

Mattia Dalla Brida

Curriculum vitae

Dipartimento di Fisica "G. Occhialini"
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Current position

06/2024-present **Associate Professor**, *University of Milan-Bicocca*, Italy.

Previous posts held

02/2024-05/2024 **External Research Collaborator**, *CERN-TH*, Switzerland.

02/2021-01/2024 **Senior Research Fellow**, *CERN-TH*, Switzerland.

11/2017-10/2020 **Fixed-term Assistant Professor (RTDa)**, *University of Milan-Bicocca*, Italy.

10/2016-09/2017 **Long-term Visiting Scientist (ViSC)**, *CERN-TH*, Switzerland.

10/2016-10/2017 **Postdoctoral Researcher (Assegnista di ricerca)**, *University of Milan-Bicocca & INFN*, Italy.

10/2014-09/2016 **Research Fellow (Wissenschaftlicher Mitarbeiter)**, *NIC Research Group Elementary Particles*, *DESY – Zeuthen*, Germany.

Education

Degrees

06/2015 **Ph.D. in Applied Mathematics**, *University of Dublin, Trinity College*, Ireland,
Supervisor: Prof. Stefan Sint.

03/2011 **M.Sc. (Laurea specialistica) in Theoretical and Computational Physics**,
University of Trento and European Centre for Theoretical Studies in Nuclear Physics and Related Areas (ECT)*, Italy.
Final grade 110/110 cum laude.

12/2008 **B.Sc. (Laurea triennale) in Physics**, *University of Trento*, Italy.
Final grade 110/110 cum laude.

Other qualifications

12/2008 **Excellence Course in Physics (Percorso di approfondimento in Fisica)**,
University of Trento, Italy.

Fellowships and grants

02/2021-01/2024 **Senior Research Fellowship in Theoretical Physics**, *CERN*, Switzerland.

12/2011-10/2014 **Irish Research Council Embark Initiative**, *Irish Research Council*, Ireland.

05/2011-11/2011 **Marie Curie Early Stage Researcher Fellowship**, *STRONGNET Initial Training Network*, EU.

Teaching

Courses

2025 **B.Sc. course: "Tutorials of Quantum Mechanics"**, *University of Milan-Bicocca*, Milan, Italy.

2025 **B.Sc. course: "Computational Physics Laboratory"**, *University of Milan-Bicocca*, Milan, Italy.

2024 **M.Sc. course: "Tutorials of Computational Physics Laboratory"**, *University of Milan-Bicocca*, Milan, Italy.

2024 **B.Sc. course: "Computational Physics Laboratory"**, *University of Milan-Bicocca*, Milan, Italy.

2020 **M.Sc. course: "Computational Physics Laboratory"**, *University of Milan-Bicocca*, Milan, Italy.

2019 **M.Sc. course: "Computational Physics Laboratory"**, *University of Milan-Bicocca*, Milan, Italy.

2019 **M.Sc. course: "Complementary Lectures on Advanced Quantum Field Theory"**, *University of Milan-Bicocca*, Milan, Italy.

2018 **M.Sc. course: "Computational Physics Laboratory"**, *University of Milan-Bicocca*, Milan, Italy.

2018 **Ph.D. course: "An introduction to Lattice QCD and its applications"**, *University of Milan-Bicocca*, Milan, Italy.

Supervised students

10/2018-10/2019 **M.Sc. student: Marco Chiapparelli**, *University of Milan-Bicocca*, Milan, Italy.
Thesis title: "Measure of entropy variations using three flavor lattice QCD with shifted boundary conditions".

01/2018-03/2019 **M.Sc. student: Marta Bianchi**, *University of Milan-Bicocca*, Milan, Italy.
Thesis title: "Determination of the latent heat of the pure SU(3) Yang-Mills theory from a moving frame".

07/2020-10/2020 **B.Sc. student: Alessandro Longhi**, *University of Milan-Bicocca*, Milan, Italy.
Thesis title: "Studio della rottura spontanea di simmetria nella teoria φ_3^4 con metodi Monte Carlo".

07/2020-09/2020 **B.Sc. student: Giuseppe Alfinito**, *University of Milan-Bicocca*, Milan, Italy.
Thesis title: "Metodi numerici per la risoluzione di integrali di cammino in meccanica quantistica e la loro applicazione in sistemi semplici".

06/2020-09/2020 **B.Sc. student: Fabio Coldani**, *University of Milan-Bicocca*, Milan, Italy.
Thesis title: "Classificazione dei vincoli secondo Dirac e loro quantizzazione".

Co-supervised students

09/2021-12/2024 **Ph.D. student: Matteo Bresciani**, *University of Milan-Bicocca*, Milan, Italy.
Thesis title: "Non-perturbative QCD at all temperatures: Equation of State and Renormalization".

01/2025-10/2025 **M.Sc. student: Davide Masinari**, *University of Milan-Bicocca*, Milan, Italy.
Thesis title: "Factorization of Disconnected Correlators in Lattice QCD".

02/2020-06/2021 **M.Sc. student: Luca Fracassi**, *University of Milan-Bicocca*, Milan, Italy.
Thesis title: "Non-perturbative renormalization of composite operators in thermal QCD".

04/2018-03/2019 **M.Sc. student: Matteo Zoccolan**, *University of Milan-Bicocca*, Milan, Italy.
Thesis title: "Studio di un metodo di misura dell'energia libera in teorie di campo quantistiche".

Faculty roles and qualifications

National Scientific Qualification for Associate Professor in Theoretical Physics of Fundamental Interactions (Abilitazione Scientifica Nazionale per Professore di II Fascia in Fisica Teorica delle Interazioni Fondamentali (02/A2)), *Ministero dell'Universita' e della Ricerca (MUR)*, Italy.

Member of the Department of Physics Council (Membro del Consiglio di Dipartimento di Fisica), *University of Milan-Bicocca*, Milan, Italy.

Member of the Teaching Council of Physics and Astrophysics (Membro del Consiglio di Coordinamento Didattico di Fisica e Astrofisica), *University of Milan-Bicocca*, Milan, Italy.

Referee work

Journals

- *Physical Review Letters*
- *Progress of Theoretical and Experimental Physics*
- *European Physics Journal C*
- *Physical Review D*
- *Computer Physics Communications*
- *Universe - MDPI*

Funding organizations

- *National Research, Development, and Innovation (NRDI) Office, Hungary*
- Computer resources
- EuroHPC
- *Leibniz Supercomputing Centre (LRZ), Germany*
- *Science and Technology Facilities Council (STFC) - DiRAC, UK*

Editorial work

- *Member of the Topical Advisory Panel of Universe - MDPI*

HPC projects

Principal Investigator

10/2019-10/2020 **The Equation of State of QCD**, *CINECA*, Italy.
Allocated computational resources: 10 Million core-hours on MARCONI.

01/2016-06/2018 **Determination of the gradient flow coupling using numerical stochastic perturbation theory**, *Leibniz Supercomputing Centre*, Germany.
Allocated computational resources: 19.6 Million core-hours on SuperMUC.
Co-Principal Investigator

04/2019-03/2020 **EoSQCD – Equation of State of QCD**, *PRACE*, EU.
Allocated computational resources: 80 Million core-hours on MareNostrum (BSC-CNS).
Participant

10/2022-06/2024 **Non-perturbative determination of b_g** , *NHR/HLRN*, Germany.
Allocated computational resources: 30 Million core-hours on Emmy/Lise.

10/2020-09/2021 **High precision strong coupling**, *PRACE*, EU.
Allocated computational resources: 100 Million core-hours on Hawk (HLRS).

01/2019-09/2022 **Gradient Flow coupling in a massive scheme**, *HLRN*, Germany.
Allocated computational resources: 8.8 Million NPL (~88 Million core-hours) on Emmy/Lise.

01/2019-01/2020 **The anomalous magnetic moment of the muon with a multi-level algorithm**, *CINECA*, Italy.
Allocated computational resources: 14 Million core-hours on Marconi.

09/2014-08/2016 **Non-Perturbative Heavy Quark Effective Theory and the strong coupling**, *GAUSS*, Germany.
Allocated computational resources: 117.8 Million core-hours on JUQUEEN and 35 Million core-hours on SuperMUC.

01/2014-06/2016 **The running coupling of QCD**, *HLRN*, Germany.
Allocated computational resources: 3 Million NPL (~30 Million core-hours) on Konrad.

Public Software

Numerical stochastic perturbation theory (NSPT), *publicly available software package developed in collaboration with Martin Lüscher (CERN)*.
Link: luscher.web.cern.ch/luscher/NSPT/index.html

Participation to funded research projects and networks

04/2022-04/2024 **Member of the research project: “Lattice Studies of Strongly Coupled Gauge Theories: Renormalization and Phase Transitions”**, *Research and Innovation Foundation*, Cyprus.

11/2017-10/2020 **Member of the INFN national project (Progetto Speciale INFN): “High performance data network: convergenza di metodologie e integrazione di infrastrutture per il calcolo High Performance (HPC) e High Throughput (HTC)”**, *INFN*, Italy.

01/2017-10/2020 **Member of the INFN national project (Iniziativa Specifica INFN): “New frontiers in lattice field theory for the Standard Model and beyond (QCQLAT)”**, *INFN*, Italy.

05/2011-11/2011 **Member of the Marie Skłodowska-Curie Initial Training Network: “Strong Interaction Supercomputing Training Network (STRONGNET)”, European Commission, EU.**
Link: cordis.europa.eu/project/id/238353

Organized conferences and workshops

09/2019 **2nd Workshop on Hadronic Contributions to New Physics Searches**, *Puerto de la Cruz*, Tenerife, Spain.
Link: research.iac.es/congreso/HC2NP2019/

Invited talks, seminars, and lectures

12/2023 **Joint Humboldt University Berlin and DESY - Zeuthen Lattice Seminars**, *Humboldt University*, Berlin, Germany.
Seminar title: “A non-perturbative determination of b_g ”.

10/2023 **Theoretical Particle Physics Seminars**, *University of Zürich and ETH*, Zürich, Switzerland.
Seminar title: “Precision determination(s) of α_s from Lattice QCD”.

10/2023 **IFT Lattice Seminars**, *Instituto de Física Teórica (IFT), Universidad Autónoma de Madrid and CSIC*, Madrid, Spain.
Seminar title: “ α_s from a tiny, heavy, universe”.

01-02/2022 **α_s (2022) Workshop – Precision measurements of the QCD coupling**, *ECT**, Trento, Italy.
Talk title: “Heavy-quark decoupling: a new tool for precision determinations of α_s ”.

10/2021 **Lattice Practices 2021**, *DESY-Zeuthen, Jülich Supercomputing Centre (JSC) & The Cyprus Institute*.
Lectures title: “Simulation algorithms for lattice QCD”.

05/2021 **Particle-Astro-Nuclear (PAN) Physics Seminars**, *Wayne State University*, Detroit, US.
Seminar title: “The energy-momentum tensor of QCD from a moving frame”.

08/2020 **Plenary talk at “The 38th International Symposium on Lattice Field Theory (Lattice 2020)”, University of Bonn**, Bonn, Germany. Plenary talks were replaced by contributions to the EPJA Special issue: “Lattice Field Theory during the COVID-19 pandemic”.
Contribution title: “Past, present, and future of precision determinations of the QCD coupling from lattice QCD”.

01/2020 **Joint Humboldt University Berlin and DESY - Zeuthen Lattice Seminars**, *DESY*, Zeuthen, Germany.
Seminar title: “A non-perturbative definition of the QCD energy-momentum tensor from a moving frame and its applications to thermodynamics”.

08/2019 **Santa Fe Workshop on Lattice QCD**, *LANL*, Santa Fe, US.
Talk title: “Determination of α_s from the ALPHA Collaboration”.

07/2019 **Advances in Lattice Gauge Theory**, *CERN*, Geneva, Switzerland.
Talk title: “Boosting hotQCD”.

02/2019 **α_s (2019) Workshop – Precision measurements of the QCD coupling, ECT***, Trento, Italy.
Talk title: “ α_s from the femto-universe”.

05-06/2018 **Frontiers in Lattice Quantum Field Theory**, *Instituto de Física Teórica (IFT), Universidad Autónoma de Madrid*, Madrid, Spain.
Talk title: “A novel form of Numerical Stochastic Perturbation Theory”.

02/2018 **Joint Humboldt University Berlin and DESY - Zeuthen Lattice Seminars**, DESY, Zeuthen, Germany.
Seminar title: “Novel algorithms for NSPT”.

12/2017 **Technical Advances in Lattice Field Theory**, *CP3-Origins, University of Southern Denmark*, Odense, Denmark.
Talk title: “Algorithmic advances in NSPT and applications”.

06/2017 **10th International Workshop on Lattice QFT and Numerical Analysis**, *University of Coimbra*, Coimbra, Portugal.
Talk title: “Algorithmic advances in NSPT”.

03/2015 **School of Physics and Astronomy and Higgs Centre for Theoretical Physics Seminars**, *University of Edinburgh*, Edinburgh, UK.
Seminar title: “A dynamical study of the chirally rotated Schrödinger functional in lattice QCD”.

02/2015 **Joint Humboldt University Berlin and DESY - Zeuthen Lattice Seminars**, DESY, Zeuthen, Germany.
Seminar title: “A dynamical study of the chirally rotated Schrödinger functional in QCD”.