Séminaire topologies*, Montpellier

Invariants d'Alexander pour enchevêtrements ruban, *Séminaires géométrie et systèmes dynamiques*, Dijon

Alexander invariants of ribbon tangles, *Topology seminar*, Glasgow

Alexander invariants of ribbon tangles, *Barcelona Algebraic Topology Group*, U. A. Barcelona

2014 **The Multivariable Alexander Polynomial for virtual tangles**, *Séminaire de topologie*, Université de Pau et des Pays de l'Adour

━━━ TALKS AND POSTERS (CONFERENCES)

2024 **(expected) TBD**, *Skew Braces, Braids and the Yang-Baxter Equation*, BIRS, Banff

2023 **How can we use TDA for breast cancer risk assessment?**, *Combinatorial Algebraic Topology and Applications*, Pisa

(poster) Congruence subgroups of braid groups and crystallographic structures, *Geometric Topology, Art, and Science*, Reggio Emilia

A topological mammography clock, *Winterbraids XII*, Tours

2022 **(poster) Evaluation of an automated system to assess future breast cancer risk using mammograms at screening**, *The Early Detection of Cancer Conference 2022*, Portland

Evaluation of an automated system to assess future breast cancer risk using mammograms at screening, *Why Study Mammographic Density? International Conference 2022*, Melbourne

(poster) MammoAI: An AI System for Risk Assessment at Mammography Screening, *Topology of Data*, Università di Roma Tor Vergata

MammoAI: An AI System for Risk Assessment at Mammography Screening, *Applied Topology in Bedlewo 2022*, Bedlewo

2021 **Generalisations of Hecke Algebras from Loop Braid Groups**, *II Encuentro de Álgebra y Teoría de Nudos*, Zoom

2019 **Loop braid groups and a new lift of Artin's representation**, *56th ARTIN Meeting*, Edinburgh

Loop braid groups and a new lift of Artin's representation, *Journées Normandes Topologie*, Caen

Loop braid groups and a new lift of Artin's representation, *Unifying 4-Dimensional Knot Theory*, BIRS - Banff

The ring motion group of an H-trivial link, *Knots and Braids in Norway*, Trondheim

(flashtalk) Some properties of congruence subgroups of braid groups, *Winterbraids IX*, Reims

2018 **Alexander invariants of ribbon tangles and circuit algebra**, *Twisted and Quantum knot invariants*, Durham

A journey through loop braid group, *Joint meeting of the UMI, SIMAI and PMS*, Wrocław

A journey through loop braid group, *Workshop on Higher Gauge Theory*, Leeds

(flashtalk) Moving towards unexplored motion groups, *Winterbraids VIII*, CIRM - Marseille

Moving towards unexplored motion groups, *13th East Asian School of Knots*, KAIST - Daejeon

2017 **A journey through loop braid group**, *Pan Pacific International Conference on Topology*, Busan

Moving towards unexplored motion groups, *4-dim topology 2017*, Osaka City University

A journey through loop braid group, *Women in Mathematics*, Sapporo

Towards a Markov theorem for ribbon links in $\mathbb{R}^4$, *Tsuda University Topology Workshop*, Tokyo

Towards a Markov theorem for ribbon links in $\mathbb{R}^4$, *Self-distributive systems and quandle (co)homology theory in algebra and low-dimensional topology*, Busan

(flashtalk) A journey through loop braid group, *Braids in algebra, geometry and topology*, ICMS - Edinburgh

A journey through loop braid group, *The 12th East Asian School of Knots and Related Topics*, Tokyo

2016 **Alexander invariants of ribbon tangles and circuit algebra**, *Four dimensional topology 2016*, Osaka City University

Alexander invariants of ribbon tangles and circuit algebra, *Knots in Hellas*, Olympia

Alexander invariants of ribbon tangles and circuit algebra, *Winterbraids VI*, Lille

2015 **On the Alexander polynomial of a (ribbon) tangle**, *Glances at Manifolds*, Kraków

On the Alexander polynomial of a (ribbon) tangle, *Young Topologists' Meeting*, EPFL

Sur le polynôme d'Alexander d'un enchevêtrement classique, *Journée de la Fédération de Recherche Normandie-Mathématiques*, Le Havre

SUPERVISION AND TEACHING

2022 - 23 **LaTeX for writing your thesis**, *training sessions for PhD students*, Queen Mary University

LaTeX for the Absolute Beginner, *training sessions for PhD students*, Queen Mary University

2021 - 22 **Research Methods (Fundamentals of Statistics)**, *web-based training*, Global Parkinson's genetics program

Human Science and Public Health PBL facilitator, *year 2 MBBS*, Queen Mary University

Locomotor PBL facilitator, *year 2 MBBS*, Queen Mary University

LaTeX for writing your thesis, *training sessions for PhD students*, Queen Mary University

LaTeX for the Absolute Beginner, *training sessions for PhD students*, Queen Mary University

Statistics for CANM937 Research Methods Module, *shared course*, Queen Mary University

2020 - 21 **Human Science and Public Health PBL facilitator**, *year 2 MBBS*, Queen Mary University

Locomotor PBL facilitator, *year 2 MBBS*, Queen Mary University

LaTeX for writing your thesis, *training sessions for PhD students*, Queen Mary University

LaTeX for the Absolute Beginner, *training sessions for PhD students*, Queen Mary University

Statistics for CANM937 Research Methods Module, *shared course*, Queen Mary University

2019 **Co-supervision of a Ph.D candidate (Basmah Alsubhi)**, *Ph.D thesis in algebra and topology*, University of Leeds

2019 **Co-supervision of 2 summer bursaries (Laidlaw Undergraduate Research and Leadership Scholarship)**, University of Leeds

2015 - 16 **Algebra (Exercises)**, L3 MATHS; **Probability (Exercises)**, L1 MIASH, Université de Caen

RESEARCH FUNDING AND AWARDS

2023 **First prize for Best Poster**, *conference Geometric Topology, Art, and Science*, Reggio Emilia

2019 **Conference grant**, *Loops in Leeds: motion groups and related topics*, **Role:** PI and Chair organiser, **Funding body:** Research and Innovation Committee of the School of Mathematics (Univ. of Leeds), Value: £5,358

2019 **Conference grant**, *Loops in Leeds: motion groups and related topics*, **Role:** PI and Chair organiser, **Funding body:** London Mathematical Society, Scheme 1, Value: £4,004

2018 **Personal travel grant**, **Funding body:** European Mathematical Society, Value: €500

2018	**Research project: Emergent physics from lattice models of higher gauge theory**, **Role:** Participant, **Funding body:** the Leverhulme Trust
2016–18	**Grant-in-Aid for JSPS Research Fellow**, **Role:** Co-I, joint with Seiichi Kamada, **Funding body:** JSPS, **Dates:** 01/11/2016 - 31/03/2018, Value: ¥1,500,000
2012	**International Mobility Grant**, *Stay at Université de Caen*, Funding body: Italian Government
2008–09	**Erasmus**, *Fribourg*, Switzerland

OUTREACH

2022	**QMUL Festival of Communities**, *Animation of the stall "Can you operate a Turing Machine?"*, Tower Hamlets, London
2020	**Leeds Festival of Science Roadshow**, *Workshop at KS5 level, Leeds*
2019	**Academic taster session**, *Part of the programme Reach for Excellence*, University of Leeds
	Leeds Festival of Science Roadshow, *Workshop at KS5 level, Bradford*
2017	***What is a knot?* - JSPS Science Dialogue program**, *Fujishima High School*, Fukui, Japan
2014–15	**Interventions in schools**, *doctoral mission in scientific communication*, Caen
2013–16	**Fête de la Science**, *Stand animation, Conference for general public, Atélier du chercheur*, Caen
2012	**Ten hours with Henri Poincaré**, *Animation of the Labosaïque stand*, Sorbonne, Paris
2010	**Science Centre Immaginario Scientifico**, *Internship as guide for primary schools*, Trieste

ORGANISATIONAL ACTIVITIES AND COMMUNITY INVOLVEMENT

	Reviewer for MathSciNet and zbMath
2021 – 22	**Co-organiser of the Wolfson Institute Statisticians meeting**, Queen Mary U. of London
2020 – 22	**Planning of Patients and Public Involvement meeting for the Mammo AI project**, Queen Mary Univ. of London
2019	**Workshop Loops in Leeds: motion groups and related topics**, *With: J. Faria Martins, P. Martin, A. Bullivant, F. Torzewska, H. Albeladi*, School of Mathematics, Univ. of Leeds
2018	**Study group on Loop Braid Groups, TQFTs, and Higher Gauge Theory**, Univ. of Leeds
2015–16	**Ph.D. students representative at the Laboratory Council**, LMNO, Univ. de Caen

LANGUAGES

Native: Italian
Fluent: English, French, Spanish
Notions: Japanese

METRICS

Metrics from Scopus	Value
H index	4
Number published works	11
Total Citations	63
Average Citations per Publication	5.73
Total Impact Factor (IF) (sum of IFs at year of publication)	46.45
Average IF per Publication	4.22

Genova, 7th March 2024