

BIKASH MAHATO

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RESEARCH AREA OF INTEREST

- Computational Fluid Dynamics
- Additive Manufacturing
- Direct Numerical Simulation (DNS)
- Large-Eddy Simulation (LES)
- High-Performance Computing
- Computational Aeroacoustics
- Particle-Laden Flows
- Atmospheric Flows

EXPERIENCE

Montana Technological University

Visiting Assistant Professor, Department of Mechanical Engineering

August 2025 – Till date

Butte, MT, USA

- *Course taught:* Fundamentals of Heat Transfer (EMEC 326), Fluid Mechanics (EGEN 335), Introduction to Modeling for Mechanical Engineers (EMEC 215).
- *Research focus:* Experimental and numerical study of fluid and particle dynamics in supersonic cold-spray nozzles

Montana Technological University

Adjunct Faculty, Department of Mechanical Engineering

August 2024 – August 2025

Butte, MT, USA

- *Course taught:* Computational Fluid Dynamics (EMEC 491), Fundamentals of Heat Transfer (EMEC 326), Fluid Mechanics (EGEN 335).

Montana Technological University

Postdoctoral Researcher, Department of Mechanical Engineering

April 2023 – August 2025

Butte, MT, USA

- *Project title:* Numerical analysis of micro-jets applied to cold spray additive manufacturing process.
- *Mentors:* Dr. Nathan Huft and Dr. Peter Lucon
- Investigated the fluid and particle dynamics inside the supersonic cold-spray nozzle using computational fluid dynamics and experimental techniques.
- Contributed intellectually to the project, performing research, writing papers, reports, and proposals
- Assisted in the training of graduate and undergraduate students

Florida State University

Postdoctoral Researcher, Department of Mechanical Engineering

November 2021 – March 2023

Tallahassee, FL, USA

- *Project title:* Numerical analysis of micro and macro scale atmospheric flows related to wildfire.
- *Mentor:* Dr. Neda Yaghoobian
- Smoke dispersion behavior was numerically investigated under different atmospheric conditions using Large-eddy Simulations (LES).
- Numerically investigated the flight behavior of a smoldering firebrand particle
- Contributed intellectually to the project, performing research, reports, and proposals
- Assisted in the training of graduate and undergraduate students
- Supervised a summer project for high school students in 2022

Indian Institute of Technology Delhi

Research Associate, Department of Mechanical Engineering

August 2021 – October 2021

New Delhi, India

- *Project title:* Development of a numerical simulator for microfabricated electrospray thrusters
- *Mentors:* Dr. Supreet Singh Bahga and Prof. Amit Gupta
- Developed finite-difference based incompressible flow solver using fractional-step method

Indian Institute of Technology Bhubaneswar

Research Associate, School of Basic Sciences (Mathematics)

July 2020 – July 2021

Odisha, India

- *Project title:* Taylor column phenomena of axially translating sphere in a rotating fluid - a numerical study
- *Mentor:* Prof. T. V. S. Sekhar
- Developed finite-difference based numerical solver using higher-order compact scheme in spherical coordinate system
- Numerically investigated the Taylor column phenomena that appear in low-Reynolds number flows.
- Supervised the research progress and guided graduate students

EDUCATION

Indian Institute of Technology Bhubaneswar, Odisha, India

July 2015 – July 2020

Ph.D. in Mechanical Engineering

- *Thesis title:* Numerical Analysis of Aeolian Tone Generation and its Control for Laminar Flow Past Bluff Bodies
- *Mentor:* Dr. Yogesh G. Bhumkar
- Developed finite-difference based direct numerical solver (DNS) using higher-order compact scheme
- Developed aeroacoustics analysis solvers (Lighthill acoustic analogy, Powell's acoustic analogy)
- Investigated sound generation mechanisms for flow over bluff bodies
- Worked as a teaching and research assistant

Indian Institute of Technology Bhubaneswar, Odisha, India

July 2013 – June 2015

Master of Technology in Mechanical Engineering

- *Thesis title:* Optimization of the Shape of an Aerofoil Using High Accuracy Numerical Scheme
- *Mentors:* Dr. Yogesh G. Bhumkar and Prof. Swarup K. Mahapatra
- Performed flow over airfoil simulations of low-Reynolds number incompressible flows
- Improved the efficiency of a reflex shaped airfoil by optimizing its shape (used in battery operated UAVs)
- Worked as a teaching and research assistant

West Bengal University of Technology, West Bengal, India

July 2008 – June 2012

Bachelor of Technology in Mechanical Engineering

- *Thesis title:* Designing and Modeling of a Cam and Follower Mechanism to Identify Faults in Cam Profile
- *Mentor:* Ms. Chandrani Guha
- Designed and developed a mechanism to detect faults in cam and follower mechanisms.
- Undertook industrial training at New Allenberry Works in Kolkata, focusing on gear manufacturing.
- Completed internship at the MSME tool room (Central Tool Room & Training Centre, Govt. of India), focusing on pattern making and casting.
- Learned to use AutoCAD software

GRANTS AND FELLOWSHIPS

- 2026** **Research grant:** *Modeling Smoke Dispersion to Enhance Prescribed Fire Planning* funded by Montana NSF EPSCoR RII Track-1 SMART FIRES Statewide Seed Award, Jan 2026 – Aug 2026.
PI: Robert Walker (Montana State University), Sub-PI: Bikash Mahato
- 2022** **Travel grant:** Received travel grant for attending the prestigious **Fire & Climate 2022, Pasadena, CA** conference organized by International Association of Wildland Fire (IAWF).
- 2019** **Travel grant:** Received Science and Engineering Research Board (SERB, Govt. of India) **Young Scientist** travel grant for attending international conference
- 2013** **Fellowship:** Received Ministry of Human Resource Development (MHRD, Govt. of India) Scholarship for postgraduate study based on All India Graduate Aptitude Test in Engineering (GATE) score

PROFESSIONAL RECOGNITION

2020	One of our research article selected as Editor's Pick in prestigious Physics of Fluids journal
2019	One of our research article selected as Featured Article in prestigious Physics of Fluids journal
2013	Secured 98.6 percentile in All India Graduate Aptitude Test in Engineering (GATE)
2008	School topper in High School state board examination

SOCIETIES AND SERVICES

2025 - Present	<i>Reviewer</i> – International Journal of Aeroacoustics
2020 - Present	<i>Reviewer</i> – Physics of Fluids
2022 - Present	<i>Member</i> – American Physical Society (APS)
2024 - Present	<i>Member</i> – The Minerals, Metals & Materials Society (TMS)
2022 - 2023	<i>Member</i> – International Association of Wildland Fire (IAWF)

PUBLICATIONS

Journal Publications

- [15] B. **Mahato**, J. Yoder, G. Simmons, N. Huft, I. Nault, and P. Lucon, "Particle dynamics in low-pressure cold spray additive manufacturing – A numerical and experimental study," *Additive Manufacturing*, vol. 110, p. 104937, 2025.
- [14] R. R. Dubey, B. **Mahato**, and N. Yaghoobian, "Effect of the atmospheric stability condition on buoyant plume dynamics," *Physics of Fluids*, vol. 36, no. 12, p. 126615, 2024.
- [13] B. **Mahato**, S. Saxena, and N. Yaghoobian, "Aerodynamic force modifications of a spherical particle with varying temperature: A study of an idealized firebrand," *Theoretical and Computational Fluid Dynamics*, vol. 38, no. 2, pp. 1–18, 2024.
- [12] V. S. Yadav, N. Ganta, B. **Mahato**, M. K. Rajpoot, and Y. G. Bhumkar, "New time-marching methods for compressible Navier-Stokes equations with applications to aeroacoustics problems," *Applied Mathematics and Computation*, vol. 419, p. 126863, 2022.
- [11] B. **Mahato**, N. Ganta, and Y. G. Bhumkar, "Effective control of aeolian tone using a pair of splitter plates," *Journal of Sound and Vibration*, vol. 494, p. 115906, Mar. 3, 2021.
- [10] P. K. Maurya, V. S. Yadav, B. **Mahato**, N. Ganta, M. K. Rajpoot, and Y. G. Bhumkar, "New optimized implicit-explicit Runge-Kutta methods with applications to the hyperbolic conservation laws," *Journal of Computational Physics*, vol. 446, p. 110650, Aug. 20, 2021.
- [9] N. Ganta, B. **Mahato**, and Y. G. Bhumkar, "Prediction of the aerodynamic sound generated due to flow over a cylinder performing combined steady rotation and rotary oscillations," *The Journal of the Acoustical Society of America*, vol. 147, no. 1, pp. 325–336, 2020.
- [8] B. **Mahato**, N. Ganta, and Y. G. Bhumkar, "Computation of aeroacoustics and fluid flow problems using a novel dispersion relation preserving scheme," *Journal of Theoretical and Computational Acoustics*, vol. 28, no. 1, p. 1850063, 2020.
- [7] B. **Mahato**, N. Ganta, and Y. G. Bhumkar, "Mitigation of aerodynamic sound for a laminar flow past a square cylinder using a pair of cowl plates," *Physics of Fluids*, vol. 32, no. 7, p. 076108, 2020.
- [6] N. Ganta, B. **Mahato**, and Y. G. Bhumkar, "Analysis of sound generation by flow past a circular cylinder performing rotary oscillations using direct simulation approach," *Physics of Fluids*, vol. 31, no. 2, p. 026104, 2019.
- [5] N. Ganta, B. **Mahato**, and Y. G. Bhumkar, "Modulation of sound waves for flow past a rotary oscillating cylinder in a non-synchronous region," *Physics of Fluids*, vol. 31, no. 9, p. 096103, 2019.
- [4] B. **Mahato**, N. Ganta, and Y. G. Bhumkar, "Numerical investigation of sound generation due to laminar flow past elliptic cylinders," *Numerical Mathematics: Theory, Methods and Applications*, vol. 13, no. 1, pp. 27–62, 2019.
- [3] B. **Mahato**, N. Ganta, and Y. G. Bhumkar, "Direct simulation of sound generation by a two-dimensional flow past a wedge," *Physics of Fluids*, vol. 30, no. 9, p. 096101, 2018.
- [2] J. Pradhan, S. Jindal, B. **Mahato**, and Y. G. Bhumkar, "Joint optimization of the spatial and the temporal discretization scheme for accurate computation of acoustic problems," *Communication in Computational Physics*, vol. 24, no. 2, pp. 408–434, 2018.
- [1] J. Pradhan, B. **Mahato**, S. D. Dhandole, and Y. G. Bhumkar, "Construction, analysis and application of coupled compact difference scheme in computational acoustics and fluid flow problems," *Communication in Computational Physics*, vol. 18, no. 4, pp. 957–984, 2015.

Conferences

- [23] B. Mahato, J. Yoder, G. Simmons, and N. Huft, "Improve particle deposition efficiency in low-pressure cold spray systems," in *155th Annual Meeting & Exhibition*, The Minerals, Metals & Materials Society (TMS), San Diego, CA, Mar. 2026.
- [22] B. Mahato, J. Yoder, G. Simmons, and N. Huft, "Influence of co-flow nozzle configuration on particle dynamics in a low-pressure cold spray additive manufacturing process," in *78th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, Houston, TX, Nov. 2025.
- [21] B. Mahato, J. Yoder, G. Simmons, N. Huft, I. Nault, and P. Lucon, "Effect of turbulence on particle dynamics of cold spray systems," in *154th Annual Meeting & Exhibition*, The Minerals, Metals & Materials Society (TMS), Las Vegas, NV, Mar. 2025.
- [20] B. Mahato, J. Yoder, K. Rapp, G. Simmons, N. Huft, I. Nault, and P. Lucon, "Particle dynamics of a low-pressure cold spray system," in *14th Cold Spray Action Team Meeting*, Worcester, MA, Jun. 2024.
- [19] B. Mahato, J. Yoder, G. Simmons, N. Huft, I. Nault, and P. Lucon, "Investigation of particle dynamics in a low-pressure cold spray additive manufacturing process," in *77th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, Salt Lake City, UT, Nov. 2024.
- [18] B. Mahato, J. Yoder, G. Simmons, N. Huft, I. Nault, and P. Lucon, "Numerical and experimental investigation of particle dynamics in cold spray additive manufacturing process," in *International Mechanical Engineering Congress & Exposition (IMECE)*, Portland, OR, Nov. 2024.
- [17] R. Dubey, B. Mahato, and N. Yaghoobian, "Dynamics of buoyant plumes in stratified atmospheric boundary layer," in *76th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, Washington, DC, Nov. 2023.
- [16] B. Mahato, J. Yoder, G. Simmons, N. Huft, and P. Lucon, "A dns investigation of aeroacoustic noise generation in cold spray additive manufacturing," in *76th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, Washington, DC, Nov. 2023.
- [15] B. Mahato, S. Saxena, and N. Yaghoobian, "A detailed dns-surface energy balance analysis of a flying firebrand particle," in *Florida Fluids Symposium-I*, Department of Mechanical Engineering, Florida State University, May 2022.
- [14] B. Mahato, S. Saxena, and N. Yaghoobian, "Predicting the flight behavior of single smoldering firebrand particle: A detailed computational fluid dynamics study," in *Fire & Climate Conference: Impacts, Issues and Futures*, International Association of Wildland Fire, May 2022.
- [13] B. Mahato, S. Saxena, and N. Yaghoobian, "Vortex dynamics of a smoldering firebrand particle," in *75th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, Indianapolis, IN, USA, Nov. 2022.
- [12] B. Sahoo, B. Mahato, and T. V. S. Sekhar, "A higher-order numerical analysis to study the flow physics and to optimize the design of a short-dwell blade coaters for higher efficiency," in *Journal of Physics: Conference Series*, IOP Publishing, vol. 2090(1), Nov. 2021, p. 012 053.
- [11] N. Ganta, B. Mahato, and Y. G. Bhumkar, "Characteristics of sound radiated due to flow around a rotationally oscillating cylinder," in *INTER-NOISE and NOISE-CON Congress and Conference Proceedings*, Institute of Noise Control Engineering, vol. 259(6), 2019, pp. 3341–3350.
- [10] B. Mahato, N. Ganta, and Y. G. Bhumkar, "Control of aeroacoustic noise generation during flow past a circular cylinder using splitter plate," in *INTER-NOISE and NOISE-CON Congress and Conference Proceedings*, Institute of Noise Control Engineering, vol. 259(6), 2019, pp. 3839–3848.
- [9] N. Ganta, B. Mahato, and Y. G. Bhumkar, "Aerodynamic noise behavior due to flow over oval-shaped cylinders," in *WESPAC-2018*, CSIR–National Physical Laboratory, New Delhi: Acoustical Society of India, Nov. 2018.
- [8] N. Ganta, B. Mahato, and Y. G. Bhumkar, "Analysis of aerodynamic noise for flow past a circular cylinder performing rotary oscillations in the non-synchronization region," in *32nd National Convention of Aerospace Engineers (NCAE 2018)*, Birla Institute of Technology, Ranchi: The Institutions of Engineers, Oct. 2018, pp. 146–150.
- [7] N. Ganta, B. Mahato, and Y. G. Bhumkar, "Numerical analysis of aerodynamic noise due to flow past a circular cylinder undergoing rotary oscillations," in *Fluid Mechanics and Fluid Power (FMFP-2018)*, Indian Institute of Technology Bombay, Mumbai: National Society for Fluid Mechanics and Fluid Power, Dec. 2018.
- [6] N. Ganta, B. Mahato, and Y. G. Bhumkar, "Numerical analysis of an acoustic field behavior for flow past corrugated cylinder," in *25th International Congress on Sound and Vibration*, Heroshima, Japan: International Institute of Acoustics and Vibration (IIAV), Jul. 2018.
- [5] B. Mahato, N. Ganta, and Y. G. Bhumkar, "Analysis of acoustic field originating from flow past elliptic cylinders using space-time accurate drp scheme," in *25th International Congress on Sound and Vibration*, Heroshima, Japan: International Institute of Acoustics and Vibration (IIAV), Jul. 2018.

- [4] B. Mahato, N. Ganta, and Y. G. Bhumkar, “Effect of axis-ratio on the sound generation from elliptic cylinder,” in *Fluid Mechanics and Fluid Power (FMFP-2018)*, Indian Institute of Technology Bombay, Mumbai: National Society for Fluid Mechanics and Fluid Power, Dec. 2018.
- [3] B. Mahato, N. Ganta, and Y. G. Bhumkar, “Effect of mach number on the sound generation due to flow past an elliptic cylinder,” in *32nd National Convention of Aerospace Engineers (NCAE 2018)*, Birla Institute of Technology, Ranchi: The Institutions of Engineers, Oct. 2018, pp. 141–145.
- [2] B. Mahato, N. Ganta, and Y. G. Bhumkar, “Effect of splitter plate on the sound generation during flow past circular cylinder,” in *WESPAC-2018*, CSIR–National Physical Laboratory, New Delhi: Acoustical Society of India, Nov. 2018.
- [1] B. Mahato and Y. G. Bhumkar, “Numerical investigation of the effects of corrugated cylinder geometries on the acoustic field,” in *INTER-NOISE and NOISE-CON Congress and Conference Proceedings*, Institute of Noise Control Engineering, vol. 255(5), Aug. 2017, pp. 2313–2322.

Posters

- [5] J. Yoder, B. Mahato, G. Simmons, T. Bacha, I. Nault, and N. Huft, “Schlieren imaging and CFD simulation of fluid flow in high pressure aerospike cold spray nozzles,” in *Cold Spray Action Team Meeting, May 20 – 21*, Worcester, MA, 2025.
- [4] J. Yoder, B. Mahato, K. Rapp, G. Simmons, N. Huft, I. Nault, and P. Lucon, “Flow and particle characterization of low-pressure cold spray systems,” in *Cold Spray Action Team Meeting, June 12 – 13*, Worcester, MA, 2024.
- [3] J. Yoder, B. Mahato, G. Simmons, N. Huft, and P. Lucon, “Flow characterization of low-pressure cold spray systems,” in *Cold Spray Action Team Meeting, June 20 – 21*, Worcester, MA, 2023.
- [2] B. Mahato, S. Saxena, and N. Yaghoobian, “Flight behavior of a smoldering spherical particle,” in *First Direct In-person Colloquium on Vortex Dominated Flows (DisCoVor), May 17–20*, École polytechnique fédérale de Lausanne (EPFL), 2022.
- [1] B. Mahato, G. Naveen, and Y. G. Bhumkar, “Reduction of drag and aeolian tone generated due to flow past circular cylinder using splitter plates,” in *National Science Day Research Demonstration, February 28*, Indian Institute of Technology Bhubaneswar, 2019.

Other Publications

- [1] I. Santos, B. Mahato, B. Bornhoft, S. S. Jain, and N. Yaghoobian, “Lagrangian subgrid-scale modeling applied to evolving firebrand particle transport,” in *Proceedings of the Summer Program*, Center for Turbulence Research, Stanford University, 2022.