Prof. S.ANIL LAL
Professor

(Updated on April 10, 2018)

GENERAL INFORMATION

Date of Birth	30-05-1965
Present position	Professor Department of Mechanical Engineering Government Engineering College, Barton Hill Thiruvananthapuram, KERALA.
Residential Address	Anjalee, CRA-A31(1) Sreekaryam P.O. Thiruvananthapuram, KERALA., PIN 695 017
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ACADEMIC DATA

B.Tech	Branch: Mechanical Year of Passing: 1987 University: University of Kerala
M.Tech	Specialization: Turbomachines Year of Passing: 1996 Institute: IIT Madras
P.hD	Area: Turbomachines Title of thesis: A Numerical Investigation of Rotor-Stator Interaction in Turbine Stages. Year of awarding: 2002 Institute: IIT Madras

EXPERIENCE

UG Teaching	From 11-3-1992 onward
Total service	22.5 years (after excluding the period of service of deputation for M.Tech & P.hD)

PG Teaching	From 1-6-1996 onward
Total service	18.5 years (After excluding the period of service of deputation for P.hD)
Research	Approved research guide in University of Kerala from 6-7-2004
	Approved research guide in KTU from August 2016.
	Total experience: 13.5 Years

AREAS OF INTEREST

1. Fluid mechanics

2. Turbomachines

3. Heat transfer

4. Mechanics of solids

5. Computational methods in fluid flow & Heat transfer

RESPONSIBILITIES/POSITIONS

1. Dean of PG studies

2. Internal Member, BoG, GECBH

3. Member, BoG, College of Engineering, Perumon

4. Member, Board of studies, University of Kerala

5. Member, Curriculum committee (Mechanical Engineering), APJ Abdul Kalam Technological University

6. Chairman, Doctoral Committee, Sree Chitra Thirunal College of Engineering, Thiruvananthapuram

7. Chairman, Doctoral Committee, Rajagiri School of Engineering & Technology, Kakkanad, Kochi 682 039

AWARDS & RECOGNITION

1. First prize in the **National Level** of ISTE-Srinivasa Ramanujan Mathematical Competitive examination in 2014 in the Engineering College Teacher category. Prize: Rs. 30,000/-

2. Received best researcher award of the year 2011 award from the Center for Engineering Research and Development(CERD) of Government of Kerala. Prize Rs. 25,000/- and Gold medal worth Rs. 25000/-

3. Best teacher award by the committee of CET-ISTE reasearch awards 2007-08.

4. Best teacher award by the committee of CET-ISTE reasearch awards 2008-09.

CURRENT RESEARCH TOPICS

1. High performance computing

2. Computational fluid dynamics and heat transfer

3. Design, analysis and optimization of fluid machines

4. Optimization of fluid and thermal systems

RESEARCH GUIDANCE (PHD)

Completed at University of Kerala

No.	Name of Scholar	Title of thesis	Role	Status
1.	M.R. Rajkumar	Natural Convection with Surface Radiation from Free Standing Planar Heat Generating Elements in a Vertical Channel	Guide	Degree awarded in 2012
2	Reji R.V.	Development of a computational tool for the Analysis of Hypersonic Flow using DSMC Method	Guide	Degree awarded in 2017
3.	Jabir. E	Patient-Specific Modelling of Blood Flow in Arteries	Guide	Degree awarded in March 2018
4	Karthika A.S.	Theoretical analysis of mixing phenomenon in vortex engines	Guide	thesis submitted in Nov. 2017

Ongoing PhD guidance

No.	Name of Scholar	Title of thesis	University	Status
1	Abhilash .R	Analysis of three dimensional flows considering junction flow in axial flow turbines	University of Kerala	Nearing completion
2	Aji Abraham	Optimization of turbine performance using computing techniques	University of Kerala	Third year
3	Sreejith .M	Investigting Energetics and Dynamics of Coherent Structures in flow using CFD	APJ Abdul Kalam Technological University	Second year
4	Hareesh Iyer	Investigation of sloshing and fluid structure interaction	APJ Abdul Kalam Technological University	First year year

FUNDED PROJECTS UNDERTAKEN

No.	Title of the work	Name of the project and agency	Role	Amount Rs. (Lakhs)	Status
1	Centre of excellence for research in fluid dynamics	CoE CERD	Principal Investigator	60	Ongoing (2012-17)
2	Development of a computational tool for the analysis of hyper sonic flow using Direct Simulation Monte-Carlo (DSMC) method	ISRO	Principal Investigator	9.62	Completed
3	Investigations of natural convection in a vertical annulus	CERD	Principal Investigator	1.40	Completed
4	Conjugate heat transfer analysis of LH2 turbine stage	LPSC	Principal Investigator	9.6	Completed
5	Numerical analysis of flow through LOX Booster turbo pump	LPSC	Principal Investigator	5.5	Completed
6	Development of piezo electric actuator for micro positioning of space structures	ISRO	Second Co-Investigator	19.6	Completed

PARTICIPATION IN TEACHER DEVELOPMENT PROGRAMS

1. AICTE sponsored QIP short term course on Introduction to hydrodynamic stability held during 26-31 March 2018.

2. AICTE sponsored QIP short term course on Special Topics in Fluid Dynamics in the Dept. of Aerospace Engineering, IIT Madras from Oct.9-14, 2017

3. GIAN course: Title "Spectral Methods for Engineering and Scientific Computing Applications", conducted during 5th-16th june 2017 at IIT Bhubaneswar

4. AICTE sponsored QIP short term course on Digital Optical Measurements: Digital Photoelasticity and Digital Image Correlation, September 12-17, 2016, IIT Madras.

5. Pedagogical Training from 5th to 7th May 2016, organized by Teaching Learning Center (TLC) of IIT Madras.

CONFERENCES/WORKSHOP/FDP ORGANIZED

1. One of the organizing secretaries of First International Colloquium on Translation Engineering and Research 13-15 March 2016 (ICTER-2016), Thiruvananthapuram.

2. One of the Technical program committee members of ISHMT-ASTFE Heat and Mass Transfer conference 2015, LPSC, ISRO, Thiruvananthapuram, December 17-20, 2015.

3. Coordinator of "National workshop on High performance computing-Future trends Parallel computing using CUDA" during 14-16, March 2013.

4. Coordinator of "National workshop on Advances in Theoretical and Computational Fluid Dynamics (ATCFD-2012)", 02-04 Feb 2012.

5. Coordinator of "FDP on Research Methodology and Open Source Computational Tools" Nov29-Dec4, 2011.

6. Coordinator of "STTP on Mathematical methods for Engineers", 18-23, Jan 2010.

TOPICS OF SELECTED EXPERT TALKS DELIVERED

1. Finite Volume Method for CFD Computations

2. Research Methodology

3. Linear Algebra

4. Open Source tools for research

5. Parallel computation using MPI

6. Fundamentals Of Vectors and Tensors

7. Direct Simulation Monte Carlo Method

BOOKS PUBLISHED/MONOGRAPHS WRITTEN

1. Advanced Mechanics of Solids, ISBN: No. 978-80-85-955-35-4, Siva Publications, Pathanamthitta, Year 2017.

2. Calculus, ISBN: No. 978-81-933029-1-0, Radhima Publications, Trivandrum, Year 2016.

3. Four volumes of Engineering Mathematics.

4. Lecture notes on finite element method

5. Lecture notes on CFD

PEER-REVIEWED JOURNAL PAPERS

1. R. Abhilash, S. Anil Lal, Three dimensional analysis of natural convection in a narrow vertical annulus closed at top and opened at bottom, International Journal of Thermal Sciences 127 (2018) 277–287.

2. Avinash G.S. and S. Anil Lal, Inverse design of airfoil using vortex element method, Accepted for publication in International Journal of Fluid Machinery and Systems (Oct. 2017).

3. A. Sameen, S. Ajith Kumar, Manikandan Mathur and S. Anil Lal, Effects of prandtl number on the laminar cross flow past a heated cylinder, Physics of fluids 28 (2016), no. 11, 113603-1. **citations: 2**

4. S. Anil Lal and C.Reji, Numerical prediction of natural convection in vented cavities using Restricted Domain Approach, International Journal of Heat and Mass Transfer, 52(2009) 724-734., **citations: 34**

5. <u>S Anil Lal</u> and V Arun Kumar, Numerical prediction of natural convection in a vertical annulus closed at top and opened at bottom, Heat transfer engineering 34 (2013), no. 1, 70-83. **citations: 16**

6. M.R. Rajkumar, G. Venugopal, and <u>S. Anil Lal</u>, Natural convection with surface radiation from a planar heat generating element mounted freely in a vertical channel, Heat and mass Transfer 47 (2011), no. 7,789-805. **citations: 14**

7. <u>S. Anil Lal</u> and E Jabir, A hybrid finite element finite volume method for incompressible flow through complex geometries using mixed grids, Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering 224 (2010), no. 1, 23-41. **citations: 7**

8. M.R. Rajkumar, G. Venugopal, and <u>S. Anil Lal</u>, Natural convection from free standing tandem planar heat sources in a vertical channel, Applied Thermal Engineering 50 (2013), no. 1, 1386-1395. **citations: 8**

9. <u>S. Anil Lal</u> and Neeraj M Paul, An accurate taylors series solution with high radius of convergence for the Blasius function and parameters of asymptotic variation, Journal of Applied Fluid Mechanics 7 (2014), No. 4, 557-564. **citations: 5**

10. <u>S. Anil Lal</u>, R.V. Reji, and K.S. Santhosh, Evaluation of diffusive flux across faces of arbitrary shaped finite volume cells, Computers & Fluids 57 (2012), 225-236. **citations: 2**

11. <u>S. Anil Lal</u> and R.V. Reji, Numerical simulation of natural flow of air through a room, International journal of green energy 9 (2012), no. 6, 540-552. **citations: 3**

12. K.C. Gopalakrishnan, R. Ramesh Kumar, and <u>S. Anil Lal</u>, Cohesive zone modelling of coupled buckling debond growth in metallic honeycomb sandwich structure, Journal of Sandwich Structures and Materials 14 (2012), no. 6, 679–693. **citations: 4**

13. R.V. Reji and <u>S. Anil Lal</u>, A new direct simulation Monte-Carlo implementation for more efficient simulation of hypersonic flow over arbitrarily shaped bodies using dynamic cells, Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering (2016), no. 0, 1-16.

14. E Jabir and <u>S. Anil Lal</u>, Numerical analysis of blood flow through an elliptic stenosis using large eddy simulation, Proc IMechE Part H: J Engineering in Medicine (2016).

15. R.V. Reji and <u>S. Anil Lal</u> , Simulations of hypersonic flow past a re-entry capsule using dsmc method, Frontiers in Heat and Mass Transfer 7 (2016), no. 28, 1-8.

16. <u>S. Anil Lal</u>, S Ajith Kumar and A Sameen, Flow past a moderately heated horizontal cylinder at low Reynolds number, Journal of Aerospace Engineering, Proceedings of the Institution of Mechanical Engineers Part G (2015), 1-16.

17. Reji R.V and S. Anil Lal, Evaluation of SPARTA DSMC tool for chemistry modelling in high temperature flows, International Journal of Scientific & Engineering Research, Vol 5, Issue 7, 937-940, July 2014. **citations: 2**

18. M.R. Rajkumar, G. Venugopal, and <u>S. Anil Lal</u>, Numerical study of natural convection from a heat generating element using a locally divergence free FEM and comparison with experiment, International Communications in Heat and Mass Transfer 39 (2012), 4, 530-536. **citations: 2**

19. <u>S. Anil Lal</u>, B.V.S.S.S. Prasad, N. Sitaram, "Geometry Based Hyperbolic Grid Generation for Computational Fluid Dynamics", AIAA Journal, Vol. 39, No. 10, 2001. **citations: 2**

20. <u>S. Anil Lal</u>, B.V.S.S.S. Prasad, N. Sitaram, Finite Volume Analysis of Inviscid Interaction for Two-Dimensional Transonic Axial Turbine Stage Using Multi-Block Hybrid Grids, International Journal of Turbo and Jet Engines, Vol. 19, 157-177(2002).

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21. Ramachandran. R, <u>S. Anil Lal</u>, Analyses and estimation of certain design parameters of micro-grooved heat pipes, arXiv:1702.05134.

JOURNAL PAPERS UNDER REVIEW

1. Aswathy Nair K, A.Sameen, <u>S. Anil Lal</u>, Passive boundary layer flow control using porous lamination, under review after revision in Transport in Porous Media, Submission ID: TIPM-D-17-00510.

INTERNATIONAL CONFERENCE PAPERS

1. R. Abhilash and S. Anil Lal, "Investigation on bi-modal dynamics of junction flow using large eddy simulation", in Proceedings of the 44th National Conference on Fluid Mechanics and Fluid Power December - FMFP 2017,Amrita University, Amritapuri Campus, Kollam, December 14-16, 2017.

2. Jabir E., H. D. Kim and <u>S. Anil Lal</u>, LES PREDICTIONS OF BLOOD FLOW IN AN ECCENTRIC STENOSIS, KSME Conference 2017, Jeju Islands, South Korea in Proceedings of the Korean Society of Mechanical Engineers(KSME) 2017, November 2017.

3. Reji R.V., <u>Anil Lal S.</u>, H. D. Kim, DSMC Study on the Re-entry Aerothermodynamics of Space Recovery Capsules13th International Symposium on Experimental Computational Aerothermodynamics of Internal Flows (ISAIF 13)(7-11 May 2017)Okinawa, Japan

4. A.S Karthika, T.C Sandeep, Neeraj Padman. U, M.R Rajkumar, <u>S. Anil Lal</u>, Control of vortex breakdown phenomenon in confined flows, Proceedings of the Canadian Society for Mechanical Engineering International Congress, Paper No. 20, (2016).

5. K.S.Santhosh, <u>S. Anil Lal</u>, DSMC simulations of flow over micro textured surfaces, Paper FDCM-O-154, XXVII IUPAP Conference on Computational Physics (CCP2015) 2–5 December 2015, IIT Guwahati, India.

6. A.S Karthika, J. Joshua, T. Milin, M.R Rajkumar, <u>S. Anil Lal</u>, Flow visualization studies in a cylindrical container with a rotating bottom end wall, International Symposium on Transport Phenomena, Leoben, Austria, Paper No. 123, (2015).

7. S. Ajith Kumar and Mekha M. Menon and Sayooj A. P. and A. Sameen and <u>Anil Lal S</u>, "The effect of surface temperature on the vortex shedding in flow past circular cylinder", Thermal and Fluids Engineering Summer Conference , New York, USA (2015).

8. Reji R.V., Santhosh K.S., and <u>Anil Lal S.</u>, Hypersonic flow characteristics of combined flat plate cylinder configurations using DSMC method, 41st National and 5th International conference on Fluid Mechanics and Fluid Power (FMFP 2014), IIT Kanpur, India.

9. Reji R.V., Abhilash R. and <u>Anil Lal S.</u>, DSMC simulations of rarefied flow over a square cylinder, 5th International conference on computational mechanics and simulation (ICCMS 2014), CSIR, Chennai, India.

10. S. Ajith Kumar and A. Sameen and <u>S. Anil Lal</u>, "Three dimensional wake transition of flow past a heated cylinder", Proc. IUTAM Symposium on Advances in Computation, Modelling and Control of Transitional and Turbulent Flows , Goa, India (December 15-18, 2014).

11. K. Aswathy Nair, A. Sameen and <u>S. Anil Lal</u>, Computation of Boundary Layer Flow over Porous Laminated Flat Plate, Advances in Computation, Modelling and Control of Transitional and Turbulent Flows, IUTAM Symposium on Advances in Computation, Modelling and control of transitional and turbulence flows, Goa, India, Dec. 15-18, Ed. T. K. Sengupta et. al., 261-268, 2014.

12. Aswathy Nair K and Ajith Kumar S and A. Sameen and <u>Anil Lal S</u>, "Self-similar profiles of boundary layer flows over porous laminated flat plate", 67th Annual Meeting of the American Physical Society Division of Fluid Dynamics , San Francisco, CA, USA (November 23-25, 2014).

13. Jabir, E. and <u>Lal, S. Anil</u>, Blood Flow Through Concentric Stenosis: An Investigation Using LES, Proceedings of the International Conference on Interdisciplinary Advances in Applied Computing, 2014, Amritapuri, India, pages 14:1—14:7.

14. Jabir, E. and <u>Lal, S. Anil</u>, Simulation of Blood Flow Through Eccentric Stenosis Using LES Proceeding of International congress on computational Mechanics and simulation, 2014, CSIR-SERC, Chennai, India.

15. R. Ramachandran, <u>S. Anil Lal</u> and K. Ganesan, EFFECT OF AXIAL HEAT CONDUCTION THROUGH THE COVER PLATE ON THE PERFORMANCE OF HEAT PIPES, Proceedings of the 22nd National and 11th International ISHMT-ASME Heat and Mass Transfer Conference , December 28-31, 2013, IIT Kharagpur, India .

16. Ajith Kumar S and A. Sameen and <u>Anil Lal S</u>, "Span wise Plumes in Wakes behind Heated Cylinder", 66th Annual Meeting of the American Physical Society Division of Fluid Dynamics, Pittsburgh, Pennsylvania (November 24-26, 2013).

17. Reji R.V., Santhosh K.S., <u>Anil Lal S.</u>, Aerothermal analysis of hypersonic flow around a cylinder, International conference on energy and environment, 2013, RIT Kottayam.

18. Santhosh K.S., Ashok Chitharenjan, Reji R.V., <u>Anil Lal S.</u>, Direct Simulation Monte-Carlo Predictions of Rarefied hypersonic flow past a re-entry vehicle, IUTAM-2011, IIT Kanpur, India.

19. Ajith Kumar S and A. Sameen and <u>Anil Lal S</u>, "Flow Past a Moderately heated Horizontal Cylinder at Low Reynolds Number", 64th Annual Meeting of the American Physical Society Division of Fluid Dynamics , Baltimore, USA (November 20-22, 2011).

20. <u>Anil Lal S.</u>, Santhosh K.S., R.V. Reji, A new approach for gradient evaluations for computation of flows, 10th International Symposium on Experimental and Computational Aerothermodynamics of Internal Flows(ISAIF10), VKI, Belgium, July 4-7, 2011.

21. Reji R.V., Ramachandran, <u>Anil Lal S.</u>, Numerical simulation of conjugate heat transfer from a rotating disc, 37th National and 4th International Conference on Fluid Mechanics and Fluid Power, December 16-18, 2010, IIT Madras, Chennai, India.

22. Karthika A.S., Shiblemon K.V. and <u>S. Anil Lal</u>, "Numerical analysis of flow in a vortex combustion chamber", Proceedings of the 37th National and 4th International Conference on Fluid Mechanics and Fluid Power, December 16-18, 2010, IIT Madras, Chennai, India.

23. Arun Kumar, E. Jabir and <u>S. Anil Lal</u>, Numerical Prediction of Asymmetric Natural Convection in a Narrow Vertical Annulus Closed at Top and Open at Bottom, 9th ISHMT-ASME Heat and Mass Transfer conference,January 4-6, 2010, IIT Bombay, Mumbai.

24. M.R. Raj Kumar, G. Venugopal and <u>S. Anil Lal</u>, Numerical analysis of conjugate natural convection from a heat generating element placed centrally in a vertical channel, 9th ISHMT-ASME Heat and Mass Transfer conference, January 4-6, 2010, IIT Bombay, Mumbai.

25. Fazil M, Z.A. Samitha, <u>S. Anil Lal</u>, Rajesh G. and P. Balachandran, "A parametric study for the optimisation of a supersonic ejector", International Symposium on Transport Phenomena, Victoria, British Columbia, Canada, July 7-10, 2009. **citations: 1**

26. Ajith Joseph, M.R. Raj Kumar and <u>S. Anil Lal</u>, Conjugate natural convection with surface radiation in non-parallel vertical channels, International Symposium on Transport Phenomena, Victoria, British Columbia, Canada, July 7-10, 2009.

27. M.R. Raj Kumar and <u>S. Anil Lal</u>, "Experimental and numerical study of natural convection from a free standing heat generating element in a vertical channel", 12th Asian congress of fluid mechanics, 18-21 August 2008, Daejeon, Korea.

28. <u>S. Anil Lal</u> and C.Reji, "Numerical prediction of natural convection flow and heat transfer in side vented cavities", 8th ISHMT-ASME Heat and Mass Transfer conference held at JNTU Hyderabad, January 3-5, 2008.

29. P.K. Jithesh, <u>S. Anil Lal</u> and M.R. Rajkumar, "Determination of radiation view factors considering shadow effect", International conference on Heat and Mass Transfer, Turkey, 15-17 June 2007. **citations: 2**

30. <u>S. Anil Lal</u> and R.C. Mehta, "Effect of thermocouple cavities on heat transfer measurements", Proc. of 6th ISHMT-ASME Heat and Mass Transfer conference, 5-7 January 2004, IGCAR, Kalpakkam.

31. <u>S. Anil Lal</u> and B.V.S.S.S. Prasad, "Computation of gas side heat transfer of a turbine blade", Proc. of 5th ISHMT-ASME Heat and Mass Transfer conference, Jan. 2002,Pune.

32. <u>S. Anil Lal</u>, B.V.S.S.S. Prasad, "Numerical prediction of flow over a circular arc bump", Proc. of 1st International conference on fluid mechanics and fluid power held at IIT Delhi, 15-17 Dec., 1999.

33. K. Velusamy, <u>S. Anil Lal</u>, A. Rajkumar, G. Vaidyanathan, "Thermal hydraulic works in support of PFBR" Proc. of International conference of fast breeder reactors and related fuel cycles, 1991, Kyoto, Japan.

34. Chellapandi P., <u>S. Anil Lal</u>, Vaidyanathan G., "Structural integrity evaluations of PFBR control plug, SMIRT 11, Transactions Vol E, Aug. 1991, Tokyo, Japan.

35. <u>S. Anil Lal</u>, K. Velusamy, A. Rajkumar , "Software development for LMFBR thermal hydraulics" Proc. of International conference on Engineering Softwares, IIT Delhi, Dec. 1990.

Selected National and internal(college) conference Papers

36. Avinash G.S and <u>S. Anil Lal</u>, "Inverse design of airfolils using Vortex Element Method", Proceedings of 11th National and 1st International Conference on Technological Trends, Nov 25-27, 2010, CET. **citations: 6**

37. R Abhilash and <u>S Anil Lal</u>, Flow topological investigation of vortex system in the junction between a flat plate cascade and a plane wall. Proceedings of the first national aerospace propulsion conference (NAPC 2017), IIT Kanpur March 15-17, 2017.

38. Abhilash.R, <u>S Anil Lal</u>, Analysis of supersonic flows over a NACA-12 aerofoil at various angles of attack using OpenFoam, Proceedings of the 4th National Technological Congress Kerala (NATCON 2014), GEC, Wayanad - 2014. pg 23 – 27.

39. Reji R.V. and <u>Anil Lal S.</u>, Evaluation of SPARTA DSMC tool for chemistry modelling in high temperature flows, International conference of Materials Mechanics and Management (IMMM 2014), College of Engineering Trivandrum, India.

40. Ajith Kumar S and A. Sameen and <u>Anil Lal S</u>, "Effects On Flow Past A Heated Horizontal Cylinder", 26th National Convention of Aerospace Engineers , Hyderabad, India (24-25/Nov/2012).

41. Ajith Kumar S and A. Sameen and <u>Anil Lal S</u>, "Studies on flow past a heated circular cylinder at low Reynolds number", 10th National Conference on Technological Trends , Trivandrum, India (6-7/Nov/2009).

42. Reji. R.V., <u>Anil Lal S.</u>, Santhosh K.S. Flow characteristics in Axial Turbine Stage Using Mixing Plane Approach, National Conference on Technological Trends-2009.

43. Reji. R.V., <u>Anil Lal S.</u>, Numerical Simulation of Natural Flow of Air through a Room, National Technological Congress, Kerala, Jan 2011.

44. Prasanth V and <u>S. Anil Lal</u>, "Bezier Parameterization of an airfoil using Genetic Algorithm", Proceedings of 11th National and 1st International Conference on Technological Trends, Nov 25-27, 2010, CET. **citations: 1**