**Mrinal Kaushik**, Ph.D

Associate Professor

Department of Aerospace Engineering

Indian Institute of Technology,

Kharagpur – 721302, India

Phone : +91 – 3222 – 283004

E-mail : mkaushik@aero.iitkgp.ac.in

Web:

https://sites.google.com/view/drmrinalkaushik

***Born on*** March 29, 1977

## CURRENT POSITION

Associate Professor, Department of Aerospace Engineering, IIT Kharagpur, 2020–to date.

## PREVIOUS ACADEMIC EMPLOYMENTS

- Assistant Professor, Department of Aerospace Engineering, IIT Kharagpur, 2013–2020.
- Assistant Professor, Department of Aerospace Engineering, Defense Institute of Advanced Technology (DIAT), Pune, 2012–2013.

## PREVIOUS INDUSTRY EMPLOYMENTS

- CAE Engineer, General Motors Tech Center, Bangalore, 2006–2007.
- Research Scientist, Vikram Sarabhai Space Center (VSSC), Indian Space Research Organization (ISRO), Trivandrum, 2005–2006.
- Assistant Systems Engineer, Tata Consultancy Services (TCS), Mumbai, 1999–2001.

## EDUCATION

- **Ph.D**, Aerospace Engineering, **IIT Kanpur**, 2009-2012.
- **M.Tech**, Aerospace Engineering, **IIT Kanpur**, 2001-2003. Accomplishment: Received cash incentive of INR 10,000/- for publishing the research article in an international journal. (2002).
- **B.Tech**, Aerospace Engineering, **IIT Kanpur**, 1995-1999. Accomplishment: The best undergraduate project work (Best BTP) in Aerospace Engineering. (1999).

## TEACHING INTERESTS

### AT THE UNDERGRADUATE LEVEL

Engineering Drawing and Computer Graphics (CE13001); Introduction to Aerodynamics (AE21001); Aerodynamics Laboratory (AE29002); High Speed Aerodynamics (AE31103); *Introduction to Aircraft Armaments (AE40012); Industrial Aerodynamics (AE51018)

### AT THE POSTGRADUATE LEVEL

*, ** The new courses designed and developed by me.

Aerodynamics (AE60001); **Physics of Fluid Flow Experiments (AE60037); Wind Tunnel Design and Testing (AE60044); Hypersonic Aerodynamics (AE61026)

## ONLINE COURSE (UNDER SWAYAM PROGRAM BY MHRD, GOVT. OF INDIA)

Lectures on Fundamentals of Gas Dynamics is recorded and made online by the Department of Aerospace Engineering, **Indian Institute of Technology Kanpur**.

## MEMBERSHIPS (LIFE)

- The Aeronautical Society of India (M–20497).
- The Institution of Engineers (India) (M–166846-8).
- The Indian Society for Technical Education (LM–129296).
- Indian Society for Heat and Mass Transfer (LM–1326).
- The Indian Science Congress Association (L–39429).
- Indian Society of Theoretical and Applied Mechanics (L–795).

## RESEARCH AREAS OF INTEREST

- Shock/Boundary-Layer Interactions
- Jet Control and Base Flows

## EXPERIMENTAL FACILITY DEVELOPMENT IN THE DEPARTMENT: Link

A state of art **supersonic free jet research facility** is developed in the Department of Aerospace Engineering at the Indian Institute of Technology, Kharagpur. This facility is being used to investigate the aerodynamics and aeroacoustic characteristics of subsonic, sonic, and supersonic jets. The details of the experimental facility are as follows:

- For aerodynamic studies, a complete setup includes a 5000 liters high-pressure air receiver, a 30-bar reciprocating compressor, settling chamber, pressure regulating valve, mixing pipe, traverse mechanism to mount Pitot probe, etc.
- Schlieren flow visualization setup to investigate shock-cell structures in the nozzle exhaust.
- Two microphones of 1/8'' and 1/6'' internal diameters, a sound-level meter and the anechoic chamber for aeroacoustic studies.

## PUBLICATIONS: Link

### AUTHORED BOOKS

1. Instrumentation and Measurements in Compressible Flows, CRC Press, Taylor & Francis, USA (*In Progress*).
2. Fundamentals of Gas Dynamics, 1st Edition, Springer Nature, Singapore, **2022** (ISBN: 978-981-16-9084-6).

3. Theoretical and Experimental Aerodynamics, 1st Edition, Springer Nature, Singapore, **2019** (ISBN: 978-981-13-1677-7).
4. Essentials of Aircraft Armaments, Springer Nature, Singapore, **2016** (ISBN: 978-981-10-2376-7).
5. Innovative Passive Control Techniques for Supersonic Jet Mixing, LAP Academic Publishing, Germany, **2012** (ISBN: 978-365-92-7608-8).

## BOOK CHAPTERS

1. Humrutha Gunasekaran, Thillaikumar Thangaraj, Tamal Jana, **Mrinal Kaushik (2022)**. Effects of Wall Ventilation on the Shock-wave/Viscous-Layer Interactions in a Mach 2.2 Intake. In: VSR Rajasekhar Pullabhotla, editor. Prime Archives in Chemistry: 2nd Edition. Vide Leaf, Hyderabad, India (ISBN: 978-81-953047-5-2) DOI: 10.1007/978-81-953047-5-2

2. Thillaikumar T., **Mrinal Kaushik (2021)** Assessment of Struts in Gas-dynamic Steering of a Supersonic Nozzle. In: T Prabu T., Viswanathan P., Agrawal A., Banerjee J. (eds) Fluid Mechanics and Fluid Power: Proceedings of FMFP 2019. Lecture Notes in Mechanical Engineering. Springer, Singapore (ISBN 978-981-16-0698-4). DOI: 10.1007/978-981-16-0698-4

3. Humrutha G., Sinhamahapatra K.P., **Mrinal Kaushik (2021)** Near-Field Effectiveness of the Sub-Boundary Layer Vortex Generators Deployed in a Supersonic Intake. In: Mistry C., Kumar S., Raghunandan B., Sivaramakrishna G. (eds) Proceedings of the *National Aerospace Propulsion Conference*. Lecture Notes in Mechanical Engineering. Springer, Singapore (ISBN 978-981-15-5039-3). DOI: 10.1007/978-981-15-5039-3_23

4. Humrutha G., **Mrinal Kaushik**, Sinhamahapatra K.P. (**2019**) Micro-vortex Generator Controlled Shock-Boundary Layer Interactions in Supersonic Intake. In: A. Sasoh et al. (eds.) *31st International Symposium on Shock Waves 1*. Springer, Cham (ISBN 978-3-319-91020-8). DOI: 10.1007/978-3-319-91020-8_123

5. Pal D., Mahananda M., Hanmaiahgari P.R., **Mrinal Kaushik** (**2017**) Experimental Investigation of Turbulent Hydrodynamics in Developing Narrow Open Channel Flow. In: V. Garg et al. (eds.) *Development of Water Resources in India*. Water Science and Technology Library, Vol 75. Springer, Cham (ISBN 978-3-319-55125-8). DOI: 10.1007/978-3-319-55125-8_37

## INTERNATIONAL JOURNALS (WEB OF SCIENCE/SCI/SCIE)

1. Tamal Jana and **Mrinal Kaushik (2022)**, *Survey of Control Techniques to Alleviate Repercussions of Shock-Wave and Boundary-Layer Interactions*, **ACCEPTED** for publication in

*Advances in Aerodynamics* (Springer).

2. Thillaikumar T., **Mrinal Kaushik** and Thanigaiarasu S. **(2022)**, Effects of Circular and Non-Circular Nozzle Exit Geometries on Subsonic and Sonic Jet Propagations. *Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering* (SAGE, I.F. = 1.082). DOI: 10.1177/09544100221097537

3. Thangaraj T., **Mrinal Kaushik**, Deb D., Unguresan M., and Muresan V. (2022) Survey on Vortex Shedding Tabs as Supersonic Jet Control. Front. Phys. (Frontiers in Physics, I.F. = 3.56, open access) 9:789742. DOI: 10.3389/fphy.2021.789742

4. T. Jana and **Mrinal Kaushik (2021)**, *Performance of Corrugated Actuator-Tabs of Aspect Ratio 2.0 on Supersonic Jet Mixing Enhancement*, *Journal of Mechanical Science and Technology* (Springer, I.F. = 1.463), 35(3): 1087-1097. DOI: 10.1007/s12206-021-0222-z

5. T. Jana, Thillaikumar T., and **Mrinal Kaushik (2021)**, Micro-vortex Generator Controlled Shock/Boundary-Layer Interactions in Hypersonic Intake, *Journal of Aerospace Engineering* (ASCE, I.F. = 1.373), 34(2): 1-13. DOI: 10.1061/(ASCE)AS.1943-5525.0001239

6. B. Mahabir, P. Bhale, and **Mrinal Kaushik (2021)**, Efficacy of Delta-Tab in Controlling the Mixing Characteristics of Mach 1.8 Jet, *Journal of Applied Fluid Mechanics* (Physics Society of Iran and Isfahan University of Technology (IUT), I.F. = 0.918, open access), 14(2): 627-640. DOI: 10.47176/jafm.14.02.31804

7. Thillaikumar T., T. Jana and **Mrinal Kaushik** (**2020**), Experimental Assessment of Corrugated Rectangular Actuators on Supersonic Jet Mixing, *Actuators* (MDPI, I.F. = 1.957, open access), *Section*: *Miniaturized and Micro Actuators*, 9: 88-112. DOI: 10.3390/act9030088

8. A. Ranjan, **Mrinal Kaushik**, D. Deb, V. Muresan and M. Unguresan (**2020**), Assessment of Short Rectangular-Tab Actuation of Supersonic Jet Mixing, *Actuators* (MDPI, I.F. = 1.957, open access), 9(3): 72-96. DOI: 10.3390/act9030072

9. T. Jana, Thillaikumar T., and **Mrinal Kaushik** (**2020**), Assessment of Cavity Covered with Porous Surface in Controlling Shock/Boundary-Layer Interactions in Hypersonic Intake, *International Journal of Aeronautical and Space Sciences* (Springer, I.F. = 0.511), 1-20. DOI: 10.1007/s42405-020-00269-4

10. T. Jana, **Mrinal Kaushik**, Dipankar Deb, Vlad Muresan and Mihaela Unguresan (**2020**), Aerodynamic Studies on Non-Premixed Oxy-Methane Flames and Separated Oxy-Methane Cold Jets, *Processes* (MDPI, I.F. = 1.963, open access), *Special Issue*: *Active Flow Control*

*Processes with Machine Learning and the Internet of Things*, 8(4): 429-445. DOI: 10.3390/pr8040429

11. Thillaikumar T., P. Bhale and **Mrinal Kaushik** (**2020**), Experimental Investigations on the Strut Controlled Thrust Vectoring of a Supersonic Nozzle, *Journal of Applied Fluid Mechanics* (Physics Society of Iran and Isfahan University of Technology (IUT), I.F. = 0.918, open access), 13(4): 1223-1232. DOI: 10.36884/jafm.13.04.31069
12. Humrutha G., Thillaikumar T., T. Jana and **Mrinal Kaushik** (**2020**), Effects of Wall Ventilation on the Shock-wave/Viscous-Layer Interactions in a Mach 2.2 Intake, *Processes* (MDPI, I.F. = 1.963, open access), 8(2): 208-228. DOI: 10.3390/pr8020208
13. **Mrinal Kaushik** (**2019**), Experimental Studies on Micro-Vortex Generator Controlled Shock/Boundary-Layer Interactions in Mach 2.2 Intake, *International Journal of Aeronautical and Space Sciences* (Springer, I.F. = 0.511), 20: 584–595 . DOI: 10.1007/s42405-019-00166-5
14. P. Bhale, **Mrinal Kaushik**, Jane-Sunn Liaw and Chi-Chuan Wang (**2019**), CFD Studies on the Heat Transfer Performance of H-type Finned Tube Banks using Innovative Designs of Fin Surfaces, *Energies* (MDPI, I.F. = 2.676, open access), 12(4): 584. DOI: 10.3390/en12040584
15. P.R. Hanmaiahgari, R.R. Kottam and **Mrinal Kaushik** (**2019**), Estimation and Examination of Linepack Pressures in Long Liquid Pipelines, *Sadhana* (Springer, I.F. = 0.769), 44: 101. DOI: 10.1007/s12046-019-1081-5
16. **Mrinal Kaushik** (**2015**), High Enthalpy Gas Dynamics E. Rathakrishnan John Wiley and Sons, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ. 2015. 330pp. £95. ISBN 978-1-118-82189-3. *The Aeronautical Journal*. 119. 791-793. DOI: 10.1017/S0001924000010848
17. **Mrinal Kaushik** and Rathakrishnan E. (**2015**), Tab Aspect Ratio Effect on Supersonic Jet Mixing, *International Journal of Turbo and Jet Engines* (Degruyter, I.F. = 0.863), 32(3): 265-273. DOI: 10.1515/tjj-2014-0032
18. **Mrinal Kaushik** and Rathakrishnan E. (**2014**), Corrugated Tabs for Supersonic Jet Mixing, *International Review of Mechanical Engineering*, 8(6): 983-991. DOI: 10.15866/ireme.v8i6.4756
19. **Mrinal Kaushik** and Rathakrishnan E. (**2013**), Corrugated Limiting Tab for Jet Mixing, *International Journal of Turbo and Jet Engines* (Degruyter, I.F. = 0.863), 30(4): 359-373. DOI: 10.1515/tjj-2013-0016

20. **Mrinal Kaushik** and Rathakrishnan E. (**2010**), Mixing Characteristics of a Supersonic Jet in the Presence of Two Neighboring Jets, *International Review of Aerospace Engineering*, 3(4): 80-185.

21. **Mrinal Kaushik**, P.S. Thakur and Rathakrishnan E. (**2006**), Studies on the Effect of Notches on Circular Sonic Jet Mixing, *Journal of Propulsion and Power* (AIAA, I.F. = 1.362), 22(1): 211-214. DOI: 10.2514/1.8424

## UNDER REVIEW

1. Thillaikumar T., Tamal Jana, **Mrinal Kaushik** and Thanigaiarasu S., *Shock-Structure Formation in Circular and Non-Circular Sonic Jets at Underexpanded Conditions*.
2. Thillaikumar T., and **Mrinal Kaushik**, *Design and Construction of Supersonic Free Jet Research Facility*.
3. Thillaikumar T., **Mrinal Kaushik**, and Thanigaiarasu S., *Experimental Studies on Tab Controlled Sonic Jets*.

## INTERNATIONAL CONFERENCES

1. Thillaikumar T., T. Jana and **Mrinal Kaushik**, Experimental Studies on the Efficacy of Tabs as Supersonic Jet Control, Proceedings of the *71st International Astronautical Congress (IAC)*, 12-16 October 2020, Dubai, United Arab Emirates.

2. T. Jana, Thillaikumar T., and **Mrinal Kaushik**, Experimental Studies on the Efficacy of Cavity with Porous Upper Surface in Controlling the Shock/Boundary-Layer Interactions in a Hypersonic Intake, Proceedings of the *71st International Astronautical Congress (IAC)*, 12-16 October 2020, Dubai, United Arab Emirates.

3. N. Kamal, T. Jana, Thillaikumar T., and **Mrinal Kaushik**, Navier-Stokes Computation of Heat Transfer and Aero-heating Modeling for Hypersonic Waverider Vehicles, Proceedings of the *71st International Astronautical Congress (IAC)*, 12-16 October 2020, Dubai, United Arab Emirates.

4. G. Jaiswal, A. Mali and **Mrinal Kaushik**, Drag Reduction Techniques for Blunt-Nosed Bodies at Mach 6, International Conference on Computational Methods, Simulation and Optimization, Proceedings of the *Asian Institute of Technology Conference Center*, 22-24 June 2018, Bangkok, Thailand.

5. Humrutha G., **Mrinal Kaushik** and Sinhamahapatra K.P., Shock-Boundary Layer Interaction Control using Innovative Micro-Vortex Generators in Supersonic Intake, Proceedings of the *47th AIAA Fluid Dynamics Conference*, 5-9 June **2017**, Denver, Colorado, USA. DOI: 10.2514/6.2017-4124

6. Humrutha G., **Mrinal Kaushik** and Sinhamahapatra K.P., Shock Boundary Layer Interaction Control in Supersonic Intake using Cavity with Porous Surface, Proceedings of the *35th AIAA Applied Aerodynamics Conference*, 5-9 June **2017**, Denver, Colorado, USA. DOI: 10.2514/6.2017-3911

7. Humrutha G., **Mrinal Kaushik** and Sinhamahapatra K.P., Micro-Vortex Generator Controlled Shock–Boundary Layer Interactions in Supersonic Intake, Proceedings of the *31th International Symposium on Shock Waves*, 9-14 July **2017**, Nagoya, Japan.

8. Yashodhar V., Humrutha G., **Mrinal Kaushik** and Khan S.A., CFD Studies on Triangular Micro-Vortex Generators in Flow Control, Proceedings of the *International Conference on Mechanical, Automotive and Aerospace Engineering*, 25-27 July **2016**, Kualalumpur, Malayasia (Published in IOP Conference Series: *Materials Science and Engineering*, Vol. 163, **2017**). DOI: 10.1088/1757-899X/184/1/012007

9. Humrutha G., **Mrinal Kaushik** and Rathakrishnan E., Effect of Corrugated Tab on Supersonic Jet Control, Proceedings of the *13th International ymposium on Fluid Control, Measurement and Visualization*, 15-18 November **2015**, Doha, Qatar.

10. **Mrinal Kaushik**, and Rathakrishnan E., Corrugated Limiting Tab for Jet Mixing, Proceedings of the *13th International Symposium on Unsteady Aerodynamics, Aeroacoustics, and Aeroelasticity of Turbomachines*, 11-14 September **2012**, Tokyo, Japan.

11. **Mrinal Kaushik** and Rathakrishnan E., Corrugation Geometry Effectiveness for Jet Mixing, Proceedings of the *11th Asian Symposium on Visualization*, 5-9 June **2011**, Niigata, Japan.

12. **Mrinal Kaushik** and Rathakrishnan E., Studies on the Effect of Notches on Circular Jet Mixing, Proceedings of the *37th Joint Propulsion Conference*, 8-11 July **2001**, Salt Lake City, Utah, USA (AIAA Paper No. 2001-3609).

## NATIONAL CONFERENCES

1. Dorbala Sai Naga Bharghava, and **Mrinal Kaushik**, Numerical Studies on Uncontrolled and Controlled Shock-Wave/Boundary-Layer Interactions in Hypersonic Intake, *9th Symposium on Applied Aerodynamics & Design of Aerospace Vehicles (SAROD- 2022)*, 15-17 December **2022**, DRDL, Kanchanbagh, Hyderabad, India.

2. Thillaikumar T., and **Mrinal Kaushik**, Influence of Varied Aspect Ratio Tabs on Subsonic Jet Mixing, *International Conference on Advances in Aviation and Aerospace Technology (ICAAAT - 2022)*, 28-30 September **2022**, Hindustan Institute of Technology & Science, Chennai, India.

3. Thillaikumar T., and **Mrinal Kaushik**, Effects of Symmetric and Asymmetric Nozzle Exit Shapes on Subsonic and Sonic Jet Mixing, Proceedings of the *3rd Biennial International Conference on Future Learning Aspects of Mechanical Engineering (FLAME - 2022)*, 3-5 August **2022**, Amity University, Noida, Uttar Pradesh, India.
4. Thillaikumar T., and **Mrinal Kaushik**, Effect of Tab Geometries on Subsonic Jet Mixing, Proceedings of the *66th* International *Congress of the Indian Society of Theoretical and Applied Mechanics (ISTAM 2021)*, 3-5 December **2021**, VIT-AP University, Andhra Pradesh, India.
5. T. Jana, Thillaikumar T., and **Mrinal Kaushik**, Numerical Studies on the Mixing Characteristics of Core and Co-Annular Jets, Proceedings of the *65th Congress of the Indian Society of Theoretical and Applied Mechanics (ISTAM 2020)*, 9–12 December **2020**, Gandhi Institute of Technology & Mamagement (GITAM), Hyderabad, India.
6. Thillaikumar T., Lakshmi S., Sridhar B., and **Mrinal Kaushik**, Experimental Studies on the Thrust Vector Control of a Supersonic Nozzle using Struts, Proceedings of the *64th Congress of the Indian Society of Theoretical and Applied Mechanics (ISTAM 2019)*, 9–12 December **2019**, IIT Bhubaneswar, India.
7. Thillaikumar T., and **Mrinal Kaushik**, Assessment of Struts in Gas-dynamic Steering of a Supersonic Nozzle, Proceedings of the *46th National Conference on Fluid Mechanics and Fluid Power (FMFP)*, December 9-11, **2019**, PSG College of Technology, Coimbatore, India.
8. T. Jana and **Mrinal Kaushik**, Studies on the Dynamics of Three-inline Non-premixed Turbulent Oxy-Methane Flame Jets, Proceedings of the *ASME 6th Biennial Gas Turbine India Conference*, 5-6 December **2019**, IIT Madras, India.
9. Thillaikumar T., and **Mrinal Kaushik**, Experimental Studies on Multijet Characteristics, Proceedings of the *25th National and 3rd International ISHMT-ASTFE Heat and Mass Transfer Conference*, 28-31 December **2019**, IIT Roorkee, India.
10. Humrutha G., Sinhamahapatra K.P., and **Mrinal Kaushik**, Near Field Effects of Micro-Vortex Generators in Supersonic Intake, Proceedings of the 2nd *National Aerospace Propulsion Conference*, 17-19 December **2018**, IIT Kharagpur, India.
11. G. Jaiswal and **Mrinal Kaushik**, Innovative Techniques of Drag Reduction over Blunt Bodies at varied Angles of Attack in Supersonic Flow, Proceedings of the *7th International Conference on Theoretical, Applied, Computational and Experimental Mechanics*, 28-31 December **2017**, IIT Kharagpur, India.

12. G. Jaiswal and **Mrinal Kaushik**, Wave-Drag Attenuation over Conical-Spiked, Flat-Faced Aero-disk and Hemispherical Aero-disk, Proceedings of the *Indian Conference on Applied Mechanics*, 5-7 July **2017**, Motilal Nehru National Institute of Technology, Allahabad, India.
13. **Mrinal Kaushik** and Rathakrishnan E., Effect of Tab Aspect Ratios on Supersonic Jet Control, Proceedings of the *10th Asian Symposium on Visualization*, 1-5 March **2010**, SRM University, Chennai, India.
14. **Mrinal Kaushik** and Rathakrishnan E., Corrugation Geometry Effectiveness for Jet Mixing, Proceedings of the *10th Asian Symposium on Visualization*, 1-5 March **2010**, SRM University, Chennai, India.
15. **Mrinal Kaushik** and Rathakrishnan E., Characteristics of three Jets in a row, Proceedings of the *10th Asian Symposium on Visualization*, 1-5 March **2010**, SRM University, Chennai, India.
16. **Mrinal Kaushik** and Rathakrishnan E., Corrugated Cross Wire for Supersonic Jet Control, Proceedings of the *10th Asian Symposium on Visualization*, 1-5 March **2010**, SRM University, Chennai, India.

## SOME OTHER JOURNAL PUBLICATIONS

1. **Mrinal Kaushik**, Rakesh K., and Humrutha G. (**2015**), Review of Computational Fluid Dynamics Studies on Jets, *American Journal of Fluid Dynamics*, 5(3A): 1-11. (open access) DOI: 10.5923/s.ajfd.201501.01
2. **Mrinal Kaushik** and Hanmaiahgari, P.R. (**2015**), Effects of Underexpansion Level on Sonic Jet Propagation, *American Journal of Fluid Dynamics*, 5(3A): 12-18. (open access) DOI: 10.5923/s.ajfd.201501.02
3. Srivastava S., and **Mrinal Kaushik** (**2015**), Supersonic Square Jet Mixing in Presence of Cross-Wire at Nozzle Exit, *American Journal of Fluid Dynamics*, 5(3A): 19-23. (open access) DOI: 10.5923/s.ajfd.201501.03
4. **Mrinal Kaushik** and Humrutha G. (**2015**), Review of Shock-Boundary Layer Controlled Interactions Studies in High Speed Intakes, *Journal of Aerospace Engineering & Technology*, 5(3): 1-14. DOI: 10.37591/.v5i3.632
5. **Mrinal Kaushik** (**2015**), Superiority of Tabs with Corrugations on Jet Mixing, *Journal of Aerospace Engineering & Technology*, 5(3): 15-26. DOI: 10.37591/.v5i3.633

**RESEARCH PROJECTS**: Link

## PROJECT # 1

- **Designation:** Principal Investigator

- **Project Name:** Experimental Studies on Controlled Shock-Boundary Layer Interactions in Hypersonic Intake
- **Sponsored by:** Science and Engineering Research Board (SERB)
- **Duration:** 28-07-2016 to 27-07-2019 (Completed)
- **Project Value:** 18.04 (In Lakhs)

### PROJECT # 2

- **Designation:** Principal Investigator
- **Project Name:** Theoretical Studies on Passive Controlled Jet Mixing
- **Sponsored by:** ISIRD-SRIC, IIT Kharagpur
- **Duration:** 20-05-2014 to 31-12-2017 (Completed)
- **Project Value:** 26.5 (In Lakhs)

### PROJECT # 3

- **Designation:** Co-Investigator
- **Project Name:** DST - FIST Project at the Department of Aerospace Engineering
- **Sponsored by:** Department of Science and Technology (DST), Government of India
- **Duration:** 18-08-2015 to 17-08-2020 (Completed)
- **Project Value:** 295 (In Lakhs)

## THESES SUPERVISION

### PH.D THESES

#### Present

1. Amit Krishnat Mali - **Thesis:** *Experimental Studies on the Effects of Grooves on Supersonic Jet Mixing*.

#### Past

1. Thillaikumar T. **(Completed in 2022)** - **Thesis:** *Experimental Studies on Axisymmetric and Asymmetric Subsonic, Sonic and Supersonic Jet Control*. (Now Assistant Professor at Hindustan Institute of Technology & Science, Chennai, India).
2. Tamal Jana **(Completed in 2021)** - **Thesis:** *Experimental Studies on Shock/Boundary-Layer Interactions in Hypersonic Intake*. (Now Assistant Professor at Jain University, Bangalore, India).
3. Humrutha G. **(Completed in 2018)** - **Thesis:** *Experimental Studies on Shock-Boundary Layer Controlled Interactions in Supersonic Intake*. (Now Senior Assistant Professor at VIT, Vellore, India).

## M.TECH THESES

### Present

1. Dorbala Sai Naga Bharghava - **Thesis:** to be decided.

### Past

1. Tamas Pal **(Completed in 2022) - Thesis**: *Aircraft Parameter Estimation using Neural Network Approach: Comparison of Gauss-Newton and Luus Jaakola Optimization Techniques*.
2. Nitish Kamal **(Completed in 2020) - Thesis**: *Navier-Stokes Computations of Heat Transfer and Aero-heating Modeling for Hypersonic Waverider Vehicles*.
3. *Ravi Sharma* **(Completed in 2020)** - **Thesis:** *Accelerating Eulerian Fluid Simulation with Artificial Neural Network.*
4. Akash Kumar **(Completed in 2020) - Thesis**: *Aero-Heating Modelling and Heat Transfer Computations of Supersonic Airborne Objects*.
5. Amit Mali **(Completed in 2019) - Thesis**: *Experimental and Computational Studies on Asymmetric Nozzles for Jet Mixing Augmentation*.
6. Saket Sharma **(Completed in 2018) - Thesis**: *Design of MUAV for Tactical Surveillance and Disaster Management*.
7. Pradhyumn Bhale **(Completed in 2017) - Thesis**: *Mixing Characteristics of Circular and Non-Circular Supersonic Nozzles*.
8. Arjit Pandey **(Completed in 2017) - Thesis**: *Numerical Simulation of Shock-Boundary Layer Interactions in Hypersonic Intake*.
9. Prithviraj Pochampalli **(Completed in 2016) - Thesis**: *CFD Studies on Co-Annular Jets*.
10. Jenny Majeed **(Completed in 2016) - Thesis**: *Preliminary Design of 2D Supersonic Intake and CFD Analysis*.
11. Siddharth Agarwal **(Completed in 2015) - Thesis**: *Simulation Studies on Tabs as Supersonic Jet Control*.
12. Vatsalya Surana **(Completed in 2015) - Thesis**: *CFD Studies on Micro-Vortex Generators on Drag Reduction of an Ahmed Body*.

## RECOGNITIONS & EDITORIAL ROLES

- Review Editor -- Frontiers in Control Engineering. **(2021)**.
- Biography included in the prestigious '*Marquis Who's Who World*'. **(2016)**.
- Guest Editor -- Special issue of the American Journal of Fluid Dynamics: "*Flying at Supersonic and Hypersonic Mach Numbers - Current Advancements and Challenges Ahead*", Deadline for manuscript submissions: 20th October 2015. **(2015)**.

- *Young Researcher Award* in Aerospace Engineering by Venus International Foundation, Chennai, India. **(2015)**.
- *First Deputy Program Director* of the Post-Induction Training School (POINTS) of Defense Research & Development Organization (DRDO), India. **(2012)**.
- Received a *fellowship* for pursuing research from The University of Alberta, Edmonton, Canada. **(2004)**.

## INVITED EXPERT FOR THE FOLLOWING

1. Member External Expert Committee, Ph.D Evaluations, Lovely Professional University (LPU), Punjab, India **(2022)**.
2. Delivered a lecture on *Shock-Boundary Layer Interactions* in Online One-Day Lecture Series on Recent Advances in Aerospace Engineering in commemoration of Birthday Celebration of Dr. A.P.J Abdul Kalam, organized by the Department of Aerospace Engineering, MIT Campus, Anna University, Chennai **(2021)**.
3. External examiner for the Aerodynamics Stream (DISSERTATION-II) for M.E. Aeronautical Engineering and M.E. Aerospace Technology, Department of Aerospace Engineering, MIT Campus, Anna University, Chennai **(2021)**.
4. Examined the Ph.D Thesis titled "Aerodynamic Characterization of Missiles Having Conventional & Unconventional Fin Configurations" Submitted by Mr. Nayhel Sharma for the award of PhD degree to the Department of Aerospace Engineering, Punjab Engineering College, Chandigarh **(2021)**.
5. Consecutively eight times invited paper setter for Aerospace Engineering in Andhra Pradesh and Telangana State, Post-Graduate Engineering Combined Entrance Test (AP-PGECET & TS-PGECET). **(2013-2020)**.
6. Delivered a lecture on *Challenges in Supersonic Combustion For Sustained Hypersonic Flight*, organized by Government Engineering College (GEC) Raipur, India, and Rustamji Institute of Technology, Tekanpur, India, sponsored under TEQIP-III **(2020)**.
7. Delivered a lecture on *Applications of Boundary Layer Theory in Aerospace Engineering,* organized by Government Engineering College (GEC) Raipur, India **(2019)**.
8. Member selection board for the recruitment of defense personnel at Defence Institute of Advanced Technology, Pune, India **(2017)**.

9. Examined the Ph.D Thesis titled "Control of Supersonic Square Jet" Submitted by Mr. Shantanu Srivastava for the award of PhD degree to the Department of Aerospace Engineering, IIT Kanpur **(2015)**.

## SHORT-TERM COURSES

1. Ministry of Human Resource and Development of Government of India sponsored TEQIP–III, 5-days short-term course title: Non-equilibrium Aerothermodynamics, 17–21 February **2020**, Indian Institute of Technology Kharagpur Extension Center, Kolkata, India.
2. Ministry of Human Resource and Development of Government of India 3-days micro-credit course title: *Experimental Flow Visualization and Measurement Techniques for both Incompressible and Compressible Flow Regimes*, 12–15 March **2019**, Indian Institute of Technology Kharagpur, India.
3. Ministry of Human Resource and Development of Government of India sponsored TEQIP–II, 3–days short-term course title: *Essence of Gas Dynamics*, 18–21 January **2017**, Indian Institute of Technology Kharagpur Extension Center, Kolkata, India.
4. Ministry of Human Resource and Development of Government of India sponsored TEQIP–I, 1–day short-term course title: *Fundamentals of Compressible Flows*, July **2015**, Indian Institute of Technology Kharagpur, India.
5. Hindustan Aeronautics Limited (HAL) sponsored short-term course title: *Air Armaments*, May–July **2014**, Indian Institute of Technology Kharagpur, India.

## SYMPOSIUMS AND WORKSHOPS

1. Member Program Committee, *8th International Conference on Theoretical, Applied, Computational and Experimental Mechanics*, 20–22 December **2021**, IIT Kharagpur.
2. *Member Program Committee, 25th National and 3rd International ISHMT-ASTFE Heat and Mass Transfer Conference,* 28–31 December **2019***, IIT Roorkee, India.*
3. *Track Chair*, 2nd National Aerospace Propulsion Conference, 17–19 December **2018**, Indian Institute of Technology Kharagpur, India.
4. *Track Chair*, 7th International Conference on Theoretical, Applied, Computational and Experimental Mechanics, 28–30 December **2017**, Indian Institute of Technology Kharagpur, India.
5. *Organizing Secretary*, 6th International Conference on Theoretical, Applied, Computational and Experimental Mechanics, 27–29 December **2014**, Indian Institute of Technology Kharagpur, India.

6. *Organizing Secretary*, Symposium on Intake Aerodynamics with Trust for Aerodynamics Advancement in India, 4–5 March **2013**, Defence Institute of Advanced Technology, Pune, India.

## EDITOR/REVIEWER (JOURNALS): Link

- Aerospace Science and Technology
- Acta Astronautica
- Physics of Fluids (AIP)
- Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering
- Journal of Aerospace Engineering (ASCE)
- Shock Waves (Springer)
- Journal of Applied Fluid Mechanics (JAFM)
- Aerospace (MDPI)
- China Ocean Engineering (Springer)
- Cogent Engineering (Taylor & Francis)
- Cogent Physics (Taylor & Francis)
- Sadhana Academy Proceedings in Engineering Sciences (Springer)
- Journal of the Institution of Engineers: Series C (Springer)
- Journal of Aerospace Technology and Management
- Propulsion and Power Research
- Review Editor for Frontiers in Control Engineering

## PROFESSIONAL ACTIVITIES

### INSTITUTIONAL RESPONSIBILITIES

- Member, Council of Dean, Students Affairs **(Janaury - December, 2022)**.
- Assistant Warden, Nehru Hall of Residence **(2017-2019)**.
- Assistant Warden, Meghnath Saha Hall of Residence **(2014-2015)**.

### DEPARTMENTAL RESPONSIBILITIES

- In-Charge, Aerodynamics Laboratory **(Janaury - September, 2022)**.
- Member, Purchase Committee **(2021-2024)**.
- Faculty Advisor, M.Tech **(2020-2022)**.
- Faculty Advisor, M.Tech **(2018-2020)**.
- Faculty Advisor, B.Tech. & M.Tech. (Dual) **(2013-2018)**.
- Member, Undergraduate Academic Committee **(2017-2019)**.
- Co-In-Charge, Aerodynamics Laboratory **(2015-2017)**.

- Professor-In-Charge, Training **(2015-2016)**.
- Professor-In-Charge, Seminar **(2013-2015)**.