1. Name: Dr. **SOMENATH MUKHERJEE**
(son of Late Mr. Meghnad Mukherjee and Late Mrs. Suniti Mukherjee)

2. Date of birth: August 12, 1963

3. Research Area /Specialization: Computational Solid Mechanics /Structural Dynamics & Aeroelasticity

4. Organisation: CSIR-Central Mechanical Engg Research Institute, (CMERI),
Durgapur 713209, West Bengal, India.

5. Designation: Senior Principal Scientist

6. **Educational Qualifications:**

Examination/ Year of passing/ Department	*Institution/ University*	*Subject of specialization*
Ph.D/1996/ Aerospace Engineering.	IIT, Kharagpur	Structural Dynamics & Aeroelasticity
ME/1989/ Applied Mechanics	BE College/ University of Calcutta	Mechanics of Solids (Engineering Mechanics)
BE/1986/ Civil Engineering.	BE College/University of Calcutta	Civil Engineering
HS/1981/Science	St. Xavier's College, Calcutta/ W.B. Council of HS Examination	Science
ICSE/1979	St. Mary's School, Calcutta/ Council of Indian School Certificate Exams.	General

7. **Awards/ Honors**:

(i) *CSIR Raman Research Fellowship* (2005-06) for visit to DLR Inst. of Aeroelasticity, Goettingen, Germany for research on "Transonic Limit Cycle Oscillations of Airfoils".

(ii) Citations in International Archives for contributions in Science and Engineering (a) *"Marquis Who's Who in the World*", New Jersey, USA. (2007 Edition) and (b) *2000 Outstanding Intellectuals of the 21st Century,* (Pub: International Biographical Centre, England; 2008 Edition).

(iii) Best paper awards: (a) *Institute of Engineers Medal* for paper in the Institute of Engineers Journal (2000) and (b) *MSC Software User's Conference*, September 8-9, 2008 (2nd runner up prize) .

(iv) *Certificate of Merit* from *The National Scholarship Scheme, Ministry of Education, New Delhi*, for performance at the ICSE examination (1978-79).

8. **Work Experience**:

Grade / Post	*From*	*To*	*Estt./Lab./Instt.*
1 Scientist SC	Jan 1993	Aug 1996	Indian Space Research Organisation, VSSC, Trivandrum-695022. (Structural Dynamics Group, SDG).
2 Visiting Lecturer	Aug 1996	May 1999	Indian Institute of Technology, Kharagpur-721302, (Department of Aerospace Engineering).
3 Research Fellow	May 1999	Jan 2000	CSIR-National Aerospace Laboratories, Bangalore-560017, (Structures Division, STR).
4 Scientist E1 Gr IV(3)	Feb 2000	Jan 2005	CSIR-National Aerospace Laboratories, Bangalore-560017, (Structures Division, STR).
5 Scientist E2 Gr IV(4)	Feb 2005	Sep 2009	CSIR-National Aerospace Laboratories, Bangalore-560017, (Structural Technologies Division, STTD).
6 Scientist E2 Gr IV(4) Presently Senior Principal Scientist.	Sep 2009	Till date	CSIR-Central Mechanical Engineering Research Institute (CMERI), (Condition Monitoring & Structural Analysis Group), Mahatma Gandhi Avenue, Durgapur -713209, W Bengal, India

Published several technical papers in refereed Journals and International Conferences, and project reports for the aerospace industry. Reviewed Technical papers of reputed journals including Journal of Sound and Vibration. Supervised several UG and PG theses / training work, and co-supervised one PhD thesis. Currently supervising two Ph.D theses work. Also served as Professor/ Instructor for the following AcSIR post graduate courses in Applied and Computational Mechanics at CMERI (i) Advanced Mechanics of Solids (ii) Finite Element Method & (iii) Analytical Mechanics.

9. Details of the CSIR Industrial projects/activities with which Somenath Mukherjee was associated till 2016.

(1) Development of Stick Model (FEM) and Vibration Analysis of SARAS Aircraft Frame. (2) Whirl Flutter Analysis of SARAS PT1/PT2 propeller (NAL).	Member	SARAS Project (I-8-117DA). Completed
Free Vibration and Supersonic Flutter Analysis of RLV-TD, Engineering Model (NAL).	Project Investigator	Sponsored by VSSC- ISRO (S-0-249). Completed
CFD based Aeroelastic Analysis of Airfoils (NAL).	Project Leader	NAL In-house Project (S-8-523). Completed.
GVT based Aeroelastic Characterization of Aircraft (NAL).	Member[♣]	11th 5 year plan. Completed.
Design of Light-weight Composite Cylinders for Storage of Compressed Natural Gas for Mobile Applications (CMERI).	Project Co-ordinator	Sponsored by GAIL. Completed in May 2013 (SSP 097812)
Numerical model for realistic simulation of support-strata interaction in powered support systems of Longwall coal mines (CMERI, Nodal Lab-CIMFR).	Project Leader	12- th Five Year Plan (ESC 0303)
Study on non-linear dynamics (LCO) of shimmy phenomenon in nose landing gear of LCA & similar aircraft (CMERI, Sponsored by ADA, Bangalore)	Project Leader	Sponsored by ADA, Bangalore (GAP 210012)
Development, fabrication and installation of 1 kW power Solar Power Trees 20-25 units to be placed in villages in the districts of Bankura and Burdwan of West Bengal (CMERI)).	Member	CSIR Project (RSP 403512)

Also contributed to the modification for aeroelastic stability of the fins of the "Prithivi" Missile, developed by DRDL, Hyderabad, using the classical theory of aeroelasticity.

LIST OF PUBLICATIONS OF SOMENATH MUKHERJEE

A) Refereed Journals

1. **S. Mukherjee** and **S. Parthan** 1993 *Journal of Sound and Vibration* 162(1), pp 57-66. Free wave propagation in rotationally restrained infinite periodic beams.
2. **S. Mukherjee** and **S. Parthan** 1993 *Journal of Sound and Vibration* 163(3), pp 535-544. Free wave propagation in rotationally restrained periodic plates.
3. **S. Mukherjee** and **S. Parthan** 1996 *Journal of Sound and Vibration* 197(5), pp 527-545. Normal modes and acoustic response of finite one-dimensional and two-dimensional multibay periodic panels.
4. **S. Mukherjee** and **S. Parthan** 1995 *Journal of Sound and Vibration* 186(1), pp 71-86. Wave propagation in one-dimensional multibay periodic panels under supersonic fluid flow.
5. **S. Mukherjee** and **S. Parthan** 1997 *Journal of Sound and Vibration* 200(3), pp 359-366. Further observations on wave propagation in one-dimensional multibay periodic panels under supersonic fluid flow.
6. **C. Pany, S. Mukherjee** and **S. Parthan** 2000. *Institute of Engineers Journal- Aerospace Engineering*, *pp 18-24*. Study of Circumferential Wave Propagation in an Un-stiffened Circular Cylindrical Shell using the

[♣] Dr. Somenath Mukherjee had proposed the project based on his original ideas, but later transferred project leadership to Dr. M. Manjuprasad, Scientist F, of Structural Technologies Division, NAL.

Periodic Structure Theory. ***Received the Institute of Engineers Gold Medal as award for the best paper for the year 2000.***

7. **S. Mukherjee** and **G. Prathap** 2001 *Communications in Numerical Methods in Engineering.* 17 (6), pp 385-393. Analysis of Shear Locking in Timoshenko beam elements using a function space approach.
8. **C. Pany, S. Parthan** and **S. Mukherjee** 2002 *International Journal of Mechanical Sciences*, 44, pp 269-285. Vibration analysis of multi-supported curved panel using the periodic structure approach.
9. **S. Mukherjee** and **G. Prathap** 2002 *Sadhana*.27(5) 507-526. Analysis of delayed convergence in the three noded isoparametric Timoshenko beam element using the function space approach.
10. **G. Prathap** and **S. Mukherjee** 2003 *Current Science,* 85(17), pp 989-994. The engineer grapples with Theorem 1.1 and Lemma 6.3 of Strang and Fix.
11. **H. Mishra** and **S. Mukherjee** 2004 *Sadhana* 29(6), pp 573-588. Examining the best-fit paradigm in FEM at element level.
12. **S. Mukherjee, P. Jafarali** and **G. Prathap** 2005 *Journal of Sound and Vibration. Vol 285(3), pp 615-635* A variational basis for error analysis in finite element elastodynamic problems.
13 **K. Sangeeta , Somenath Mukherjee** and **Gangan Prathap** 2005 *Structural Engineering and Mechanics Vol 21(5), pp 539-551.* A function space approach to study rank deficiency and spurious modes in finite elements.
14. **K. Sangeeta, Somenath Mukherjee** and **Gangan Prathap** 2006 *International Journal for Computational Methods in Engineering Science & Mechanics, Vol 7, pages 1-12.* Conservation of the Best-Fit Paradigm at Element Level.
15. **P. Jafarali, M Ammen, S. Mukherjee** and **G. Prathap** 2007. *Journal of Sound and Vibration* , Vol 299(2), pp 196-211. Variational Correctness in Timoshenko Beam Finite Element Elastodynamics.
16. **S. Mukherjee, P. Jafarali** 2010. *Communication in Numerical Methods in Engineering (also known as International Journal of Numerical Methods in Biomedical Engineering)*. *Vol 26; pp 1246-1262*. Prathap's best-fit paradigm and optimal strain recovery points in indeterminate tapered bar analysis using linear element.
17. **S Mukherjee** and **S. Manju** 2011 *Structural Engineering and Mechanics, Vol 38 (3).* An improved parametric formulation for the variationally correct distortion immune three-noded bar element.
18. **Subrata Kr. Mandal, Basudeb Bhattacharyya, Somenath Mukherjee** 2013. *Scientific Journal of Pure & Applied Sciences, 2(6): 260-269.* Design optimization of Rotary tiller's blade: a critical review.
19. **Subrata Kr. Mandal, Basudeb Bhattacharyya, Somenath Mukherjee, P Chattopadhyay.** 2013. *International Journal of Scientific Research in Knowledge. 1(10): 439-447.* Design & Development of Rotavator Blade: Interrogation of Cad Method.
20. **Subrata Kr. Mandal, Basudeb Bhattacharyya, Somenath Mukherjee, S Karmakar,** 2014. *International Journal of Sustainable Agricultural Research, 2014, 1(3): 58-69*. Soil-blade interaction of a Rotary tiller: Soil bin Evaluation.
21. **Subrata Kr. Mandal, Basudeb Bhattacharyya, Somenath Mukherjee, P Chattopadhyay** 2014. *Middle-East Journal of Scientific Research. 20 (2): 171-177, 2014*. Use of Cad Tool for Design & Development of Rotavator Blade.
22. **Subrata Kr. Mandal, Basudeb Bhattacharyya, Somenath Mukherjee**, 2015. *Journal of Applied Mechanical engineering. 4(2):164-169. doi:10.4172/2168-9873.1000164.* Design optimization of Rotary tiller's blade using specific work method (SWM).
23. **Subrata Kr. Mandal, Basudeb Bhattacharyya, Somenath Mukherjee, A Maity** 2015. *International Journal of Modern Studies in Mechanical Engineering. 1(1):19-26*. Rotary Tiller's Blade Design using Finite Element Analysis (FEA).
24. **Subrata Kr. Mandal, Basudeb Bhattacharyya, Somenath Mukherjee** 2016. *Journal of Civil & Environmental Engineering*. 6(2): 1-5. doi: 10.4172/2165-784X.1000220. Design optimization of Rotary tiller's blade using specific work method (SWM).
25. **Subrata Kr. Mandal, Basudeb Bhattacharyya, Somenath Mukherjee, Ashok Kumar Prasad** 2016. *Internal Journal of Current Engineering and Technology*. 6(4): 1257-63. doi: http:// Dx. Doi. Org/10.14741/Ijcet/22774106/6.4.2015.31. Design optimization of Rotary tiller's blade using specific energy requirement.

B) Book

"***Computational Fluid Dynamics***" with co-author Prof. Gautam Biswas; publisher Narosa, 2014.

C) Book Review in Journal:

Gnomon: From Pharaohs to Fractals, by Midhat J. Gazale, 1999, University Press; Princeton. Review appeared in Current Science, Vol 77, No.9, Nov 1999, pp1204-1205.

D) National/ International Conferences

1. **S. Mukherjee and S. Parthan** 1994 Acoustic response of finite one-dimensional periodic panels by modal superposition. *Computational Structural Mechanics, Proceedings of the National Seminar on Aerospace Structures, IIT Kharagpur.* (*NASAS'94),* pp322-332.
2. **S. Mukherjee and S. Parthan** 1994 Flutter of multibay panels at high supersonic speeds using a wave propagation method. *Aerodynamic testing and Structural Dynamics, Indian Institute of Science, Bangalore,* pp303-321.
3. **S. Mukherjee and S. Parthan** 1997 Vibration and supersonic flutter of periodic panels by a wave propagation method. *Proceedings of the National Seminar of Aerospace Structures (NASAS'97) , NAL, Bangalore,* pp 291-300 (III).
4. **C. Pany, S. Mukherjee and S. Parthan** 1997 Vibration of Cylindrical Shells Using a Wave Propagation Method. 49th conference *Aeronautical Society of India, Annual General Meeting.* Vibration of Cylindrical Shells Using a Wave Propagation Method.
5. **S. Mukherjee and G. Prathap** 2001 (Dec). Analysis of Shear Locking in Timoshenko beam elements using a function space approach. *International Conference on Theoretical, Applied, Computational and Experimental Mechanics (ICTACEM), IIT Kharagpur*.
6. **S. Mukherjee and G Prathap.** 2006. The Best-fit Paradigm of FEA; Shadows of the Exact, *Recent Advances in Computational Mechanics and Simulation, Vol I, pp 95-108. International Congress of Computational Mechanics and Simulation (ICCMS'06), December 8th –10th , 2006, IIT Guwahati.*
7. **S. Mukherjee, P Jafarali and G Prathap** 2007. Error Analysis in Computational Elastodynamics. *Proceedings in Physics, Springer, International Conference on Vibration Problems (ICOVP'07), February 1st -3rd, 2007, Bengal Engineering and Science University.*
8. **Somenath Mukherjee, Ralph Voss and Jens Nitzsche** 2007 An investigation of Transonic Limit Cycle Oscillations in Airfoils. *Paper No 209, Proceedings of ICTACEM-07 International Conference on Theoretical, Applied, Computational and Experimental Mechanics, December 27-29, 2007, IIT Kharagpur, India.*
9. **Avinash R, Deepa N and Somenath Mukherjee** 2007 Investigation of Supersonic Panel Flutter under thermal environment with arbitrary flow direction. *Paper No 210, Proceedings of ICTACEM 2007 International Conference on Theoretical, Applied, Computational and Experimental Mechanics, December 27-29, 2007, IIT Kharagpur, India.*
10. **Somenath Mukherjee, Sashi Prakash B M, Alok Burgal P, Shiva Prasad MV, Saraswathi Krishna and S. Viswanath** 2007 Dynamic characterization and Prediction of Dynamic Response of structures of known/unknown configurations, using experimental modal parameters from GVT (Ground Vibration Tests). *Proceedings of the International Conference of Computer Aided Engineering (CAE 2007, Dec 13-15,), IIT Chennai, India*
11. **Somenath Mukherjee, M Manjuprasad, S Deepa Sakravarthini, R Avinash** 2008. Finite Element Studies on Supersonic Panel Flutter under high thermal environment with arbitrary flow direction. *Proceedings of the International Conference on Aerospace Science and Technology (INCAST), NAL Golden Jubilee Celebration, June 26-28, 2008, Bangalore, India.*
12. **S. Deepa Sakravarthini, M. Manjuprasad, Somenath Mukherjee** 2008 Supersonic panel flutter analysis under high thermal environment using MSC Nastran. *MSC. Software India User Conference – 2008 September 08-09, 2008, Bangalore. (Awarded the 2nd Runner Up Best Paper Prize).*
13. **Somenath Mukherjee, M. Manjuprasad, S Deepa Sakravarthini.** 2008**.** Supersonic panel flutter analysis under thermal gradient. *Proceedings of the Sixth Structural Engineering Convention (SEC-2008)*, December 18-20, 2008, Bangalore, India.
14. **Neeraj Kumar Sharma, Davinder Rana, Amit Kumar Onkar, Somenath Mukherjee, Manjuprasad, M.** Time domain simulation of airfoil flutter in the subsonic regime using fluid structure coupling through panel method, Proceedings of the IISc Centenary International Conference and Exhibition on Aerospace Engineering (ICEAE'2009), 18 – 22 May 2009, Indian Institute of Science, Bangalore, India.
15. **Anoop, A.M., Manjuprasad, M., Somenath Mukherjee.** Aeroelastic Optimization of Airfoil Flutter Using Sensitivity Based Approach. Proceedings, 3rd International Congress on Computational Mechanics and Simulation (ICCMS09, IIT-Bombay, Mumbai, 1-5, December 2009.
16. **Anoop, A.M., Ganesh, R., Somenath Mukherjee, Manjuprasad, M.** Flutter Analysis of Airfoil using State-Space Method. Proceedings, Symposium on Applied Aerodynamics and Design of Aerospace Vehicle (SAROD 2009), December 10-12, 2009, Bangalore, India.
17. **Subrata Kr. Mandal, Basudeb Bhattacharyya, Somenath Mukherjee, S Karmakar**, 2013. Design optimization of Rotary tiller's blade through Finite Element Analysis (FEA). *Proceedings of the 47th Annual Convention of Indian Society of Agricultural Engineers (ISAE) and International Symposium on Bio-Energy: Challenges & Opportunities,* January 28-30, 2013; pp-47 (abstract).
18. **Subrata Kr Mandal, Basudeb Bhattacharyya, Somenath Mukherjee**. 2013. Optimization of Design Parameters for Rotary tiller's Blade. *Proc. of the 1st International and 16th National Conference on Machines and Mechanism, **iNaCoMM** 2013, Dec. 18-20. IIT Roorkee, India, pp -533-539.*

19. **Subrata Kr Mandal, Basudeb Bhattacharyya, Somenath Mukherjee**. 2013. *Proc. of 58th Congress of the Indian Socienty of Theoretical and Applied Mechanics,* ISTAM-2013, Dec18-21, BESU, Howrah. Design and Development of Rotary tiller's Blade.

E) Technical Reports (published in CSIR-NAL)

1. **S. Mukherjee and G. Prathap** 1999 *NAL Project Document* ST 9931. Non-linear Analysis of Beams
2. **S. Mukherjee and G. Prathap** 2000 *NAL Technical Memorandum* ST 0001. Analysis of Shear Locking in the Timoshenko Beam Element using the Function Space approach.
3. **S**. **Mukherjee, S Manju and MV Arjun** 2003 *NAL Project Document* ST 0314. Dynamic characterization of SARAS Wing and Empennage using a Timoshenko Beam Model.
4. **S. Mukherjee and Partha Bhattacharya** 2003. *NAL Project Document* ST 0332. Whirl Flutter Analysis of Pusher Type Propeller-Nacelle System of SARAS using a two-degree of freedom model.
5. **S. Mukherjee, M V Arjun and S Manju** 2004 *NAL Project Document* ST 0411. Dynamic characterization of the integrated SARAS fuselage, wing and empennage using a Timoshenko beam model.
6. **S. Mukherjee and K N Deepak** 2005 *NAL Project Document* ST 05-08. A 4-dof whirl flutter analysis of tractor and pusher (Saras) type propeller nacelle system of aircraft.
7. **S. Mukherjee and B G Arvind** 2005 *NAL Project Document* ST 05-09. A theoretical formulation for flutter analysis of a typical subsonic aircraft wing (Saras) using quasi-steady aerodynamic theory.
8. **S. Mukherjee**, 2006, *February, Report No DLR IB 232 -2006 J 01.*, **DLR, Germany**. An investigation of Transonic Limit Cycle Oscillations of Airfoils. (Research supported by CSIR **Raman Research Fellowship**, 2005-06).
9. **Somenath Mukherjee, Deepa N, Avinash, M Manjuprasad, R, S Viswanath** 2007. *NAL Project Document PD-ST-0704.* Analytical investigation of supersonic panel flutter under high thermal environment, with arbitrary flow direction.
10. **Somenath Mukherjee, Sashi Prakash B M, Alok Burgal, Shiva Prasad M.V, Saraswati Krishna, S Viswanath** 2007. *NAL Project Document* PD-ST-07 05. A method for Dynamic Characterisation and Response Prediction using Ground Vibration Test (GVT) data for unknown structures.
11. **Somenath Mukherjee, M. Manjuprasad, R. Avinash, S. Deepa Sakravarthini, S. Sridhara Murthy** (Project Coordinator) 2007 *NAL Technical Memorandum*, TM-ST-07 01. Finite element studies on supersonic panel flutter under high thermal environment with arbitrary flow direction.
12. **Somenath Mukherjee, M. Manjuprasad, S. Deepa Sakravarthini, C.S. Anil Kumar, R. Avinash, B. Hariprasad, S. Sridhara Murthy** (Project Coordinator). 2007 *NAL Project Document* PD-ST-0720 Supersonic flutter analysis of the RLV-TD (EM) components (Vertical Tail and Wing)
13. **M. Manjuprasad, Somenath Mukherjee, S. Deepa Sakravarthini, B. Hariprasad, S. Sridhara Murthy** 2008. *NAL Project Document* PD-STTD-0805. Supersonic Flutter analysis of RLV-TD (EM).
14. **Somenath Mukherjee, Umamaheshwari B, Shiva Prasad M V, Chandra N, Saraswathi Krishna**. 2008 *Special Publication* SP 0818. A Proposed method of Dynamic Characterization and Prediction of Flutter Boundary of Wing-like Structures using Ground Vibration Test (GVT) data.
15. **Somenath Mukherjee, M. Manjuprasad, Neeraj Kumar Sharma, Davinder Rana, Amit Kumar Onkar.** 2008 *Special Publication* SP-08 25. Time domain simulation of airfoil flutter in the subsonic regime using fluid structure coupling through panel method.
16. **Somenath Mukherjee, M. Manjuprasad, Ganesh Raghunath, Anoop A. M., Amit Kumar Onkar.** 2009.*NAL Technical Memorandum* TM-09 01. A Study of Airfoil Flutter.

F) Classified Technical Reports from the Structural Dynamics Division, Vikram Sarabhai Space Center, Indian Space Research Organisation (VSSC, ISRO), Trivandrum-695022.

1. Evaluation of Launch Vehicle Response to unsteady Aerodynamics Loads. *No VSSC/SEG/SDD/TR-125/1993.*
2. Ground Wind Response Studies of GSLV-Approach to the analysis NO IWTR 237 *Indian Institute of Science,* Bangalore.
3. Design of PSLV 2/3 Interstage Panels for safety against Supersonic Panel Flutter.No.*VSSC/SEG/SDD/TN-016/1994.*
4. Contributed to the work: Final Report of Ground Wind Loads of GSLV obtained by modal testing IWTR 252, *Indian Institute of Science,* Bangalore.
5. Dynamic Analysis and relative Incident Acoustic Response of the LH2 Tank of GSLV.. No VSSC/SEG/SDD/TR-016/1995.
6. Low Frequency Random Acoustic Response of the LH2 Tank of GSLV. No VSSC/SEG/SDD/TR-001/1995.