

LinkedIn

Jawad Ali

Curriculum Vitae

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"Where there is matter, there is geometry." – Kepler

Research Interests

Sub-Riemannian Geometry, Computational Neuroscience, Decision-making

Education

March 2023 - Ongoing **Ph.D. in Mathematics**, Double Degree Programme between Alma Mater Studiorum – Università di Bologna, Italy, and Sorbonne University Paris, France.

Research Field, Sub-Riemannian Geometry and Its applications in Neuroscience

Project Title, Mathematical Models of the Functional Architectures of the Brain in Physiological and/or Pathological Conditions

Supervisors, [Prof. Giovanna Citti](#) (University of Bologna), [Prof. Alessandro Sarti](#) (CAMS, EHESS, Paris)

Research Timeline, 01 March 2023 – 31 August 2024: Università di Bologna, Italy, 01 September 2024 – 31 August 2025: CAMS, EHESS / Sorbonne University, France, 01 September 2025 – 30 April 2026: Università di Bologna, Italy

November 2022 - February 2023 **Master Degree in Mathematics (Higher Semester)**, Institute of Mathematics, Freie University Berlin, Germany. **Major Courses**: Topology-I, Topology-II, Commutative Algebra, **Supervisor**: [Prof. Pavle Blagojević](#)

Sept 2020 - Aug 2022 **Master Degree in Mathematics**, Quaid-I-Azam University Islamabad, Pakistan. **Major Courses**: Commutative Algebra, Homological Algebra, Banach Algebra, Algebraic Geometry and Statistical Learning, Algebraic Cryptography, Algebraic coding theory, Theory of Semirings, Fourier Transform and Distributions, **Thesis title**: "Generalized q-rung picture linguistic aggregation operators and their application in decision making", **Keywords**: Decision making, data analysis, Modeling, Fuzzy Aggregation Operator, **Supervisor**: [Prof. Waqas Mahmood](#), **Graduation date**: 05/08/2022, **Graduation grade**: 3.70/4.00

20 Oct 2016 - 09 Sept 2020 **Bachelor Degree in Mathematics**, Government College University Faisalabad, Pakistan. **Major Courses**: Calculus, Discrete Mathematics, Topology, Functional Analysis, Real Analysis, Complex Analysis, Vector and Tensor Analysis, Differential Geometry, Linear Algebra, Advance Group Theory, Module Theory, Ordinary Differential Equations, Partial Differential Equations, Numerical Analysis, Mechanics, Number Theory, Mathematical Statistics, **Graduation date**: 09/09/2020, **Graduation grade**: 3.99/4.00

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Employment history

15 June 2022 - 31 Oct 2022 **Lecturer in Mathematics at Aspire College Dijkot, Faisalabad, Pakistan**

International Mathematics Master-Single Course

15 Sep 2021 - Passed a single Course "[Complex Analysis \(Fall 2021\)](#)", COMSATS University
20 Feb 2022 [Lahore, Pakistan](#), by International mathematics master, ICTP-Italy

Poster Presentation and Talks

25th June 2025 Title: Mathematical Modeling of Neural States in the Primary Motor Cortex via Optimal Transport, Event: Sub-Riemannian Geometry and Beyond, IV, Schwarzsee, Fribourg, Switzerland

2nd October 2024 Title: Mathematical Modeling of Neural States in the Primary Motor Cortex Using the Wasserstein Distance, Event: Annual Symposium of the Department of Mathematics, University of Bologna, Italy

7th May 2024 Title: Mathematically Modeling of Neural States in the Primary Motor Cortex, Event: MNEYS-SPOKE 4 Meeting, University of Bologna, Italy

Academic Honors and Awards

Mar 2023-Apr 2026 Recipient of the PhD Scholarship under NRRP Partenariati Estesi (PE12 – MNESYS), funded by the EU–NextGenerationEU through Italy's National Recovery and Resilience Plan (CUP: J33C22002970002), for research on mathematical models of brain functional architectures in physiological and/or pathological conditions.

19 Jan 2023 Conferred the Gold Medal for achieving 1st position in undergraduate studies at Government College University Faisalabad, by the Governor of Punjab, Pakistan during the 10th Convocation (Phase-II).

Oct 2020-Aug 2022 Recipient of a fully funded merit-based scholarship during Master's studies at Quaid-i-Azam University, Islamabad, awarded by the university.

Publications

- [1] **Ali, J.**, Sarti, A. and Citti, A sub-Riemannian model of the motor cortex with Wasserstein distance (in preparations).
- [2] Mazzetti, C., **Ali, J.**, Sarti, A. and Citti, G., 2024. A sub-Riemannian model of neural states in the primary motor cortex. arXiv preprint arXiv:2501.03247.

Summer Schools, Conferences and Workshops participated in

23-27 June 2025 Conference on Sub-Riemannian Geometry and Beyond, IV, Schwarzsee, Fribourg, Switzerland

17-20 June 2025 ICMNS 2025-International Conference on Mathematical Neuroscience, Barcelona, Spain

12-13 Sep 2024 Conference on Differential evolutive models in spaces with singularities, Accademia dei Lincei, Roma - Dipartimento di Matematica, Università di Bologna, Italy;

21-23 August 2024 Workshop on Metric Geometry and Geometric Measure Theory, University of Fribourg, Switzerland;

3-5 July 2024 PaPa24 Padua Paris Sub-Riemannian seminar Padova, University of Padua, Italy;

- 24-28 June 2024 First Johns Hopkins University - University of Bologna Conference "Noncommutativity at the Interface of Topology, Geometry and Analysis, University of Bologna, Italy;
- 9-14 June 2024 13th School on Analysis and Geometry in Metric Spaces Department of Mathematics University of Trento, Italy;
- 17-19 Apr 24 Workshop on Manifolds and groups in Bologna, II, University of Bologna, Italy;
- 6-7 Mar 24 CalVaFer - Calculus of Variations in Ferrara, Italy;
- 12-16 Feb 24 XXXIII National Conference on Calculus of Variations held in Riccione, Italy;
- 03 July 2023 - Organized and participated in the esteemed international conference on Sub-
05 July 2023 Riemannian Geometry Harmonic Analysis, PDEs and Applications Bologna, Italy, organized by Alma Mater Studiorum - Università di Bologna, Italy;
- 19 Jun 2023 - Participation to workshop on Sub-Riemannian Geometry and Beyond, III, Pisa, Italy,
23 Jun 2023 organized by Centro di Ricerca Matematica Ennio De Giorgi Palazzo Puteano Scuola Normale Superiore, Italy;
- 01 Mar 2022 - Participation to CIMPA Research School on Algebraic and Combinatorial methods
11 Mar 2022 in geometry, Lahore, Pakistan, organized by CIMPA and HEC Pakisan;
- 08 Nov 2021 - Participation to CIMPA Research School on Recent Advances in Dynamical Systems,
19 Nov 2021 Lahore, Pakistan, organized by CIMPA and HEC Pakistan;
- 15 Nov 2021 - Participation to School on Markov Partitions and Young Towers in Dynamics —
10 Dec 2021 (smr 3642) organized by ICTP, Italy.

Organizing Activities

- 03-05 July 2023 Member of the Organizing Committee of the conference, Sub-Riemannian Geometry Harmonic Analysis, PDEs, held in Bologna, Italy.

Computer skills

Computational tools MATHEMATICA, MATLAB

LaTeX Knowledge of the main packages

Operative systems Windows

Coding **Python**: basic knowledge of use; **MATLAB**: Proficient in MATLAB at an advanced level, with extensive experience in developing algorithms, performing data analysis, and utilizing specialized toolboxes for simulation and modeling.

Language skills

English B2(Fluent)

Urdu Mother tongue

Hobby

Love to find out solutions to Problems, Traveling and tourism