

Dr. Jagdish Prasad Maurya

CONTACT INFORMATION	Assistant Professor, Department of Mathematics, Rajiv Gandhi University, (A Central University), Rono Hills, Doimukh, Arunachal Pradesh-791112 India	Contact No. +91 9795784415, 7408081188 E-mail: jpmaurya.rs.apm12@itbhu.ac.in E-mail: jagdish.maurya@rgu.ac.in
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PERSONAL DETAILS	• Father's Name: Shri Daya Shanker • Mother's Name: Smt. Ram Dulari • Category: OBC • Date of Birth: 15/12/1989 • Permanent Address: H. No. 679, Vill. - Lakhanpurva, Post- Ramia Behar, Dist. - Lakhimpur (Kheri)-262724
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RESEARCH FOCUS	My research interests are in Applied Mathematics. More specifically, my interests lie in mathematical modelling, theoretical and computational fluid dynamics, vortex dynamics with application to naturally occurring atmospheric vortices like dust devils, tornadoes, and tropical cyclones etc. I use a variety of mathematical tools to solve basic unresolved questions in atmospheric vortices. I construct several mathematical models using ordinary and partial differential equations. To solve the governing equations, I use linearization, stability analysis, similarity transformations (including Lie-group methods), differential-equation theory, and analytical and numerical techniques. For numerical simulations, I prefer MATLAB, MATHEMATICA, and ANSYS CFD software.
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EDUCATION	• Ph.D. (2018) (Fluid Dynamics, Atmospheric Vortices), Indian Institute of Technology (BHU), Varanasi, (IIT (BHU)), U.P., India. • Thesis Topic: <i>Exploration of Characteristics Governing Dynamics of Whirlwinds: Applications to Atmospheric Vortices.</i> • Supervisor: Prof. Sanjay Kumar Pandey • Ph.D. coursework (CPI: 8.0). – Numerical Heat Transfer and Fluid Flow (ME-5246). – Analysis (AM-7001-601). – Algebra (AM-7002). – Mathematical Methods (AM-7003). – Computer Programming (AM-7015). – Wavelets and its Applications (AM-5101). • M.Sc. Mathematics, University of Lucknow, Lucknow, U.P., 2010 with 80.67%.
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- **B.Sc.** Mathematics, Physics and Chemistry, University of Lucknow, Lucknow, U.P., 2008 with 57.72%.
- **Intermediate**, Z.P.I.C. Nighasan, Lakhimpur (Kheri), U.P., 2005 with 66.60%.
- **High School**, Z.P.I.C. Nighasan, Lakhimpur (Kheri), U.P., 2003 with 53.67%.

TEACHING EXPERIENCE

- October 2021–Present, Assistant Professor, Department of Mathematics, Rajiv Gandhi University, Arunachal Pradesh, India.
- October 2018–September 2021, Assistant Professor, Department of Mathematics, Jorhat Engineering College, Jorhat, Assam, India.
- Courses currently taught:
(i) Calculus , (ii) Calculus of Variations and Integral Equations.
- Courses taught in previous semesters:
(i) Ordinary and Partial differential equations, (ii) Vector Calculus, (iii) Multiple Integrals, (iv) Differential Calculus and Multivariable Calculus, (v) Complex analysis, (vi) Computer programming in C, Mathematical Methods etc.
- September 2012–September 2018, Teaching Assistant (TA), **IIT (BHU)** for several courses in Mathematics such as Numerical Methods, Engineering mathematics I & II, Fluid Dynamics, Real Analysis, Linear Algebra.
- July 2010–February 2012, Lecturer, Department of Mathematics, **Isabella Thoburn College**, Lucknow, U.P., India.
 - Ordinary Differential Equations and Partial Differential Equations
 - Differential Calculus and Integral Calculus
 - Linear Algebra
 - Complex Analysis
 - Numerical Analysis
 - Mathematical Analysis
 - Coordinate Geometry (2D & 3D)

RESEARCH INTERESTS

- Differential Equations,
- Mathematical Modelling,
- Theoretical and Computational Fluid Dynamics,
- Vortex Dynamics, Atmospheric Vortices.

- S. K. Pandey & J. P. Maurya, Exploration of Characteristics Governing Dynamics of whirlwinds: Applications to Dust Devils, *Zeitschrift für Naturforschung A*, 72 (8), 763-768, (2017).
- S. K. Pandey & J. P. Maurya, A Mathematical Model Governing Tornado Dynamics: An Exact Solution of a Generalized Model, *Zeitschrift für Naturforschung A*, 73 (8), (2018).
- S. K. Pandey & J. P. Maurya, Exact solutions for unsteady axisymmetric vortex motions governing atmospheric vortices, *Dynamics of Atmospheres and Oceans*, 83, 111-121, (2018).
- S. K. Pandey & J. P. Maurya, A general viscous model for some aspects of tropical cyclonic winds , *Zeitschrift für Naturforschung A*, 75 (04), 301-315, (2020).
- Baiju Dayanandan, S. K. Maurya, Smitha Thakadiyil & J. P. Maurya, Extended gravitationally decoupled Finch-Skea anisotropic model using embedding class I spacetime , *Chinese Journal of Physics* (2023).
- J. P. Maurya & S. K. Tiwari, A Generalized Analytical Model of Unsteady Chlorine Transport in Drinking Water Supply Pipes, *Ganita: Bharat Ganita Parisad*, 74 (01), 43-54, (2024).
- J. P. Maurya, An Analytical Model of the Tornado-Like Stationary Atmospheric Vortices, *Journal of Applied Nonlinear Dynamics*, 13 (3), 461-473, (2024).
- Kriti Yadav, Jagdish Prasad Maurya, & Sanjay Kumar Pandey, A generalized analytical viscous model for steady-state atmospheric vortices, *Physica Scripta*, 99 (7), 075233, (2024).
- Jagdish Prasad Maurya, Shruti, & Sanjay Kumar Pandey, A modified 3D analytical viscous model of single-cell tornado-like atmospheric vortices, *Physica Scripta*, 100 (12), 125223, (2025).
- Jagdish Prasad Maurya, & Pongngam Chama, Mathematical model of tropical cyclones wind fields: A generalized analytical model, *Physics of Fluids*, 38 (1), 016616:1-18, (2026).
- Chubrang Yun, Jagdish Prasad Maurya, & Sangeeta Maurya, Mathematical Modelling of oxygen transport and its role in oocyte maturation, *Applications of Mathematics*, 71 (4), 575–599, (2026).
- Shailendra Kumar Tiwari, Jagdish Prasad Maurya, & Sangeeta Maurya, Amirlal Singh, Mathematical Modelling of Transportation of Newtonian Fluid through Curved Tube under the Impact of Hiatus Hernia, *Journal of Applied Nonlinear Dynamics*, 16(1), 33-46, (2027).
- Jagdish Prasad Maurya, & Onima Nyising, A generalized mathematical model of tornado-like atmospheric vortices with two-cell structure and secondary recirculation, (Under review).

	Pongngam Chama, & Jagdish Prasad Maurya, Wind Field and Vorticity Dynamics of Unsteady and Viscous Tropical Cyclones: A Modified Mathematical Model, (Under review).
	J. P. Maurya & S. K. Pandey, A mathematical model of whirlwinds: Exploration of the genesis of dust devils (Under review).
CONFERENCE PROCEEDINGS AND BOOK CHAPTERS	Jagdish Prasad Maurya, Onima Nyising, MATHEMATICAL MODEL OF SINGLE-CELL TORNADO LIKE VORTICES: A COMPARATIVE STUDY , <i>Advances in Applied Mathematics: Modeling, Simulation, and Real-World Applications, IIP Series</i> , 6, 48-60, (2026).
PROJECTS	• Title: Mathematical Investigation of Tropical cyclones structure and analysis of their stability. Funding Agency:TEQIP-III (NPIU-MHRD) Collaborative Research Scheme Amount: Rs. 19,65,000/- Duration: 2 Years 06 Months Principal Investigator: Jagdish Prasad Maurya Co-PIs: Prof. Sanjay Kumar Pandey (IIT BHU, Varanasi), Prof. Durga Charan Dalal (IIT, Guwahati), Mr. Rafiqul Islam (JEC)
ACADEMIC ADMINISTRATION	• Faculty Advisor: ISTE Student Chapter, Jorhat Engineering College, Jorhat, Assam.
ACHIEVEMENTS /AWARDS /FELLOWSHIPS	• Qualified CSIR-UGC-JRF (Mathematical Sciences), December, 2015. • Qualified GATE (Mathematics)-2010, 2011, 2012 & 2014. • Awarded Teaching Assistantship during Ph.D. as JRF, September 20, 2012 to September 20, 2014 and as SRF, September 21, 2014 to September 20, 2017. • Financial support, DST-SERB, Govt. of India, New Delhi under ITS scheme to attend and present a research paper in 9th ICIAM, July 15-19, 2019 held at University of Valencia, Valencia, Spain . • Student Travel Grant Support, IIT (BHU), Varanasi to attend and present a research paper in International Conference on Mathematical Modeling in Physical Sciences, during August 27-31, 2018 held at Russian Academy of Sciences and the Lomonosov Moscow State University, Moscow, Russia. • SIAM (Society for Industrial and Applied Mathematics) and CSIR (Council of Scientific and Industrial Research) Travel Grant Award for presenting a research paper in SIAM Conference “2018 SIAM Annual Meeting” held in Portland, Oregon, USA. • Student Travel Grant Support, IIT (BHU), Varanasi to attend and present a research paper in International Conference on Differential Equations and Application, September 04-07, 2017, held at Brno University of Technology, Czech Republic. • Offered a position as an Assistant Professor (AGP: Rs. 6,000) at Manipal

University Jaipur, Dept. of Mathematics.

PAPERS UNDER
PREPARATION
CONFERENCES

J P Maurya, & Pongngam Chama, Mathematical modelling of tropical cyclonic winds and analysis of their stability.

• **International**

- Participated and presented a paper entitled “A Mathematical Model Governing Tornado-like Vortex from a Fluid Dynamics Perspective”, in 6th International Conference on Mathematics and Computing, 2020, during September 23-25, 2020 held at **Sikkim University**, Sikkim, India.
- Participated and presented a paper entitled “Mathematical modelling of intensification of cyclonic wind”, in 9th International Congress on Industrial and Applied Mathematics, during July 15-19, 2019 held at **University of Valencia**, Valencia, Spain.
- Participated and presented a paper entitled “Mathematical modelling of dynamics of tornado like stationary vortex: An exact solution”, in International Conference on Mathematical Modeling in Physical Sciences, during August 27-31, 2018 held at **Russian Academy of Sciences and the Lomonosov Moscow State University**, Moscow, Russia.
- Participated and presented a paper entitled “Exact solutions for unsteady axisymmetric vortex motions governing atmospheric vortices”, in International Conference Differential Equations and Applications, during September 04-07, 2017 held at **Brno University of Technology**, Brno, Czech Republic.
- Participated and presented a paper entitled “An analytical model for tornado”, in International Conference on Applications of Fluid Dynamics during December 19-21, 2016 held at **IIT (ISM)**, Dhanbad Jharkhand-INDIA.
- Participated and presented a paper entitled “Exploration of Characteristic Governing Dynamics of whirlwinds”, in International Conference of the Indian Mathematics Consortium held at **Banaras Hindu University**, Varanasi December 14-17, 2016.
- Participated and presented a paper entitled “A generalized analytical steady model of tornado”, in International Conference on “Recent Advances in Theoretical & Computational Partial Differential Equations with Applications” during December 05-09, 2016 held at University Institute of Engineering and Technology, **Panjab University**, Chandigarh.
- Participated and presented a paper entitled “An Analytical Model of a Hurricane”, in International Conference on Mathematical modelling & Simulation, held during August 29-31, 2016 at the Department of Mathematics, Institute of Sciences, **Banaras Hindu University**, Varanasi.
- Participated and presented a paper entitled “A Mathematical model discovering tornado dynamics”, in International Conference on Frontiers in Mathematics-2015, held during March 26-28, 2015 at the Department of Mathematics, **Guwahati University**, Assam India.

- **National**

- Participated in the National Symposium on “Application of Various Techniques in Fluid Dynamics” – (UGC Sponsored), Organized by: Department of Mathematics **B.S.N.V.P.G. College**, Lucknow February 10-12, 2011.
- Presented a paper entitled ”Unsteady exact solution exploring dynamics of tornadoes”, in Institute Day during February 16-18, 2018 at the Department of Mathematical Sciences, **IIT(BHU)**, Varanasi.
- Presented a paper entitled ”Mathematical Investigation of Tropical Cyclonic Winds”, in 35th Annual Conference of The Mathematical Society, BHU on Advancements in Mathematical Analysis and their Applications (AMATA-2019), held during November 11-12, 2019 at the Department of Mathematics, Institute of Science, BHU, Varanasi.

WORKSHOPS
/SHORT TERM
COURSES/FDPs

- **International**

- Participated in GIAN Course on “Advanced Fluid Dynamics and Applications” during September 12-22, 2016 at **IIT (BHU)**, Varanasi.
- Participated in GIAN Course on “Volume Averaging Methods for Upscaling in Porous Media” during January 5-16, 2016 at **IIT (BHU)**, Varanasi.

- **National:**

- Participated in National Symposium on Research Methodology for Future Researches, organized by Teaching- Learning Cell at **IIT (BHU)**, Varanasi-221005, on 22 March, 2015.
- Participated in workshop “Hands on Training Program on MATLAB” organized by DST-Center for Interdisciplinary Mathematical Sciences (CIMS), Faculty of Sciences, **Banaras Hindu University**, Varanasi, UP, India, on 10 - 16 November, 2014.
- Participated in Author Workshop jointly organized by Springer and IIT BHU at **IIT (BHU)** on 10 February, 2014.
- Participated in AICTE Sponsored QIP-Short term course on “Computational Methods for Integral and Differential Equations”, organized by Department of Mathematical Sciences, **IIT (BHU)** Varanasi during December 10-16, 2018.
- Participated in TEQIP-III Sponsored Short term course on “Computational Fluid Dynamics for Solving Engineering Problems”, organized by Department of Mechanical Engineering, **Malaviya National Institute of Technology**, Jaipur, Rajasthan during August 07-11, 2020.

- **Faculty Development Programme:**

- Participated in Faculty Development Programme conducted by Teaching Learning Centre, IIT Madras, from June 24-28, 2019.
- Participated in TEQIP-III Sponsored workshop on Advanced Pedagogies: Active Learning and Digital Tools organized IIT Hyderabad from December 14 - 18, 2020.

- COMPUTATIONAL SKILLS
- **General Computational Skills:** MS-office, Ubuntu, Excel.
 - **Mathematical Software tools:** LaTeX, MATLAB, MATHEMATICA, ANSYS CFD, Origin Lab etc.
- INTERNATIONAL RESEARCH VISITS
- Presented a research paper in 9th International Congress on Industrial and Applied Mathematics, during July 15-19, 2019 held at **University of Valencia, Valencia, Spain.**
 - **Presented** a research paper in International Conference Differential Equations and Applications, during September 04-07, 2017 held at Brno University of Technology, **Brno, Czech Republic.**
 - **Presented** a research paper entitled in International Conference on Mathematical Modeling in Physical Sciences, during August 27-31, 2018 held at **Russian Academy of Sciences and the Lomonosov Moscow State University, Moscow, Russia.**

RESEARCH PLAN Atmospheric vortices are extremely complex phenomena. Despite extensive research on their flow dynamics, many fundamental questions remain unresolved. Real atmospheric vortices are often idealized for the sake of modelling hidden characteristics and the simulations done dealt with single aspects. An atmospheric vortex—whether a dust devil, tornado, or tropical cyclone—has not yet been fully modelled. Some of the characteristics are definitely common but the properties differ due to vast differences in their structures. Uneven and consistently changing structure add to the woe. Non-linear forms of the governing equations are still a huge hurdle on the way to arriving at solutions. The lack of appropriate models makes reliable prediction difficult, although such predictions are essential for reducing loss of life and property. Augmentation of more reality to the existing solutions will help us come closer to possible predictions. New discoveries of mathematical tools for the solution of nonlinear equations governing motion could be of immense help. Additional observational and experimental data are needed to validate proposed models. Hugeness and might of the atmospheric vortices remain troublesome reasons in investigation. More sophisticated engineering tools and measurement devices are therefore needed to investigate these powerful and complex vortices.

REFERENCES

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