

DR. MUSAVARAH SARWAR

Assistant Professor

Department of Mathematics,
GC Women University, Sialkot, Pakistan.
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BRIEF BIOGRAPHY

Dr. Musavarah Sarwar has received her undergraduate as well as postgraduate degrees in Mathematics from University of the Punjab, where she received awards and Gold Medal for academic excellence. She received MPhil and PhD degrees in Mathematics from Punjab University, Lahore. Dr. Musavarah's research interests include graph theory, fuzzy graphs, fuzzy decision support systems/decision-making systems and extensions of soft set theory. She has published one monograph and 22 research articles in international peer-reviewed ISI Indexed /Impact factor journals. Some of her papers have been published in high impact journals including International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems, Neural Computing and Applications, Symmetry, Mathematics, Journal of Intelligent and Fuzzy Systems, Soft Computing and Artificial Intelligence Review. Her current impact factor is 36.125, H-index on Publons is 12 and i10-index on Google Scholar is 14. She has been editorial member of 3 international journals and reviewer for 11 international journals including IEEE Access and Engineering Applications of Artificial Intelligence.

Objective: Enter into professional life with commitment and to become part of dynamic organization where I can fully apply my knowledge and skills towards the organization growth.

RESEARCH PROFILE

• Number of Published Books by International Publisher	01
• Number of International/HEC recognized Journal publications	24
• Total impact factor	36.125
• Number of Citations of the Publications (Google Scholar)	386
• Number of Citations of the Publications (Scopus)	302
• H -index	12
• i10-index (Google Scholar)	14
• Number of Foreign Research Collaborators	4
• Number of National Research Collaborators	4
• Reviewer/Referee for International Journals including IEEE Access	11
• Member Editorial Board	03

RESEARCH INTERESTS

- Graph Theory
- Applications of fuzzy systems and related topics in graphs, hypergraphs and matroids.
- Fuzzy Decision Support/ Decision-Making Systems
- Hybrid soft computing models

ACADEMIC QUALIFICATION

Sr no.	Education	Pct/cgpa	Year/Div	Institute
1	Ph.D. (Mathematics)	completed 4.00 cgpa (course work)	2014 – 22 February 2018	Department of Mathematics, PU, Lahore
2	M.Phil. (Mathematics)	98%	2014/1 st	Department of Mathematics, PU, Lahore
3	MSc (Mathematics)	88%	2011/1 st	Department of Mathematics, PU, Lahore
4	BSc (Math A, Math B, Statistics)	82%	2009/1 st	Punjab College for Women, Gujranwala
5	ICS(Math, Statistics, Computer)	87%	2007/1 st	Punjab College for Women, Gujranwala
6	Matric(Science)	66%	2007/1 st	Govt. Girls High School, Gujranwala

Title of Doctoral Dissertation: Novel Decision-Making Methods based on m-Polar Fuzzy Graphs.

Title of MPhil Dissertation: Metric Invariance of Flower Snarks and some Families of Convex Polytopes.

ACHIEVEMENTS/AWARDS

- Awardee of HEC Indigenous Scholarship Phase II Batch III, 2015.
- Obtained highest CGPA in MPhil and PhD examinations held at Department of Mathematics, Punjab University, Lahore.
- Awarded with Gold Medal in 121st convocation 2012 in PU, Lahore for obtaining 1st position in MSc.
- Obtained 3rd position in overall Punjab University in BSc 2009 and was awarded with a prize by CM Punjab.
- Stood 4th in Inter Examinations 2007 BISE Gujranwala.

FIELDS OF INTEREST

- Abstract Algebra
- Linear Algebra
- Real Analysis
- Topology and Functional analysis
- Graph Theory

PERSONAL SKILLS

- Installation and operation of all general softwares and drivers
- MS office
- FORTRAN, Mathematica
- Latex, Latex Draw
- Mayura Draw

LIST OF PUBLICATIONS

INTERNATIONAL BOOKS

Muhammad Akram, **Musavarah Sarwar**, Wiselaw A. Dudek, Graphs for the Analysis of Bipolar Fuzzy Information, Studies in Fuzziness and Soft Computing, Springer, vol 401, 2021 (Publication Date: 01 December 2020).

ARTICLES IN INTERNATIONAL JOURNALS/HEC RECOGNIZED JOURNALS

Year 2021

- (24) Ghous Ali, **Musavarah Sarwar**, Novel technique for group decision-making under fuzzy parameterized-rung orthopair fuzzy soft expert framework, Mathematical Problems in Engineering, Volume 2021, Article ID 5449403, 27 October 2021. (**Impact Factor=1.305**)
- (23) Sundas Shahzadi, Areen Rasool, **Musavarah Sarwar**, Muhammad Akram, A framework of decision making based on bipolar fuzzy competition hypergraphs, Journal of Intelligent and Fuzzy Systems, 41(1): 1319–1339, 11 August 2021.
- (22) **Musavarah Sarwar**, Muhammad Akram, Peide Liu, An integrated rough ELECTRE II approach for risk evaluation and effects analysis in automatic manufacturing process, Artificial Intelligence Review, 54(6): 4449–4481, 23 April 2021. (**Impact Factor=8.139**)
- (21) **Musavarah Sarwar**, Muhammad Akram, Sundas Shahzadi, Bipolar Fuzzy Soft Information Applied to Hypergraphs, Soft Computing, 25(5):3417–3439, 16 February 2021. (**Impact Factor=3.643**)

Year 2020

- (20) Sundas Shahzadi, **Musavarah Sarwar**, Muhammad Akram, Decision-Making Approach with Fuzzy Type-2 Soft Graphs, Journal of Mathematics, Volume 2020, Article ID 8872446, 25 pages, 17 November 2020. (**Impact Factor=0.971**)

- (19) **Musavarah Sarwar**, Decision-making approaches based on color spectrum and D-TOPSIS method under rough environment, Computational and Applied Mathematics, 39(4): 1–32, 12 October 2020. (**Impact Factor=2.239**)
- (18) **Musavarah Sarwar**, Muhammad Akram, Usman Ali, Double dominating energy of m -polar fuzzy graphs, Journal of Intelligent and Fuzzy Systems, 38(2) : 1997 – 2008, 06 February 2020. (**Impact Factor=1.851**)

Year 2018

- (17) Muhammad Akram, **Musavarah Sarwar**, Novel applications of m -polar fuzzy competition graphs in decision support system, Neural Computing and Applications, 30(10) : 3145 – 3165, November 2018. (**Impact Factor=4.664**) (Online Published: 27 February 2017)
- (16) **Musavarah Sarwar**, Muhammad Akram, Noura Omair Alshehri, A new method to decision-making with fuzzy competition hypergraphs, Symmetry, 2018, 10(9), 404; <https://doi.org/10.3390/sym1009040>, 22 pages, 16 September 2018. (**Impact Factor=2.143**)
- (15) **Musavarah Sarwar**, Muhammad Akram, Fariha Zafar, Decision making approach based on competition graphs and extended TOPSIS method under bipolar fuzzy environment, Mathematical and Computational Applications, 2018, 23(4), 68; <https://doi.org/10.3390/mca23040068>, 17 pages, 28 October 2018. (**ISI Indexed Journal**)
- (14) Muhammad Akram, **Musavarah Sarwar**, Rajab Ali Borzooei, A novel decision-making approach based on hypergraphs in intuitionistic fuzzy environment, Journal of Intelligent and Fuzzy Systems, 35(2) : 1905 – 1922, 26 August 2018. (**Impact Factor=1.637**)
- (13) Muhammad Akram, **Musavarah Sarwar**, New applications of m -polar fuzzy competition graphs, New Mathematics and Natural Computation, 14(2) : 249 – 276, 2 July 2018. (**ISI Indexed Journal**)
- (12) **Musavarah Sarwar**, Muhammad Akram, Certain algorithms for modeling uncertain data using fuzzy tensor product Bezier surfaces, Mathematics, 6, 42; [doi:10.3390/math6030042](https://doi.org/10.3390/math6030042), 12 pages, 09 March 2018. (**Impact Factor=1.105**)
- (11) **Musavarah Sarwar**, Muhammad Akram, Bipolar fuzzy circuits with applications, Journal of Intelligent and Fuzzy Systems, 34(1) : 547 – 558, 12 January 2018. (**Impact Factor=1.637**)

Year 2017

- (10) Muhammad Akram, **Musavarah Sarwar**, Novel applications of m -polar fuzzy hypergraphs, Journal of Intelligent and Fuzzy Systems, 32(3) : 2747 – 2762, 24 February 2017. (**Impact Factor=1.426**)
- (9) **Musavarah Sarwar**, Muhammad Akram, Representation of graphs using m -polar fuzzy environment, Italian Journal of Pure and Applied Mathematics, 38 : 291 – 312, March 2017. (**ISI Indexed Journal**)

- (8) Muhammad Akram, **Musavarah Sarwar**, Novel multi-criteria decision making methods based on bipolar neutrosophic graphs and bipolar neutrosophic sets, Italian Journal of Pure and Applied Mathematics, 38 : 368 – 389, March 2017. **(ISI Indexed Journal)**
- (7) **Musavarah Sarwar**, Muhammad Akram, Novel concepts of bipolar fuzzy competition graphs, Journal of Applied Mathematics and Computing, 54(1 – 2) : 511 – 547, June 2017. **(ISI Indexed Journal)** (Online Published: 9 June 2016)
- (6) Muhammad Akram, **Musavarah Sarwar**, Transversals of m-polar fuzzy hypergraphs with applications, Journal of Intelligent and Fuzzy Systems, 33(1) : 351 – 364, 22 June 2017. **(Impact Factor=1.426)**
- (5) **Musavarah Sarwar**, Muhammad Akram, Novel applications of m-polar fuzzy concept lattice, New Mathematics and Natural Computation, 13(3) : 261 – 287, November 2017. **(ISI Indexed Journal)**
- (4) **Musavarah Sarwar**, Muhammad Akram, Certain Algorithms for computing strength of competition in bipolar fuzzy graphs, International Journal of Uncertainty, Fuzziness and Knowledge- Based System, 25(6) : 877–896, 26 December 2017. **(Impact Factor=1.214)**
- (3) **Musavarah Sarwar**, Muhammad Akram, New applications of m-polar fuzzy matroids, Symmetry, 9, 319; doi:10.3390/sym9120319, 18 December 2017. **(Impact Factor=1.256)**

Year 2016

- (2) **Musavarah Sarwar**, Muhammad Akram, An algorithm for computing certain metrics in intuitionistic fuzzy graphs, Journal of Intelligent and Fuzzy Systems, 30(4) : 2405 – 2416, 10 March 2016. **(Impact Factor=1.261)**
- (1) Muhammad Aslam Malik, **Musavarah Sarwar**, On the metric dimension of two families of convex polytopes, Afrika Matematika, 27 : 229 – 238, March 2016. **(ISI Indexed Journal)** (Online Published: 07 May 2015)

EDITORIAL BOARD

- (1) Advances in Fuzzy Systems (Hindawi Publishing Corporation)(Academic Editor)
- (2) Journal of Mathematics (Hindawi Publishing Corporation)(Academic Editor)
- (3) Mathematical Problems in Engineering (Hindawi Publishing Corporation)(Academic Editor)

REFEREEING AND REVIEWING

- (1) TWMS Journal of Applied and Engineering Mathematics (Turkey, Isik University)

- (2) International Journal of Fuzzy Computation and Modelling (Switzerland, INDERSCIENCE Publishers)
- (3) Soft Computing (Germany, Springer Verlag)
- (4) Journal of Intelligent and Fuzzy Systems (Netherlands, IOS Press)
- (5) Complexity (Egypt, Hindawi Limited)
- (6) Mathematical Problems in Engineering (Egypt, Hindawi Publishing Corporation)
- (7) Advances in Fuzzy Systems (Egypt, Hindawi)
- (8) Computational and Applied Mathematics (Brazil, Springer)
- (9) IEEE Access (United States, IEEE)
- (10) Journal Of Applied Mathematics and Computing (Germany, Springer)
- (11) Engineering Applications of Artificial Intelligence (United Kingdom, Elsevier)

LIST OF FOREIGN CO-AUTHORS

- (1) Peide Liu, School of Management Science and Engineering, Shandong University of Finance and Economics, Shandong, China.
- (2) Wieslaw A. Dudek, Wroclaw University of Technology, Wroclaw, Poland
- (3) Prof. Dr. Rajab Ali Borzooei, Shahid Beheshti University, Tehran, Iran
- (4) Noura O. Alshehri, King Abdulaziz University, Jeddah, Saudi Arabia

CONFERENCES AND SEMINARS

AS A SPEAKER

- (9) Speaker of PhD public defense at Department of Mathematics, University of the Punjab, Lahore held on 22 February 2018 on the thesis entitled “**Novel decision-making methods based on m-polar fuzzy graphs**”.
- (8) Speaker in the departmental seminar series at Department of Mathematics, University of the Punjab, Lahore held on 24 May 2017 on the topic “**Formal concept analysis: Extensions and applications**”.
- (7) Speaker in “International Workshop on Nonlinear Analysis and Applications” held on October 1-3, 2016 on the topic “**On m -polar fuzzy hypergraphs**” at CMAP UMT, Lahore.

- (6) Speaker in the departmental seminar series at Department of Mathematics, University of the Punjab, Lahore held on 7 September 2016 on the topic “**On m -polar fuzzy graphs**”.
- (5) Participated as a speaker in “1st UMT International Conference on Pure and Applied Science” held on March 5-7, 2016 on the topic “ **m -polar fuzzy graphs**” at UMT, Lahore.
- (4) Participated as a speaker in “International Conference on Recent Advances in Applied Mathematics” held on December 17-18, 2015 on the topic “**An algorithm for computing certain metrics in intuitionistic fuzzy graphs**” at CIIT COMSATS, Lahore.
- (3) Speaker in the departmental seminar series at Department of Mathematics, University of the Punjab, Lahore held on 25 November 2015 on the topic “**An algorithm for computing certain metrics in intuitionistic fuzzy graphs**”.
- (2) Speaker in the MPhil final talk at Department of Mathematics, University of the Punjab, Lahore held on 23 June 2014 on the topic “**Metric invariance in flower snarks and some families of convex polytopes**”.
- (1) Speaker in the departmental seminar series at Department of Mathematics, University of the Punjab, Lahore held on 9 April 2014 on the topic “**Metric dimension of some families of graphs**”.

AS A PARTICIPANT

- (12) Attended 5th UMT International Conference on “**Pure and Applied Mathematics (5th UICPAM-2019)**” organized by Centre for Mathematics and its Applications (CMAP) UMT, Lahore held on 29–31 March, 2019.
- (11) Attended International conference on “**Recent Advances in Applied Mathematics (ICRAAM 2019)**” organized by Department of Mathematics, COMSATS, Lahore on 20–22 February, 2019.
- (10) Attended 3rd one day symposium on “**Algebra, Analysis and its Applications**” organized by Department of Mathematics, University of Management and Technology, Sialkot on 2nd December, 2018.
- (9) Attended “**3rd International Conference on Pure and Applied Mathematics**” organized by CMAP, UMT Lahore on March 4-6, 2017.
- (8) Attended “**Understanding Salam Two day school on Salam’s big ideas**” organized by Abdus Salam School of Mathematical Sciences, Lahore on 28-29 January, 2017.
- (7) Attended “**Second Workshop on Modern Aspects of Algebra and Graph Theory**” organized by CIIT, COMSATS Lahore on November 2-3, 2016.
- (6) Attended “**One Day Conference on Gravitation and Cosmology**” organized by Department of Mathematics, University of the Punjab, Lahore on 26th November 2014.

- (5) Attended “**Workshop on Modern Aspects of Algebra and Graph Theory**” organized by CIIT, COMSATS Lahore on March 27-28, 2015.
- (4) Participated in LUMS CASM Workshop on “**Recent Advances in Graph Theory and Combinatorics**”, November 22-24, 2013.
- (3) Participated in LUMS CASM Workshop on “**Recent Advances in Commutative Algebra with Algebraic Geometry**”, March 28-29, 2014.
- (2) Participated in “**International Workshop on Discrete Structures**” at NUST, Islamabad, March 5-7, 2014.
- (1) Attended a lecture series on Cosmology held at Punjab University, Lahore in 2013.

REFERENCES

- (1) Dr. Muhammad Akram, Professor, Department of Mathematics, University of the Punjab, Lahore.
- (2) Dr. Hafiz Khalid Mehmood, Assistant Professor, Department of Mathematics, University of the Punjab, Lahore.