



Sk Safique Ahmad

Resumé

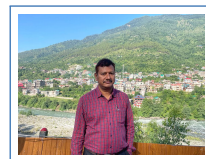
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Education

- 2008 **Ph.D. Mathematics**, *IIT Guwahati*
- 2002 **MPhil Mathematics**, *Reveshaw University, Cuttack*
- 2000 **M.Sc. Mathematics**, *Utkal University, Bhubaneswar*
- 1998 **B.Sc.**, *Utkal University, Bhubaneswar*

Work Experience

- Feb. 22– **Professor**, *IIT Indore*
- Feb. 16-Feb. 22 **Associate Professor**, *IIT Indore*
- Feb 12-Jan. 16 **Assistant Professor**, *IIT Indore*
- Dec. 09- Feb. 12 **Assistant Professor(contract)**, *IIT Indore*
- Dec. 08-Feb. 09 **Research Associate**, *IISc Bangalore*
- Feb. 09-Dec. 09 **Post-doctoral Fellow**, *TU Berlin*

Research Interest, Projects, and Supervision

Research Interest

- Numerical Linear Algebra: Linear, Non-linear, and Multi-parameter eigenvalue problems, Quaternion Linear Algebra, Inverse Eigenvalue problems in Vibration and Control, Aeroelasticity, Saddle point problem and its application in SVM

Research Grant and Funding

- On inverse eigenvalue problems for structured matrix pencils, Department of Science and Technology (DST), New Delhi, SERC, Under the scheme MATRICS
- On Multi parameter Eigenvalue Problems, Department of Science and Technology (DST), New Delhi, SERC, Fast Track scheme for young scientist
- Grant received by DST SERB for research meet in Birmingham
- Grant received by Brazil Govt for research meet in Seoul
- Chebyshev grant received for research meet in St. Petersburg during July 2022
- Selected to receive travel support from the Simons Foundation and in collaboration with the International Mathematical Union (IMU) and its Commission for Developing Countries (CDC), to attend the (ICM) 2026 to be held July 23-30, 2026, in Philadelphia, Pennsylvania, USA. Congratulations!
- Selected to receive travel support from from the Institute to visit to University of Split for collaborative research work in 2024

Research Advisees

Post-Doctoral Advisees:

- Charitha Cherugondi (PhD from IIT Kanpur) Women Scientists funded by DST SERB. Currently working at IIT Indore as Assistant Professor

As sole Doctoral Advisor:

- Istkhari Ali (PhD degree awarded), Thesis Title: Localization Theorems and Perturbation Analysis on Quaternionic Eigenvalue Problems
- Prince Kanhiya (PhD degree awarded), Thesis Title: Backward Error Analysis of Specified Eigenpairs and its Application in Solving Inverse Eigenvalue Problems
- Gyan Swarup Nag Thesis Title: "Backward error, Pseudospectra and Stability radii of Structured Eigenvalue Problems"
- Neha Bhadala. Thesis Title: "On the Solutions and Perturbation Analysis of Generalized Reduced Biquaternion Matrix Equations with Applications"
- Pinki Khatun. Thesis Title: Preconditioned Iterative Methods and Perturbation Analysis for a class of Saddle point problems"

Ph.D. Students :

- Mr. Sagar Ranga

Internship & Master Advisor:

Master Advisor	Internship
Suraj Bhan	Himanshu Singh(NITR)
Yashpal Yadav	Harshdeep Singh Tuteja
Rahul	Rohitash Yadav
Pravakar Barik	Manas Ranjan Jena (IMA)
	Md Aabish Rahman (AMU)

- Varun Shirish Kulkarni

Selected Services

Reviewer:

- (1) American Mathematical Society
- (2) Linear Algebra and its Applications (Elsevier)
- (3) Computers and Mathematics Applications (Elsevier)
- (4) Analysis and Abstract (Hindwai)
- (5) Proceedings of the National Academy of Sciences, Indian Section A: Physical Sciences
- (6) Applied Mathematics and Information Sciences: Natural Sciences Publishing
- (7) Bio Mathematics
- (8) Journal of Communications in Numerical Analysis
- (9) Reviewer and Examiner of numerous PhD thesis from IIT Kharagpur, Utkal University, Ravenshaw University, SVNIT Surat, MNIT Bhopal etc.

- (10) Member of the Editorial Board of the Journal of the Indian Academy of Mathematics for a period of four years (2022-2025)
- (11) Serve as a referee of SIAM Undergraduate Research Online
- (12) Institute Representative for JEE and GATE Examinations
- (13) Research Visit to Ohio State University (March 15 - July 15, 2018) for an opportunity to have research interactions and explore possibilities of future mutual research collaborations

Administrative work

- (1) 2015-Sept 2018 : Head, Department of Mathematics, IIT Indore
- (2) 2010-2012 : Faculty coordinator of the Department of Mathematics
- (3) Institute representative for JEE and GATE Examination
- (4) Department Faculty coordinator of Training and Placement
- (5) Institute transport convener of IIT Indore

Academic Activities

- (1) DPGC Convener at IIT Indore
- (2) DUGC Convener at IIT Indore
- (3) Convener of undergraduate program on Mathematics and Scientific Computing at the Department of Mathematics
- (4) Convener of undergraduate courses of MMathematics of B.Tech. at IIT Indore
- (5) Coordinator for the development of M.Sc. program and the development of different courses for M.Sc. program in Mathematics at IIT Indore
- (6) Coordinator for the development of different courses in BTech program at IIT Indore
- (7) Development of the various courses at IIT Indore like Numerical Linear Algebra, Linear Algebra, Calculus, Complex analysis, ODE-I, and ODE-II

Outreach Activities

Organized QIP Workshop:

- (1) Wavelet via Matrices and its Applications in signal and image processing during 16-21 November 2020 funded by AICTE under QIP
- (2) Matrix Computations and its application in system, signal and control problems during 16-21 February 2021 funded by AICTE under QIP
- (3) Sampling theory and its applications: Signal, Image processing, and Data Science during January 24-29, 2022
- (4) Organized Workshop on "Numerical Linear Algebra in Quantum Computing and Machine Learning." Feb 21-22, 2025 In Collaboration with IISc Bangalore, Birla Institute of Technology & Science, Pilani K K Birla Goa Campus

Organized GIAN Workshop:

- (3) Course conducted "Solving linear systems and computing generalized inverses using recurrent neural networks" under the auspices of Global Initiative of Academic Networks (GIAN) funded by MHRD Govt. of India, Course Duration: 09 th June- 19 June 2025. Foreign Faculty: Prof Predrag Staminovic.

- (2) Course Name: Big Data Stream Analytics, Course Area: Mathematical & Computer Sciences, Foreign Faculty : Professor Yann Busnel, Crest(Ensai) / Inria Rennes, France , Course Duration: 26th Oct. - 1st Nov.,2016, Venue: IIT Indore, URL: <http://iiti.ac.in/people/ashokm/GianBigData.html>
- (1) Course conducted "Modern Applications of Numerical Linear Algebra Methods" under the auspices of Global Initiative of Academic Networks (GIAN) funded by MHED Govt. of India, Course Duration: 27th June- 5 July 2016

Organized Conference:

- Convener of the International Conference on Mathematical Modeling and Scientific Computing (ICMMSC) July 19-21,2018 at IIT Indore. URL: <http://icmmssc.iiti.ac.in/>

Book

- Santanu Manna, Biswanath Datta, Sk. Safique Ahmad, [Mathematical Modeling and Scientific Computing with Applications](#), Springer Singapore, 2020

Membership in Active Groups

- GAMM, OMS (Orissa Mathematical Society), SIAM, AMS, Member in the OR Society of MP, India, Nominated as Department quality assurance cell (DQAC) of DAVV University as an expert

Lab Development

- M.Sc. computational lab is developed and has done various work for the initial development of the department when Institute was on a temporary campus

Teaching/Lab

Course Name:

- MA 103 Calculus (UG) Sole Instructor & Coordinator
- MA 104 Linear Algebra and ODE-I (UG) Instructor & Coordinator
- MA 706 Numerical Linear Algebra (PG) Instructor & Coordinator
- MA 204 Numerical Methods (UG) instructor & Coordinator
- PMA 101 Calculus UG Instructor & Coordinator
- PMA 102 Calculus UG Instructor & Coordinator
- MA 798 Ph.D. Seminar Course (PG) Instructor
- MA 797 Ph.D. Seminar Course (PG) Instructor & Coordinator
- MA 706 Numerical Linear Algebra (PG) Instructor & Coordinator
- MA 673 Discrete Mathematics (PG) Instructor & Coordinator
- MA 203 Complex Analysis and ODE-II (UG) Instructor
- MA 680 Computational Techniques (PG) Instructor
- MA 705 Applied Operator Theory (PG) Instructor & Coordinator
- MA 641 Linear Algebra (PG) Instructor

Fellowship Obtained

- GATE, SRF, NBHM Post Doctoral Fellowship, German Postdoctoral Fellowship

Miscellaneous Experience

- Senate Member of IIIT Bhopal
- Convener for the Under graduate Program of IIIT Bhopal
- Convener for the Under graduate Program of IIIT Bhopal
- Expert Committee for the Faculty Selection in IIIT Bhopal, Jamiaamia Islamia University, SVVV University, IIM Indore
- Appointed as an external examiner for conducting MSc Project viva voce examination in 15th May 2025 in the Department of Mathematics Raipur
- Appointed as an external examiner for conducting MSc Project viva voce examination in 20 th May 2025 in the Department of Msthemstics, DAVV, Indore
- Departmental Academic Committee (DAC) of NIT Raipur approved by the Board of Governors, in its 64th meeting tenure is for three years.

Publications

- (29) A Class of Generalized Shift-Splitting Preconditioners for Double Saddle Point Problems, **S. S. Ahmad** and P. Khatun, Appl. Maths and Comput. (Accepted) <https://doi.org/10.1016/j.amc.2025.129658>
- (28) Structured Backward Errors of Sparse Generalized Saddle Point Problems with Hermitian Block Matrices, **S. S. Ahmad** and P. Khatun, Electronic Trans. Numer. Anal. (ETNA) (Accepted)
- (27) Partial condition numbers for double saddle point problems, **S. S. Ahmad** and P. Khatun, Numerical Algorithms (Accepted) <https://doi.org/10.1007/s11075-025-02161-2>
- (26) Structured Backward Errors for Special Classes of Saddle Point Problems with Applications, **S. S. Ahmad** and P. Khatun, Linear Algebra Application, 713,(2025), 90-112. <https://doi.org/10.1016/j.laa.2025.03.003>
- (25) L-structure least squares solutions of generalized reduced biquaternion matrix equations with applications **S. S. Ahmad** and N. Bhadala, Accepted in Linear and Multilinear Algebra (LAMA), Volume 73(2025), 1685-1713, doi-10.1080/03081087.2024.2437658.
- (24) Outer inverse of reduced biquaternion matrices, N. Bhadala, **S. S. Ahmad** and P. S. Stanimirović, Numer Algor (2024), (Published).
- (23) A robust parameterized enhanced shift-splitting preconditioner for three-by-three block saddle point problems, **S. S. Ahmad** and P. Khatun, Journal of Computational and Applied Mathematics, 459(2025), 116358. DOI: <https://www.sciencedirect.com/science/article/pii/S037704272400606X?via%3Dihub>
- (22) Backward error analysis of generalized eigenvalue problems preserving block structures of matrices,, **S. S. Ahmad**, G. S. Nag, FILOMAT, 39 (2025).
- (21) Condition numbers for the Moore-Penrose inverse and the least squares problem involving rank-structured matrices, **S. S. Ahmad** and Pinki Khatun, Accepted for Publication in Linear and Multilinear Algebra (LAMA), 73 (2024), 1159–1195
- (20) Algebraic technique for mixed least squares and total least squares problem in the reduced biquaternion algebra, **S. S. Ahmad** and N. Bhadala: Accepted for Publication in Linear and Multilinear Algebra (LAMA), 73 (2024), 1121-1141.

- (19) Structured condition numbers for a linear function of the solution of the generalized saddle point problem, **S. S. Ahmad** and P. Khatun: Electr. Trans. Num. Anal. (ETNA) Vol. 60, pp. 471–500, 2024. <https://etna.math.kent.edu/vol.60.2024/pp471-500.dir/pp471-500.pdf>
- (18) Pseudospectra, Stability radii and their relationship with Backward error for Structured Nonlinear Eigenvalue Problems, **S. S. Ahmad** and G. S. Nag, Vol 47, 2024, 7372–7396. <https://doi.org/10.1002/mma.9976>
- (17) Structured Backward Errors for Special Classes of Saddle Point Problems with Applications, **S. S. Ahmad** and P. Khatun, Linear Algebra Application (Accepted) <https://doi.org/10.1016/j.laa.2025.03.003>.
- (16) Backward error analysis and inverse eigenvalue problems for Hankel and Symmetric-Toeplitz structures, **S. S. Ahmad** and P. Kanhiya, Applied Mathematics and Computations, 406, 2021.
- (15) Perturbation analysis on matrix pencils for two specified eigenpairs of a semisimple eigenvalue with multiplicity two, **S. S. Ahmad** and P. Kanhiya, Electr. Trans. Num. Anal., 52:370–390, 2020.
- (14) Structured perturbation analysis of sparse matrix pencils with s-specified eigenpairs, **S. S. Ahmad** and P. Kanhiya, Linear Algebra Appl., 602:93–119, 2020.
- (13) Perturbation analysis of matrices over a quaternion division algebra, **S. S. Ahmad** I. Ali, and I. Slapnicar, Electr. Trans. Num. Anal., Vol. 54, pp. 128–149, 2021.
- (12) Perturbation analysis for palindromic and anti-palindromic nonlinear eigenvalue problems, **S. S. Ahmad**, Electr. Trans. Num. Anal. (ETNA), Vol. 51, pp. 151–168, 2019.
- (11) Sensitivity Analysis of Nonlinear Eigenproblems, R Alam and **S. S. Ahmad**, SIAM J. Matrix Anal. Appl., 40, pp. 672–695, 2019.
- (10) Localization theorems for matrices and bounds for the zeros of polynomials over a quaternion division algebra, **S. S. Ahmad** and I. Ali, Filomat, Vol. 32, pp. 553–573, 2018.
- (9) Backward errors and pseudospectra for structured nonlinear eigenvalue problems, **S. S. Ahmad** and V. Mehrmann, Operators and Matrices, Vol. 10, pp. 539–556, 2016.
- (8) Bounds for eigenvalues of matrix polynomials over quaternion division algebra, **S. S. Ahmad** and I. Ali, Advances in Applied Clifford Algebras, Vol. 26, pp. 1095–1125, 2016.
- (7) Wilkinson's problem for matrix pencils, **S. S. Ahmad** and R. Alam, The electronic J. Linear Algebra (ELA), Vol. 30, pp. 632–648, 2015.
- (6) Backward errors for eigenvalues and eigenvectors of Hermitian, skew-Hermitian, H-even and H-odd matrix polynomials, **S. S. Ahmad** and V. Mehrmann, Linear and Multi linear Algebra (LAMA), Vol. 61, pp. 1244–1266, 2013.
- (5) Perturbation analysis for complex symmetric, skew symmetric, even, and odd matrix polynomials, **S. S. Ahmad** and V. Mehrmann, Electronic Transactions on Numerical Analysis (ETNA), Vol. 38, pp. 275–302, 2011.
- (4) On Pseudo spectra, Critical points and Multiple Eigenvalues of Matrix Pencils, **S. S. Ahmad**, R. Alam, and R. Byers, Siam Journal of Matrix Analysis, vol. 31, no. 4, pp. 1915–1933, 2010.

- (3) On estimation of Transient Stochastic Stability of Linear Systems, **S. S. Ahmad** and S. Raha, Stochastic and Dynamics, vol. 10, no. 3, pp. 385-405, 2010.
- (2) Pseudo spectra, Critical points and Multiple Eigenvalues of Matrix Polynomials, **S. S. Ahmad** and R. Alam, Linear Algebra and its Applications, vol. 430, pp.1171-1195, 2009.
- (1) The Fully Implicit Stochastic-alpha Method for Stiff Stochastic Differential Equations, **S. S. Ahmad**, Nigam C Parida and S. Raha, Journal of Computational Physics, vol. 228, pp. 8263–8282, 2009.

Details about paper can be found on Mathscinet: <https://mathscinet.ams.org/mathscinet/search/author.html?mrauthid=861933>

Selected Invited Talks

- (43) Given an Invited talk on "Mathematical Foundations of Data Science", funded by the Central University of Jharkhand, Ranchi on August August 8, 2025.
- (42) Given two talks Short-Term Training Program on "Mathematical Foundations of Big Data Analysis", funded by the Madhya Pradesh Council of Science & Technology and organized by AUMP from July 28th to August 01st, 2025, Amity University Gwalior
- (41) Given eight talks in the GIAN course Organised by Department of Mathematics on Solving linear systems and computing generalized inverses using recurrent neural networks during 09-19, June 2025.
- (40) Given six talks in the workshop on Mathematical Foundation for Data Science and Machine Learning" to NCM (A joint venture of IIT Bombay and TIFR Mumbai) funded by NBHM, which was held at IIIT Naya Raipur, Chhattisgarh during 02-14 Jun 2025 in offline mode.
- (39) Giving a talk in the Department of Mathematics NIT Raipur and the MSc. Project evaluation in 15th June 2025.
- (38) Third 1-day workshop on Matrix Equations TU Braunschweig; 09. October 2009.
- (37) In the Seminar Series Diplomanden- und Doktorandenseminar Numerische Mathematik TU Berlin; 03. December 2009.
- (36) Invited Speaker in one day National Conference in Mathematical modeling and its applications at School of Studies in Mathematics, vikram University Ujjain (M.P.) on 22nd December 2024.
- (35) Invited talk given in ICAGAAAI - 2024 during November, 7-9, 2024.
- (34) Invited talk in the Department of Mathematics, NIT Raipur on 15th May 2025.
- (33) Invited talk in the OMS conference during Jan 11-12, 2025.
- (32) Invited Speaker in National Conference on Recent Advances in Mathematics and its Applications (NCRAMA-2024), organized by the Department of Mathematics, National Institute of Technology Rourkela during September 28th–29th, 2024.
- (31) Invited key note speaker in "International Conference on Applied Mathematics & Nanoscience (ICAMN 2024)" organized by Vidya Academy of Science and Technology during Jan 23-25, 2024.
- (30) Invited talk at the International Workshop on Linear Algebra and Related Areas. Organised by Department of Mathematics BITS Pilani K K Birla Goa Campus during November 1st to 3rd, 2023.

- (29) Contributed talk on Structured Perturbation analysis generalized eigenvalue problem with s-specified, ICM 2018 - Rio de Janeiro eigenpairs.
- (28) Invite talk to give a talk at the Scientific Colloquium of the Split Mathematical Society, March 1, 2024.
- (27) Delivered two lectures in refresher course in Applied mathematics and statistics with the theme centered on certain mathematical and statistical aspects of operations research during 25th November 2020 to 8th December 2020, organized by HRDC center of Devi Ahilya University.
- (26) Delivered a talk in Faculty Development Program Pedagogy for effective use of Mathematics in Engineering under TEQIP scheduled from 16th September to 20th September 2019, IPS Academy Indore.
- (25) Invited speaker in International Conference on Algebra and Related Topics with Applications (ICARTA-19) December 17-19, 2019. Delivered a talk on Backward error analysis of sparse matrix pencils with specified eigenpairs.
- (24) Invited speaker in international Conference on Mathematical Analysis and its Applications from 14-12-2019 to 16-12-2019. Delivered a talk on Backward error analysis of sparse matrix pencils with specified eigenpairs.
- (23) Invited talk on Matrix factorization and its application, Medi-Caps University Indore on 21st Feb 2019.
- (22) Discipline of Mathematics, Ohio State University, Columbus during May to July, 2018.
- (21) Invited talk and Chairing the Session in 35th Ohio-State Denison conference held in Department of Mathematics, OSU in May 2018.
- (20) Delivered a lecture in Workshop on computational mathematics on 29th and 30th November 2019, organized by School of mathematics DAVV.
- (19) Delivered a talk in Medicap institute of Technology on Matrix factorization and its application on Feb 2019.
- (18) Invitation for Keynote Speaker for the One Week Faculty Development Program from 26-08-2019 to 30-08-2019 sponsored by Under TEQIP-III, RGPV, Bhopal.
- (17) Delivered lectures in the workshop entitled Wavelet via Matrices and its Applications in signals and image processing during 16-21 November 2020 funded by AICTE under QIP.
- (16) Delivered lectures in the workshop entitled Matrix Computations and its application in systems, signal and control problems during 16-21 February 2021 funded by AICTE under QIP.
- (15) Invited talk on Workshop on Inverse Eigenvalue Problem and applications on February 1, 2021, Organized by SVVV, Indore.
- (14) Invited plenary talk in a Faculty Development program organized by SVVV on 27th May, 2017.
- (13) Invited plenary talk in International Conference on Power, Control, Signal, and Computations (EPSCICON18) , Organized by Vidya Academy of Science and Technology, Thrissur, Kerala.
- (12) Resource person in the Faculty Development Programme on 'Statistical computing and R programming' during February 27 th to March 1st 2017, under the sponsorship of TEQIP-II.

- (11) Visited MIAMI University for the research Collaboration with Dr. Kumar Vikram Singh during September and December 2017.
- (10) Contributed talk in the AMS conference held in UCF, Orlando in Sept. 2017.
- (09) Contributed talk in the AMS conference held in UCF, Orlando in Sept. 2017.
- (8) Perturbation on Nonlinear eigenvalue problems, IIT Indore - TU9 Research held at Berlin, Nov 02-03, 2016 .
- (7) LU Decomposition and its Stability Analysis Current Trends in Applied Mathematics: Applications and Future Aspects, NIT, Raipur, July 6-10, 2015.
- (6) Why Mathematics? On the Occasion of Ramanujan's week celebrated by Millennium School in 2015, Indore.
- (5) Talk on Palindromic numbers, in Ishan Vikash program held in Dec. 2015 at IIT Indore, supported by MHRD.
- (4) International Conference on Numerical Linear Algebra and Applications during 14-19 Jan 2013 in IITG, India.
- (3) International Workshop on Linear Algebra on Linear Algebra and Application during Nov. 26-27, 2012 in DAVV, Indore, MP. India.
- (2) National Workshop on Linear Algebra on Linear Algebra and Application during Nov. 26-27, 2012, in DAVV, Indore, MP, India.
- (1) Invited Speaker on Study Group Meeting on Industrial Problems (SGMIP-11) 14-20, March-2011 in Supercomputer Education and Research Center, IISc. Bangalore funded by DST, India.