Karthick Sengunthapuram Kandasamy

M.E., Ph.D., M.R.Ae.S., M.A.S.M.E., M.A.P.S., M.A.I.A.A., M.E.M., M.I.S.W.I.,
Post-Doctoral Fellow, with Prof. Jacob Cohen

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Research and Academic Background

Research

Jun 2018 – Present
PDF

Post-Doctoral Fellow (with Prof. Jacob Cohen)
Technion Wind Tunnel Complex
Faculty of Aerospace Engineering
Technion-Israel Institute of Technology
Haifa, Israel - 3200003

Sep 2017 – May 2018
RA

Research Associate (with Prof. G. Jagadeesh)
Indian Institute of Science | Aerospace Engineering
Laboratory of Hypersonic and Shock wave Research
Bengaluru, Karnataka, India – 560012

Education

Aug 2012 – Sep 2017

Indian Institute of Science (Colloquium: 01-09-2017 | Defense: 27-04-2018 | Awarded: 23-06-2018)
Doctorate in Engineering, Aerospace Engineering | (81.25% in course works)
Laboratory of Hypersonic and Shock wave Research
Bengaluru, Karnataka, India – 560012

Aug 2010 – Jul 2012

Birla Institute of Technology, Mesra | 95.00% (Univ. Rank Holder: 1)
Master of Engineering, Aerodynamics of Ballistics, Missiles & Rockets
Department of Space Engineering and Rocketry
Mesra, Jharkand, India – 835215

Aug 2006 – Apr 2010

Rajalakshmi Engineering College | 86.74% (Univ. Rank Holder: 2)
Bachelor of Engineering, Aeronautical Engineering
Faculty of Mechanical Engineering, Affiliated to Anna University
Chennai, Tamil Nadu, India - 602105

Jun 2003 – Apr 2006

C. S. I. Anderson Higher Secondary School
12th – Maths, Physics, Chemistry, Biology | (Mar. 2006, State Board – 92.75%)
10th – Maths, Science, Social Science | (Apr. 2004, State Board – 96.8%)
Kanchipuram, Tamil Nadu, India – 631501

Master's Thesis Title — **Aerodynamics of a projectile in ground proximity at supersonic speed**

Advisors:
Prof. J. K. Prasad and Prof. Sudip Das

In the present study, a model of NATO 5.56 mm ammunition is selected. Series of experiments and computations are performed to obtain the aerodynamic coefficients. Supersonic Wind Tunnel has been used for Schlieren/Shadowgraph flow visualization, oil flow visualization, static pressure measurements, and forces and moment measurements using a 3-component strain gauge balance. Experiments are conducted at various ground heights for a few angles of attack. Computations are made using 'fluent' and adopting the S-A turbulence model. At different Mach numbers, the computed results are in good agreement with experimental results. The obtained aerodynamic coefficients are further utilized to estimate the trajectory.

Doctoral Thesis Title — **Experimental studies on mixing in a supersonic confined jet**

Advisors:
Prof. K. P. J. Reddy and
Prof. G. Jagadeesh

An existing rectangular supersonic ejector is used to study the aspects of mixing encountered in a supersonic confined jet. Air is used as the working fluid in both the primary and secondary flow. The primary flow is supersonic and the secondary flow is subsonic. Effects of the primary flow Mach number and the secondary flow rate on the gaseous mixing in the confined jet are studied. Non-mixed length, mixed length, and potential core length of the primary flow are used as key parameters in the mixing studies. Mie scattering (PLMS), laser-induced fluorescence (PLIF), and particle image velocimetry (PIV) are used as flow diagnostics. Linearity in the mixing progression, lengthening of the potential core, the encountering of a multitude of unstable modes are a few of the key findings in this work.

Experimental facilities designed/developed/augmented/commissioned

2012 – 2017 (During doctoral studies)

Free/confined blow-down jet facility: Augmented the existing blow-down unit at LHSR with extended capabilities units including screw compressor, refrigeration-type drier, additional air storage unit, modified stagnation chamber for high mass flow particle seeding, in-house designed, and developed liquid particle seeder, and integrated optical flow diagnostics like PIV, Rayleigh/Mie scattering, and acetone/OH fluorescence imaging.

2018 – 2020 (During post-doctoral studies)

Modular cold combustor flow facility: Designed and developed a testbed to study the mixing environment of an annular (cylindrical) combustor in a micro-gas turbine engine in a rectangular (cartesian) space so that optical measurements can be done. It is basically a suction-based wind-tunnel with a custom modified test-section. The facility has a capacity to produce 1–30 m/s of flow speeds simulating air-fuel mixing but in a air-air environment. The facility is integrated with simultaneous measurement of kinematic and scalar variables using PIV and iodine-based fluorescence imaging.

2020 – 2022 (During the post-doctoral studies)

Hypersonic Ludwieg tunnel: Designed and developed a hypersonic impulse flow facility for M = 6 using the Ludwieg tunnel concept. The facility has a test-section diameter of 75 mm with a stationary flow time of 12.5 ms. The unit has a capacity to produce repeated shots for a wide range of unit Reynolds numbers (~10^6 to ~10^7) and it is automated. The total pressure and temperature are varied between 3-10 bar and 300-500 K, respectively. Unsteadiness in the flow field is identified using high-speed nano-pulse schlieren/shadowgraphy, carbon-di-oxide based Rayleigh scattering, and unsteady pressure or temperature measurements.

Contributions in the funded projects during the post-doctoral study

2020 – 2021
Ministry of Defense, Israel | Approx. 50,000 USD

Design and development of a hypersonic Ludwieg tunnel at M=6 to study the unsteadiness observed during leading-edge separation.

Principal Investigator: Jacob Cohen
Co-investigator: SK Karthick

2021 – 2022
Israel Aerospace Industries, Israel | Approx. 50,000 USD

Understanding the separated shear layer in a hypersonic cone-cavity configurations across a wide range of Reynolds numbers at M = 6.

Principal Investigator: Jacob Cohen
Co-investigators: SR Nanda, SK Karthick

Skills & Activities

Research Interests

Gas dynamics, turbomachinery, hypersonics, aeroacoustics, experimental fluid dynamics, mixing flows, aerothermodynamics, shock/wind tunnels, fluidic devices, flow measurement techniques, optical flow diagnostics, thermo-fluids, high-speed imaging, jets and wakes, data-driven techniques, digital image processing

Other Research Interests	Aircraft design, vehicle dynamics and stability, flow control, fluid structure interactions, fluid turbulence, computational fluid dynamics using commercial solvers, energy conversion and conservation
Research Activities	Real and ideal flow analysis of obstacles, Design and development of supersonic blow-down wind tunnel, Ground proximity studies of supersonic bullets, Flow morphology of the supersonic free/confined jet, Studies on exotic supersonic nozzle shapes, Aerodynamics behind the auto rotation of seeds, DBD plasma wall jet PIV studies, Blast-wave visualization, hypersonic flow visualization, Mist generation and applications in high speed flows, spiked bodies in supersonic/hypersonic flows, transonic flow past cavities, external flow control, jet aeroacoustics, cold flow mixing studies in the gas turbine combustors and supersonic inlets, high-speed facility design and testing, low Re flows past polygons, supersonic wall jets
Experimental Skills	Rayleigh/Mie Scattering, Particle Image Velocimetry, Laser Induced Fluorescence (acetone, iodine, NO and OH PLIF), Particle Size Analysis, Stereoscopy, High Speed Imaging, Schlieren and Shadowgraph Imaging, Spectroscopy, Surface pressure measurements (steady/unsteady), Oil flow visualization, Aeroacoustics
Software Skills	Ansys ICEM Meshing (2D, 3D), Ansys Fluent (2D, 3D RANS/URANS, DES, LES), Davis 8.5 (2D PIV, LIF, Stereoscopic PIV), Tecplot (2D, 3D), Matlab (Image Processing Routines, Data Processing), Catia V5 & V6 (Sketching, Part, Surface, Assembly, Drafting), Solid Works (sketching, drafting, assembly, rendering), Microsoft Office (Word, Power Point, Excel, Publisher), Adobe (Illustrator, After Effects, Premiere Pro, Photoshop, Light Room), and LaTeX
Languages (Read, Write & Speak)	English, Tamil

Awards, Achievements, Honors, and Scholarships

Feb 2023	Award: Ramanujan Fellowship (Dept. Mech. Engg., IITM, Chennai, India)
Jan 2023	Honor: Editor's Pick, Phys. Fluids (Vol. 35, Issue 1, 016105)
May 2022	Honor: Best Paper, Featured Article, Phys. Fluids (Vol. 34, Issue 6, 097235)
Aug 2021	Achievement: Reviewed 300+ research articles on Fluid Dynamics (Publons)
Jun 2021	Honor: Invited Article in Phys. Fluids (Vol. 33, Issue 6, 066102)
May 2021	Honor: Served in the Jury of AIAA: Graduate Scholarship Awards
Dec 2020	Honor: Editor's Pick in Phys. Fluids (Vol. 32, Issue 12, 126104)
Aug 2020	Award: Extended Fine Trust Post-Doctoral Fellowship (Technion, Haifa, Israel)
Sep 2019	Award: Top Peer Reviewer in Engineering & Cross-field (Web of Science)
Aug 2019	Award: Fine Trust Post-Doctoral Fellowship (Technion, Haifa, Israel)
Dec 2018	Award: Outstanding Reviewer award (4 Elsevier Journals)
May 2018	Honor: Invited Article in Energy (Vol. 161, Issue 1, 832-845)
Feb 2018	Award: Best Paper Award (NSSW-5, Chandigarh, India)
July 2017	Award: Best Paper Award (ISSW-31, Nagoya, Japan)
July 2017	Award: CSIR Travel Fellowship
Feb 2016	Award: Best Paper Award (NSSW-4, Coimbatore, India)
Jul 2015	Award: Best Poster Award (ISSW-30, Tel-Aviv, Israel)
Aug 2012	Scholarship: MHRD Scholarship for Doctoral Studies, India (IISc, Bangalore)
May 2012	Achievement: University 1st in the Post Graduate Studies
Aug 2010	Scholarship: UGC Scholarship for Post Graduate Studies, India (BIT, Mesra)
May 2010	Achievement: University 2nd in the Under Graduate Studies (Affiliated: Anna University)

Publications (citations – 236 | h-index – 9 | i10-index – 9 | Google Scholar)

International Journals

Manuscript Accepted and Published

1. **SK Karthick**, Soumya R Nanda, J Cohen: *Unsteadiness in hypersonic leading-edge separation*. Experiments in Fluids; 12/2022; 64(1):13; **Impact Factor: 2.790**
2. **SK Karthick**, D Bhelave, A De: *Supersonic flow unsteadiness induced by control surface deflections*. Physics of Fluids; 01/2023; 35(1):016105; **Impact Factor: 3.514 (Editor's Pick)**
3. S Janardhanraj, **SK Karthick**, A Farooq: *A review of diaphragmless shock tubes for interdisciplinary applications*. Progress in Energy and Combustion Science; 10/2022; 93(1):101042; **Impact Factor: 35.34**
4. Luckachan K George, **SK Karthick**[1]**,** AR Srikrishnan, R Kannan: *Unsteady dynamics in a subsonic duct flow with a bluff body*. Physics of Fluids; 05/2022; 34(6):067114; **Impact Factor: 3.514 (Best Paper, Featured Article)**
5. Ibrahim M Sugarno, R Sriram, **SK Karthick**[1]**,** G Jagadeesh: *Unsteady pulsating flow field over spiked axisymmetric Forebodies at hypersonic flows*. Physics of Fluids; 01/2022; 34(1):016104; **Impact Factor: 3.514 (Invited Paper)**
6. Soumya R Nanda, **SK Karthick**[1], TV Krishna, A De, Ibrahim M Sugarno: *On the unsteady dynamics of partially shrouded compressible jets*. Experiments in Fluids; 10/2021; 62(8):221; **Impact Factor: 2.790**
7. **SK Karthick**: *Shock and shear layer interaction in a confined supersonic cavity flow*. Physics of Fluids; 06/2021; 33(6):066102; **Impact Factor: 3.514 (Invited Paper)**
8. D Sahoo, **SK Karthick**[1]**,** S Das, J Cohen: *Shock related unsteadiness of axisymmetric spiked bodies in the supersonic flow*. Experiments in Fluids; 04/2021; 62(4):89; **Impact Factor: 2.790**
9. **SK Karthick,** I Jacobi, B Cukurel: *The Confounding Effect of Temperature in Laser-Induced Fluorescence Concentration Measurements with Iodine Vapor*. Measurements Science and Technology 01/2021; 32(1):015301; **Impact Factor: 1.857**
10. KR Sekar, **SK Karthick**[1], S Jegadheeswaran, R Kannan: *On the unsteady throttling dynamics and scaling analysis in a typical hypersonic inlet-isolator flow*. Physics of Fluids; 12/2020; 32(12):126104; **Impact Factor: 3.514 (Editor's Pick)**
11. Srisha MV Rao, **SK Karthick**[1]**,** A Anand: *Elliptic supersonic jet morphology manipulation using sharp-tipped lobes*. Physics of Fluids 08/2020; 32(8):086107; **Impact Factor: 3.514**
12. M Chaudhary, TV Krishna, Soumya R Nanda, **SK Karthick**[1]**,** A Khan, A De, Ibrahim M Sugarno: *On the fluidic behavior of an over-expanded planar plug nozzle under lateral confinement.* Physics of Fluids 08/2020; 32(8):086106; **Impact Factor: 3.514**
13. D Sahoo, **SK Karthick**[1]**,** S Das, J Cohen: *Parametric experimental studies on supersonic flow unsteadiness over a hemispherical spiked body*. AIAA Journal; 06/2020; 58(8):3446-3463; **Impact Factor: 2.72**
14. Srisha MV Rao, **SK Karthick**[1]: *Studies on the effect of imaging parameters on dynamic mode decomposition of time-resolved schlieren flow images*. Aerospace Science and Technology 05/2019; 88(1):136-146; **Impact Factor: 4.499**
15. **SK Karthick,** Srisha MV Rao, G Jagadeesh, KPJ Reddy: *Experimental parametric studies on the performance and mixing characteristics of a low area ratio rectangular supersonic gaseous ejector by varying the secondary flow rate*. Energy 05/2018; 161(1):832-845; **Impact Factor: 6.082 (Invited Paper)**

[1] Contributed as equal to the first author

16. **SK Karthick**, Srisha MV Rao, G Jagadeesh, KPJ Reddy: *Passive scalar mixing studies to identify the mixing length in a supersonic confined jet*. Experiments in Fluids 04/2017; 58(5):59; **Impact Factor: 2.790**

17. **SK Karthick**, Srisha MV Rao, G Jagadeesh, KPJ Reddy: *Parametric experimental studies on mixing characteristics within a low area ratio rectangular supersonic gaseous ejector*. Physics of Fluids 07/2016; 28(7):26; **Impact Factor: 3.514**

18. **SK Karthick**, G Jagadeesh, KPJ Reddy: *Visualization of supersonic free and confined jet using planar laser Mie scattering technique*. Journal of the Indian Institute of Science 03/2016; 96(1):29-45; **Impact Factor: 0.857**

Manuscript to be submitted

1. **SK Karthick,** D Sahoo, S Das, J Cohen: Unsteadiness in separated flows at supersonic speed using two-dimensional detached eddy simulations. Physical Review Fluids; Manuscript about to be submitted; 2023

2. **SK Karthick,** D Sahoo, S Das, J Cohen: Mechanism of unsteady leading-edge flow separation ahead of a two-dimensional forebody at supersonic speed. Physical Review Fluids; Manuscript about to be submitted; 2023

3. **SK Karthick,** Soumya R Nanda, J Cohen: *Unsteadiness in a hypersonic cavity flow*. Physical Review Fluids; Manuscript about to be submitted; 2023

International Conference Proceedings

1. **SK Karthick**, G Jagadeesh: *An overview on the aspects of supersonic gaseous mixing*. 31st International Congress on High-Speed Imaging and Photonics (ICHSIP 31), Osaka, Japan; 11/2016

2. **SK Karthick**, Srisha MV Rao, G Jagadeesh, KPJ Reddy: *Effect of Primary Flow Mach Number on the Non-Mixed Length in a Two Dimensional Supersonic Ejector*. 30th International Symposium on Shock Waves (ISSW 30), Tel-Aviv, Israel; 07/2015 (Note: **Best Poster Award**)

3. V Albin, **SK Karthick**[1], Srisha MV Rao, G Jagadeesh: *Mixing enhancement in free-jets from supersonic ESTS lobed nozzle*. 30th International Symposium on Shock Waves (ISSW 30), Tel-Aviv, Israel; 07/2015

4. **SK Karthick**, Srisha MV Rao, G Jagadeesh, KPJ Reddy: *Visualizing the flow through a supersonic gaseous ejector using Planar Laser Mie Scattering*. 10th Pacific Symposium on Flow Visualization and Image Processing (PSFVIP 10), Naples, Italy; 06/2015

5. **SK Karthick**, Srisha MV Rao, G Jagadeesh, KPJ Reddy: *Experiments in supersonic gaseous ejector using 2D-PIV techniques*. 31st International Symposium on Shock Waves (ISSW 31), Nagoya, Japan; 07/2017 (Note: **Best Presentation Award**)

6. **SK Karthick**, V Albin, Srisha MV Rao, G Jagadeesh: *PIV studies on the effect of number of lobes in a supersonic ESTS lobbed nozzle*. 31st International Symposium on Shock Waves (ISSW 31), Nagoya, Japan; 07/2017

7. **SK Karthick**, PR Rajitha, S Janardhanraj, Y Krishna, G Jagadeesh: *PLIF based concentration measurement of OH behind the blast wave emanating from an oxy-hydrogen detonation-driven shock tube*. 31st International Symposium on Shock Waves (ISSW 31), Nagoya, Japan; 07/2017

8. **SK Karthick**, R Sriram: *Computational Studies on the Unsteadiness in Hypersonic Shock Induced Leading Edge Separation*. 32nd International Symposium on Shock Waves (ISSW 32), National University of Singapore, Singapore; 07/2019

[1] Contributed as equal to the first author

National Conference Proceedings

1. D Sahoo, **SK Karthick**[1], S Das, J Cohen: *Numerical investigation on the variation of thermal load over spike mounted blunt bodies*. 6th National Shock Waves Symposium (NSSW 6), Indian Institute of Technology Madras (IITM), Chennai – 600036, India; 02/2020
2. **SK Karthick**, Srisha MV Rao, G Jagadeesh, KPJ Reddy: *Dominant modes in the supersonic free and confined jet*. 5th National Shock Waves Symposium (NSSW 5), Terminal Ballistics and Research Laboratory (TRBL), Chandigarh - 134111, India; 02/2018 (Note: **Best Paper Award**)
3. **SK Karthick**, G Jagadeesh, KPJ Reddy: *Studies on fluid mixing in the supersonic gaseous ejector using acetone PLIF*. 1st Aerospace Research Students Symposium (ARSS 1), Indian Institute of Science, Bangalore, Karnataka – 560012, India; 07/2016
4. **SK Karthick**, Srisha MV Rao, G Jagadeesh, KPJ Reddy: *Scaling and non-dimensionalization studies on mixing characteristics within a rectangular supersonic gaseous ejector*. 4th National Shock Waves Symposium (NSSW 4), Karunya University, Coimbatore, Tamilnadu - 641114, India; 02/2016
5. **SK Karthick**, Vikas M Shelar, G Jagadeesh, KPJ Reddy: *Studies on mixing in the supersonic gaseous ejector using acetone PLIF*. 4th National Shock Waves Symposium (NSSW 4), Karunya University, Coimbatore, Tamilnadu - 641114, India; 02/2016 (Note: **Best Paper Award**)
6. SN Omkar, RV Mangipudi, **SK Karthick**, G Jagadeesh: *Experimental investigation of Flow Field Velocity During Forced Breathing using Schlieren Flow Visualization Technique*. 21st International Conference on Frontiers in Yoga Research and Its Applications (INCOFYRA 21), Prashanti Kutiram, International Headquarters of VYASA, Bengaluru-560105, India; 01/2016
7. **SK Karthick**, Srisha MV Rao, G Jagadeesh, KPJ Reddy: *Experimental studies on the effect of primary flow Mach number on mixing in a two dimensional supersonic ejector*. 3rd National Symposium on Shock Waves (NSSW 3), IIT, Bombay, India; 02/2014
8. **SK Karthick**, S Das, P Kumar, JK Prasad: *Aerodynamics and performance of a projectile in ground proximity at supersonic speed*. 57th Congress of Indian Society of Theoretical and Applied Mechanics (ISTAM 57), Pune, India, Pune; 12/2012
9. **SK Karthick**, S Das, P Kumar, JK Prasad: *Effect of Ground Proximity on the Trajectory of a Bullet at a Supersonic Speed*. 26th National Convention of Aerospace Engineers (NCAE 26), Hyderabad, India; 11/2012

International Conference Meetings

1. 20 Nov 2022 **SK Karthick,** SR Nanda, J Cohen – 75th Annual Meeting of the APS Division of Fluid Dynamics, Indianapolis, USA: *Leading-edge separation in hypersonic flow.*
2. 10 Mar 2022 **SK Karthick,** SR Nanda, J Cohen – 61st Israel Annual Conference on Aerospace Sciences, Tel-Aviv, Israel: *Experiments in a hypersonic miniature Ludwieg tunnel at different Reynolds numbers on a flat-face spiked-body at a freestream Mach number of 6.*
3. 21 Nov 2021 **SK Karthick,** J Cohen, D Sahoo, S Das – 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, USA: *Unsteadiness in a leading-edge separated flow at supersonic speed.*
4. 21 Nov 2020 **SK Karthick,** J Cohen, D Sahoo, S Das – 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, USA: *On the spectral characteristics of separated flows in a spiked body at supersonic flow*.

5. 24 Nov 2019 J Cohen, D Sahoo, **SK Karthick**[1], S Das – 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, Washington, USA: *Reducing shock related unsteadiness of supersonic flow.*
6. 16 Apr 2019 J Cohen, D Sahoo, **SK Karthick**[1], S Das – 8th International Symposium on Bifurcations and Instabilities in Fluid Dynamics, Limerick, Ireland: *Supersonic flow unsteadiness in spiked body configurations*.
7. 6 Dec 2018 **SK Karthick**, I Jacobi, B Cukurel – 32nd Annual Symposium of the Israeli Section of The Combustion Institute, Tel-Aviv, Israel: *End-wall and array-size effects in modeling the annular combustor of a micro gas turbine.*

Professional Affiliations (from 2016 onwards)

APS	Member, American Physical Society | 61251158 |
RAeS	Member, Royal Aeronautical Society | 3026787 |
AIAA	Sr. Member, American Institute of Aeronautics & Astronautics | 513496 |
ASME	Member, American Society of Mechanical Engineers | 102105929 |
EUROMECH	Member, European Mechanics Society | 2006609 |
ISWI	Member, International Shock Wave Institute | 30910373 |
SSWR	Member, Society for Shock Wave Research, India

Peer Reviewed in Journals & Conferences

(390+ **Verified Reviews** - 48 **Journals,** 4 **Conferences**)

Physics of fluids ✦ Experiments in Fluids ✦ European Journal of Mechanics B: Fluids ✦ Acta Astronautica ✦ Journal of Spacecraft and Rockets ✦ AIAA Journal ✦ Energy ✦ Energy Conservation and Management ✦ Experimental Thermal and Fluid Science ✦ Journal of Engineering and Technology Research ✦ Journal of Applied Fluid Mechanics ✦ Energies ✦ Aerospace Science and Technology ✦ Applied Thermal Engineering ✦ The Aeronautical Journal ✦ Open Journal of Fluid Dynamics ✦ Acoustics ✦ Acta Polytechnica ✦ Aerospace ✦ Aircraft Engineering and Aerospace Technology ✦ International Journal of Environmental Research and Public Health ✦ International Journal of Fluid Mechanics Research ✦ International Journal of Heat and Mass Transfer ✦ Applied Energy ✦ Experimental Mechanics ✦ Journal of Fluids Engineering ✦ Propulsion and Power Research ✦ Symmetry ✦ Electronics ✦ Entropy ✦ Thermal Science ✦ Flow Measurements and Instrumentation ✦ Journal of Aerospace Engineering ✦ Journal of Mechanical Science and Technology ✦ Flow Turbulence and Combustion ✦ Mathematics ✦ Processes ✦ Proceedings of the Mechanical Engineers, Part G: Journal of Aerospace Engineering ✦ Sustainability ✦ Journal of the Institute of Engineers: Series C ✦ International Journal of Space Science and Engineering ✦ Fluids ✦ Experimental Mechanics ✦ IOP Conference Series: Materials Science and Engineering ✦ International Conference on Aviation and Cosmonautics ✦ IEEE Pune Section International Conference ✦ Thermal and Fluids Engineering Conference ✦ Frontiers in Physics ✦ APL Machine Learning

Verified Reviewer | publons.com/a/1513792/
Researcher Id | researcherid.com/rid/G-3359-2017
Scopus Id | 57190130752

[1] Contributed as equal to the first author

Personal Details

Date of Birth	12th March, 1989 | Passport No. L6217262
Age	34
Sex	Male
Place of Birth	Kanchipuram-631501, Tamilnadu, India
Nationality	Indian
Marital Status	Married to Dr. Hemaprabha Elangovan (Assistant Professor, Metallurgical and Materials Engineering, IIT Madras, Chennai - 60037)

Presently Living at G8-6C, 7th cross street, IITM, Chennai – 600036, Tamilnadu, India
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References

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Dr. PS Vignesh Ram, *Asst. Professor,*
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