

Dr. E. BALASUBRAMANIAN

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Career Objective

Seeking an eminent environment where my skills and knowledge can be shared and enriched. To perform the best and aim towards technical excellence in the field of **design** and **analysis**.

Experience

Duration	Organization	Designation
NOV 2002- AUG 2006	AUFRG Institute for CAD/CAM, College of Engineering, Guindy, Anna university, Chennai, India.	Teaching Research Associate
AUG 2006 – AUG 2007	Vellore Institute of Technology, Vellore, India.	Lecturer
SEP 2007 – APR 2011	Concordia University, Montreal, Canada.	Research Assistant/Teaching Assistant
JUN 2011 – OCT 2019	Vel Tech Rangarajan Dr. Sagunthala R & D Institute of Science and Technology, Chennai, India.	Associate Professor
26 th OCT 2019 – Till Now	Vel Tech Rangarajan Dr. Sagunthala R & D Institute of Science and Technology, Chennai, India.	Professor
27 th SEP 2021 – Till Now	Vel Tech Rangarajan Dr. Sagunthala R & D Institute of Science and Technology, Chennai, India.	Dean R & D

Strengths

Hard and smart working, fast learner, boundary less behavior, good trainer, good attitude and able to work within a group or as an individual.

Education

PhD

University : **Concordia University, Montreal, Canada (2007-2011).**

Thesis topic : **Modeling and Robust Control of Two Collaborative Robot Manipulators Handling a Flexible Object.**

Masters in Engineering Design

College : **PSG College of Technology, Coimbatore (2000-2002).**
University : **Bharathiyar University.**

Bachelors in Mechanical Engineering

College : **Government College of Engineering, Tirunelveli (1996-2000).**
University : **Manonmanium Sundaranar University.**

Skill Set

Modeling Packages : **I-DEAS, Pro-E, Solidworks, CATIA.**
Analysis Packages : **ADAMS, ANSYS, IDEAS.**
Programming Package : **MATLAB, C.**

Projects at AUFRG Institute for CAD/CAM

1. Project Title : **Design and Analysis (structural and vibration) of launcher platform and articulation mechanism for NAMICA.**
Client : **Bharat Electronics Limited, Chennai.**
Software's used : **IDEAS, ADAMS.**
2. Project Title : **Finite Element Analysis of Optical tracking Mount.**
Client : **Bharat Electronics Limited, Chennai.**
Software's Used : **IDEAS, ANSYS.**
3. Project Title : **Kinematic Analysis of Fueling Machine.**
Client : **BARC, Mumbai.**
Software used : **IDEAS – Mechanism Module.**

Academic Projects

1. Project Title : **Optimization of worm Gear box casing.**
Software Used : **ANSYS.**
2. Project Title : **Workspace Analysis of Planar Parallel Manipulators.**
Software used : **IDEAS – Mechanism Module and ADAMS.**

Subjects Handled

Introduction to Robotics, Theory of Machines, CAD, Advanced Mechanism Design, Engineering Mechanics (Statics and Dynamics), Design of Machine Elements, UAV Dynamics and Control.

Membership

- Life time member in Association for Machines and Mechanisms (AMM).
- Fellow in Institution of Engineers: F -1280895

Patents

1. Appln No. 2237/CHE/2014 – Power Line Inspection Robot, **Final Examination**
2. Appln No. 5037/CHE/2014 – Telecom Tower Inspection Using Unmanned Aerial Vehicles, **Final Examination**
3. Appln No. 2016400361 – Vision Base Control of Multiple Flapping Wing Micro Aerial Vehicles and Formation Flight, **Final Examination**
4. Appln. No. 201641009924 – Adaptive Traffic Control and Mapping using Unmanned Aerial Vehicle, **Final Examination**
5. Appln. No. 20174024946 - “Elevated Civil Infrastructure Health Assessment Using Rotary Wing UAVs”, **Final Examination**
6. Amphibian Unmanned Aerial Vehicle for Multi-terrain applications
PCT Intl. Appln.No. PCT/IN2018/050651; India :201741036299 (Applied)
7. Appln. No.201841029828 – “Medical Assistive Device for Geriatric Care and Orthopedic Rehabilitation”, **Final Examination**
8. Appln. No. 201841044458, Adjustable Frame Unmanned Amphibious Aerial Vehicle With Extended Floats, **Final Examination**

Funded Projects (Completed / On-Going)

1. “Design, Development and Formation Control of Micro Ornithopters”, Indo – Taiwan Collaboration Scheme, DST- GITA – CII, July 2013 – 2016. **India : Rs 26.35 Lakh, Taiwan : NTD 17.15 Lakhs, PI, Completed**
2. “Ornithopter Test Rig – Design, Analysis and Manufacture”, DRDO – AR & DB, SIGMA Panel, Sep. 2014- Dec. 2016, 9.74 Lakh, Completed.
3. “Robotic assisted rapid prototyping of near net shape components through indigenous polymers”, DST-SERB, Jun- 2014 – 2018, **22.16 Lakh, PI, Completed.**
4. “Near Net Shape Components through Automated Selective Inhibition Sintering Process (SISP) for Small Armament Applications”, DRDO – ARMREB, July 2015 – Jan 2018, **Rs 27.15 Lakh, PI, Completed.**
5. “Full Field Non-Contact SHM Protocols for Long Span Railway Bridges and Heritage Structures”, Indo - Canada Collaboration Project, DST / IC – IMPACTS, Oct. 2015 – 2018, **India: Rs 41.15 Lakh, Canada: CAD 1,44,066, PI, Completed.**

6. "Design and Development of Autonomous Amphibious Unmanned Aerial Vehicle and UAV mountable water sampling devices for Water Based Applications", Indo - Korea Collaboration Scheme, DST – GITA – CII, Jan 2017 – Mar. 2019, **India: Rs 3 crore and South korea: 7 crore, PI**, Completed.
7. "Design and Development of Ornithopter Test Rig", Institution of Engineers, Oct. 2013 – April. 2014, **Rs 50,000**, Completed.
8. "Expansion of Activities of Biotech- KISAN Hub in Three Aspirational Districts (Kadapa, Vizaingaram and Visakhapatnam) of Andhra Pradesh", DBT, 2019-2020, **Rs. 6 Lakh, PI**, Completed.
9. "UAV Autopilot system for water sampling with folding arm", Indo-Korea (Institute Collaboration), Sept. – Nov. 2021, 6.40 lakhs (8420 USD), Completed
10. "Energy efficient and optimal path planning strategies for SWARM of UAVs in real time localisation using deep learning based stereo vision system", ISRO – Respond, 2019 – 2022, **Rs. 24.51 Lakh, PI**, On-Going.
11. "Development of 3D Printed flexible patch antennas for enhancement of communication range in UAV", DRDO, ARDB – Unmanned Aero System Panel, **Rs 29.06 Lakh, PI**, On-Going.
12. "Drone assisted mapping of seaweeds at Chilka lake and development of Value added products from biomass", DBT, **Rs. 61.00 Lakh, Co-PI**, On-Going.
13. Minimizing the Post Harvesting Loss In Ware Houses Through Examining Rice Kernel / Paddy Quality using Infrared Measurements and Image Processing Algorithms, TNSCST, 2021-203, **Rs. 2.00 Lakh, PI**, On-Going
14. Devising point-of-care diagnostic microchip biosensor for early diagnosis of cardiovascular disease, DST – GITA, Indo-Taiwan, 2022 – 2025, **Rs 41.23 Lakh, Co-PI**, On-Going
15. UAV Based In-situ Measurements and Hyper spectral Analysis for Water Quality Mapping and Developing Remediation Strategies, DST- SERB – EQUITY, 2022 – 2025, **Rs 42.54 Lakh, PI**, On-Going

Consultancy Projects

1. Design and Analysis (structural and vibration) of launcher platform and articulation mechanism for NAMICA, Bharat Electronics Limited, Chennai, Rs. 5 lakhs, Mar 2003 – Apr 2004
2. Finite Element and Kinematic Analysis of Fueling Machine, BARC, Mumbai, Rs. 6 lakhs, Dec 2003 – Oct 2005.
3. Bridge Inspection using UAV, LASA India Pvt. Ltd., Rs 80,000 Jan 23- 27, 2018
4. Design and Fabrication (Composite Material) of Hybrid UAV, M/s Magnum Wings, Guntur, Andhra Pradesh, Rs. 3,57,000, June – August 2019
5. Modeling and CFD analysis of Hybrid UAV, M/s Magnum Wings, Guntur, Andhra Pradesh, Rs 1,20,000, July – August 2019.
6. Development of multi rotor system for 1kg payload, BLUNAV TECHNOLOGIES PVT LTD, Rs 2,60,000, Oct - Dec 2020

7. Mapping of airport fencing with accurate RTK module, BLUNAV TECHNOLOGIES PVT LTD., Rs 45,000, Oct – Dec 2020

Books

- Balasubramanian Esakki, **Two Collaborative Robot Manipulators Handling a Flexible Object: Modeling, Control and Analysis**, LAP LAMBERT Academic Publishing GmbH & Co. KG, Germany, ISBN: 978-3845407272.
- Rama Bhat, Jothi lakshmi Rajendran, Balasubramanian Esakki, **“University Physics”**, Narosa Publishing House Pvt. Ltd, ISBN 978-8184872699 and Alpha Science International Ltd, ISBN: 978-1842658130.
- Lung – Jieh Yang and Balasubramanian Esakki, **“Flapping Wing Vehicles: Numerical and Experimental Approach”**, CRC Press, Taylor & Francis, ISBN 9780367232573.

Publications

1. B. Esakki and S. Riyaz Ahammed, “Adaptive Control For Two Robot Manipulators Collaboratively Handling An Object Without Velocity Measurement”, Intl. Journal of Engineering Science and Technology, Vol.3, No.8, pp. 6251 -6258, 2011.
2. Balasubramanian Esakki, Rama Bhat, Chun-Yi Su, “Regressor Based Robust Control for Collaborative Manipulators Handling an Object”, 18th International Federation of Automatic Control World Congress, Milan, Italy Vol.18, pp. 14681 – 14686, 2011, Scopus.
3. Balasubramanian Esakki, Rama Bhat, Chun-Yi Su, “Trajectory tracking and vibration control of two planar rigid manipulators moving a flexible object”, International Conference on Intelligent Robotics and Applications, Germany, Springer Lecture Notes in Computer Science, Volume 7101/2011, pp. 376-387, 2011, Scopus.
4. E. Balasubramanian, S. Riaz Ahammed, S.Abilash, “Robust Adaptive Control for two robot manipulators handling an object”, International Conference on International Conference On Mechatronics, Robotics and Manufacturing, Bhubaneswar, India, pp. 29-35,2011.
5. E. Balasubramanian, S. Riyaz Ahammed and S. Abilash, “Cooperative Manipulators Handling an Object: Adaptive Control in Joint Space”, Intl. Journal of Advanced Mechatronics and Robotics, Vol. 4, No. 1, pp. 1-12,January-June 2012.
6. Balasubramanian Esakki, Rama Bhat, Chun-Yi Su, “Robust Control Of Collaborative Manipulators -Flexible Object System, Intl. Journal of Advanced Robotic Systems, Vol. 10, pp. 1-18, 2013, IF:0.952

7. E. Balasubramanian, S. Abilash and S. Riyaz ahammed, "Collaborative manipulators handling flexible object in joint space modeling, control and analysis", International journal of mechanical Production Engineering Research and Development, Vol. 3, pp. 163-180, 2013.
8. E.Balasubramanian and R.Vasantharaj, Dynamic Modeling and Control of Quad Rotor, Intl. Journal of Engineering and Technology, Vol. 5, No. 1, 2013.
9. Mugunthan G, Balasubramanian E, Madhavan R and Jebin Sing, "Off Line Performance Measures of Two wheeler Engine – In Automatic Objective Method", International Conference on "Innovative Design, Analysis and Development Practices in Aerospace and Automotive Engineering", 6-8 Jan, 2014, Springer Proceedings, Scopus.Q4
10. Balasubramanian Esakki, Vasantharaj Rajagopal and Rusendar Babu Srihari "Dynamic Modeling and Simulation of Flapping Wings UAV", International Conference on "Innovative Design, Analysis and Development Practices in Aerospace and Automotive Engineering", 22-24 Feb, 2014, Springer Proceedings, Scopus.Q4
11. Mugunthan G, Balasubramanian E, Madhavan R and Jebin Sing, "Hardware in Loop Performance Measures of a Two Wheeler Using Vehicle Performance Simulator", International Conference On Trends in Product Life Cycle, Modeling, Simulation and Synthesis, 22-24 Feb, 2014.
12. N.K. Udaya Prakash, R. Vasantharaj, E. Balasubramanian, Gosavi Bhushan, Sudip Das and Farhan Eqbal, "Design, Development And Analysis Of Air Mycoflora Using Fixed Wing Unmanned Aerial Vehicle", Journal of Applied Science and Engineering, Vol. 17, No.1, pp. 1-8, 2013, Web of Science, Scopus.
13. L.-J. Yang, H.-L. Huang, J.-C. Liou, S. Marimuthu, B. Esakki and U. Chandrasekhar, "2D Quasi-Steady Flow Simulation of an Actual Flapping Wing", Journal of Unmanned System Technology, Vol. 2, No. 1, 2014.
14. Vasantharaj Rajagopal, Balasubramanian Esakki, Sivas Sakthi Velan, Rushendra Babu Shrihari, "Design and Kinematic analysis of ornithopter mechanisms", Intl. Conference on modeling, optimization and computing, 10-11 April, 2014. Won best paper award
15. N.K. Udaya Prakash, R. Vasantharaj, E. Balasubramanian, S. Rushendar Babu and S. Bhuvaneshwari, Unmanned Avionic Vehicles in Monitoring Bioaerosols, Biologist Forums of India.
16. Dhivakar Anand D, Chandrasekhar U, Balasubramanian E, Baboo D and Vasantharaj R, Development Of Tabletop Test Rig For Aerodynamic Characterization Of Ornithopters, 2nd International Conference of Multi-Disciplines of Engineering on Advanced Technology and Environmentalism Design, NUTN, Tainan, TAIWAN, Oct. 31 to Nov. 1-2, 2014.

17. Sankarasrinivasan S, Balasubramanian Esakki, "Vision Based Algorithms for MAV Navigation", IEEE International Conference on Electrical, Computer and Communication Technologies, 05-07 March, pp. 1-4, 2015, Scopus.
18. Sankarasrinivasan S, Balasubramanian E, L.J. Yang, F.Y. Hsaio, "Robust Vision Based Target Tracking Algorithm for MAV Navigation System" IEEE International Conference on Industrial Instrumentation and Control, pp. 269-274, 28-30 May, 2015, Scopus.
19. Sivas Sakthi Velan, Balasubramanian Esakki, Vasantharaj Rajagopal, Design and kinematic analysis of ornihopter mechanisms, IEEE International Conference on Emerging Trends in Science, Engineering, Business and Disaster Management (ICBDM), 27 - 28 Feb., 2015.
20. Lung-Jieh Yang, Balasubramanian Esakki, Udayagiri Chandrasekhar, Kuan-Cheng Hung, Chieh-Ming Cheng, "Practical Flapping Mechanisms for 20cm-span Micro Air Vehicles", Intl. Journal of Micro Aerial Vehicle, Vol. 7, No. 2, pp.181-202, 2015, IF : 0.854, SAGE.
21. Arunkumar P, Balasubramanian E, Chandrasekhar U, "Thermo mechanical modeling of selective inhibition sintered thermoplastic parts", Intl. Conf. on Mechanical and Manufacturing Engineering, 03-04 April, 2015
22. Arunkumar P, Balasubramanian E, Chandrasekhar U, "Thermo mechanical modeling of selective inhibition sintered thermoplastic parts", Journal of Applied Mechanics and Materials, Vol. 813-814, pp. 791-795, 2015
23. Deepak kumar K, Prasanth N, Arunkumar P, Balasubramanian E, and Abilash A, "Coupled field transient thermo - structural analysis of inhibited sintering process" Intl. Conf. on Mechanical and Manufacturing Engineering, 03-04 April, 2015.
24. Deepak kumar K, Prasanth N, Arunkumar P, Balasubramanian E, and Abilash A, "Coupled field transient thermo - structural analysis of inhibited sintering process", Journal of Applied Mechanics and Materials, Vol. 813-814, pp. 663-667, 2015
25. Sankarasrinivasan S, Balasubramanian Esakki, Chandrasekhar U, Karthik K and Rishi Gupta, "Health Monitoring of Civil Structures with Integrated UAV and Image Processing System", 11th Intl. Multi Conf. on Information Processing, Elsevier Procedia - Computer Science, 21-23 August, 2015, Scopus.
26. Balasubramanian Esakki, S. Riyaz Ahammed, " Dynamics and Control of collaborative robot manipulators", IEEE International Conference on Smart Technologies and Management for Computing, Communication, Controls, Energy & Materials (ICSTM 2015), 06-08 May, 2015.
27. Sankarasrinivasan S, Balasubramanian E, L.J. Yang, F.Y. Hsaio, Autonomous Control of Flapping Wing Vehicles Using Graphical User Interface, 4th IEEE

- International Conference on Advances in Computing, Communications and Informatics, pp. 2217-2220, 10-13 August, 2015.
28. Aditya Pandey, Adarsh Nair, Paramveer, Balasubramanian E, "Flapping Wing Mechanism Design and Manufacture", National Conference in Design, Materials and Constructions, 21-22 Aug., 2015. Won Best paper award. Published in International Journal of Applied Engineering Research, Vol. 10, No. 84, 2015
 29. Sainathan R, Sibichakravarthi V, Arunkumar P, Balasubramanian E, "Effect On the Variation of Spot Size in Selective Inhibition Sintering Process Using Finite Element Analysis", National Conference in Design, Materials and Constructions, 21-22 Aug., 2015.
 30. Sankarasrinivasan Seshardi, Balasubramanian Esakki, Lung-Jieh Yang, Udayagiri Chandrasekhar, Packiriswamy Sarasu, "A Novel Vision based Protocol for Controlling Flapping Wing Vehicles in Indoor Surveillance Mission", Journal of Applied Science and Engineering, Vol. 18, No.4, pp. 331-338, 2015, Web of Science, Scopus.
 31. Udayagiri Chandrasekhar, Milind Kulkarni, Balasubramanian Esakki, Sarasu Pakiriswamy, and Lung-Jieh Yang, "Experimental Studies on 3D Printed Parts for Rapid Prototyping of Micro Aerial Vehicles", Journal of Applied Science and Engineering, Vol. 19, No.1, pp. 17-22, 2015, Web of Science.
 32. Arunkumar P, Balasubramanian E, Chandrasekhar U, "Investigation on multi-layer selective inhibition sintering process using finite element analysis" 5th International Conference of Materials Processing and Characterization (ICMPC 2016), Hyderabad, Materials Today : Elsevier Proceedings, Scopus.
 33. Ponnambalam Arunkumar, Esakki Balasubramanian, "Taguchi's Parametric Approach in Optimizing Selective Inhibition Sintering Process Variables", International Conference On. Innovative Design & Development Practices in. Aerospace and Automotive Engineering (IDAD), 22nd - 24th February 2016, Springer Proceedings, Scopus.
 34. Arunachalam Aravind, Ponnambalam Arunkumar, Esakki Balasubramanian, "- Finite element analysis of high strength polymers interaction with inhibitors in selective inhibition sintering process", International Conference On. Innovative Design & Development Practices in. Aerospace and Automotive Engineering (IDAD), 22nd - 24th February 2016, Springer Proceedings, Scopus.
 35. Sankarasrinivasan Seshardi, Balasubramanian Esakki, Rishi Gupta, "Image processing framework for detection and quantification of structural defects", 5th International Structural Specialty Conference, CSCE, London, Canada, 2016.
 36. Arunachalam Aravind, Ponnambalam Arunkumar, Esakki Balasubramanian, "Comparative study of High performance Polymers in Selective Inhibition Sintering process through Finite Element Analysis", International Conference on

Technological Advancements in Materials and Manufacturing for Industrial Environment (TAMMIE), 4th - 5th March 2016 .

37. D Rajamani, A Tamilarasan, Balasubramanian Esakki and K Ananthakumar, "Synthesis and characterization of sintered az91d magnesium matrix composites reinforced with red mud particles", *Material Science Research India*, 13(2), 2016.
38. P. Arunkumar, Balasubramanian Esakki and D. Rajamani, Artificial neural network and regression modeling of SIS process for predicting dynamic mechanical properties, *International Conference on Materials, Manufacturing and Modeling*, VIT University, Vellore, India, 9-11th March 2017, *Materials Today : Elsevier Proceedings*, Scopus.
39. Balasubramanian Esakki, D. Rajamani and P. Arunkumar, An intelligent modeling system to predict mechanical strength characteristics of selective inhibition sintered parts using fuzzy logic approach, *International Conference on Materials, Manufacturing and Modeling*, VIT University, Vellore, India, 9-11th March 2017, *Materials Today : Elsevier Proceedings*, Scopus.
40. Balasubramanian Esakki, D. Rajamani and P. Arunkumar, Investigation on dry sliding wear behavior of selective inhibition sintered HDPE parts using simulated annealing algorithm, *International Conference on Emerging trends in Materials and Manufacturing Engineering*, NIT Tiruchirappalli, 10-12th March 2017, *Materials Today : Elsevier Proceedings*, Scopus.
41. D. Rajamani, Balasubramanian Esakki and P. Arunkumar, A study on dimensional accuracy of Selective Inhibition Sintered HDPE parts using fuzzy logic, *International Conference on Materials Processing and Characterization*, GRIET Hyderabad, 17-19th March 2017, *Materials Today : Elsevier Proceedings*, Scopus.
42. D. Rajamani, Balasubramanian Esakki, P. Arunkumar and R.Velu, Fuzzy Logic-Based Expert System for Prediction of Wear Rate in Selective Inhibition Sintered HDPE Parts, *International Conference on Materials Processing and Characterization*, GRIET Hyderabad, 17-19th March 2017, *Materials Today : Elsevier Proceedings*, Scopus.
43. D. Rajamani and Balasubramanian Esakki, Examining mechanical strength characteristics of Selective Inhibition Sintered HDPE specimens using RSM and desirability approach, *International Conference on Advanced Technologies in Design, Mechanical and Aeronautical Engineering*, Nanyang Technological University, Singapore, 12-14th July 2017, Scopus.
44. Ismael Boulbaz, Sankarasrinivasan S, Balasubramanian Esakki, A Comparative Analysis on Image Translation and Rotation Algorithms towards Implementations in Micro Aerial Vehicles, *International Conference on*

Mechatronics and Robotics Engineering, Paris, France, 8-12 Feb., 2017, Springer Proceedings, Scopus.

45. D. C. Haran Pragalath, Balasubramanian Esakki, Rishi Gupta and Karthikeyan, Bridge Structural Health Monitoring Tool using AASTHO guidelines, International Conference on Sustainable Energy and Built Environment, ASCE, 16-17th March, 2017.
46. Rishi Gupta, Harsh Rathod, Balasubramanian Esakki and Sean Blaney, "A Non-Contact Non-Destructive Evaluation Technique based on Infrared Thermography for Reinforced Concrete bridge decks and Heritage structures", CSCE 6th International Conference on Engineering Mechanics and Materials, Vancouver, British Columbia, May 31 - June 3, 2017.
47. D. C. Haran Pragalath, S. Sankar srinivasn, Harsh Rathod, Balasubramanian Esakki and Rishi Gupta, "Deterioration assessment of infrastructure using fuzzy logic and image processing algorithm", ASCE Journal of Performance of Constructed Facilities, Vol. 32, No.2, 2018 – 04018009, IF : 1.542.
48. A. Tamilarasan, D. Rajamani and Balasubramanian Esakki, "Parametric optimisation in Nd-YAG laser cutting of Thin Ti-6Al-4V super alloy sheet using evolutionary algorithms", International Journal of Materials and Product Technology, Vol. 31, No.2, pp. 813-821, 2018, IF: 0.802.
49. Lung-Jieh Yang, Ai-Lien Feng, Hsi-Chun Lee, Balasubramanian Esakki, and Wei He, The three-dimensional flow simulation of a flapping wing, Journal of Marine Science and Technology, Vol. 26, No. 3, 2018, Springer, IF : 1.845.
50. Arunachalam Aravind, Ponnambalam Arunkumar, Esakki Balasubramanian, "Comparative study of High performance Polymers in Selective Inhibition Sintering process through Finite Element Analysis", Journal of Polymer and Polymer Composites, Vol. 25, No.3, pp. 199-202, 2017, IF:0.43
51. Nikhil panchal, Lung-Jieh Yang, Xin yang zheng and Esakki Balasubramanian, "Preliminary Study on Altitude and Heading Control of FWMAVs", Intl. Conf. on Intelligent Unmanned Systems, Tamkang University, Taiwan on 21-24 Aug., 2017.
52. Esakki Balasubramanian, Sasitharan A, Chandrasekhar Udayagiri, Karthik K, "Low-cost test rig for aerodynamic evaluation of ornithopters", Intl. Conf. on Intelligent Unmanned Systems, Tamkang University, Taiwan on 21-24 Aug., 2017.
53. Jibin Sam Jo, Shibu Gopalakrishnan, Esakki Balasubramanian, "Hovering analysis of a beetle generating lemniscate of Bernoulli", Intl. Conf. on Intelligent Unmanned Systems, Tamkang University, Taiwan on 21-24 Aug., 2017.
54. Sean Blaney, Harsh Rathod, Rishi Gupta and Balasubramanian Esakki, "Damage Identification and localization in Bridges and Heritage Structures using

- Unmanned Aerial Vehicles" Structural Health Monitoring of Intelligent Infrastructure conference 2017, Brisbane, Australia
55. Sankarasrinivasan S, Esakki Balasubramanian, Lung-Jieh Yang, "Image Processing Framework towards Motion Estimation and Control of Multiple FWMAVs", Intl. Conf. on Intelligent Unmanned Systems, Tamkang University, Taiwan on 21-24 Aug., 2017.
 56. Balasubramanian Esakki, P. Arunkumar and D. Rajamani, Modeling and prediction of optimal process parameters in wear behaviour of selective inhibition sintered high density polyethylene parts, Progress in Additive Manufacturing, pp. 1-13, 2017, Springer.
 57. Madhu B., Balasubramanian E., Nagarajan P.K., Ravishankar Sathyamurthy, Mageshbabu D. (2017), "Improving the Yield of Freshwater and Exergy Analysis of Conventional Solar Still with Different Nanofluids, FME Transactions, 45(4), 525.
 58. B. Madhu, E. Balasubramanian, P.K. Nagarajan, R. Sathyamurthy, A.E. Kabeel, T. Arunkumar, D. Mageshbabu. (2017), "Improving the yield of fresh water from conventional and stepped solar still with different nanofluids", Desalination and Water Treatment, Taylor and Francis, IF 1.234.
 59. Udayagiri Chandrasekhar, Lung-Jieh Yang, Balasubramanian Esakki, Subramanian Suryanarayanan, Sachin Salunkhe, Rapid prototyping of flapping mechanisms for monoplane and biplane ornithopter configurations, International Journal of Modern Manufacturing Technologies, Vol. IX, No.2, 2017, Scopus.
 60. D. Rajamani and E. Balasubramanian, U. Chandrasekhar, 'Effects of heat energy on morphology and properties of selective inhibition sintered high density polyethylene' in Advances in Materials & Processing Technologies Conference held on 11th - 14th, December 2017 at VIT University, Chennai, India.
 61. Balasubramanian E, Sasitharan A, Chandrasekhar U and Karthik K, Low-cost test rig for aerodynamic evaluation of ornithopters, Journal of Applied Science and Engineering, Vol. 21, No.2, pp. 179-186, 2018, Scopus and Web of Science.
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 63. Sachin Salunkhe, D Rajamani, E Balasubramanian, U Chandrasekhar, Prediction of Life of Piercing Punches Using Artificial Neural Network (ANN) and Adaptive Neuro Fuzzy Inference Systems (ANFIS)", International Journal of Materials Engineering Innovation, Inder science, Accepted, Scopus.
 64. Madhu.B, Balasubramanian.E, Ravishankar Sathyamurthy, Nagarajan.P.K., Mageshbabu.D, Bharathwaaj. R, A. Muthu manokar, "Exergy analysis of solar

- still with sand heat energy storage”, *Applied Solar Energy*, Vol. 54, No. 3, pp.173-177, 2018, Springer.
65. B. Madhu, E. Balasubramanian, P.K. Nagarajan, R. Sathyamurthy, A.E. Kabeel, T. Arunkumar, D.Magesh Babu, “Improving the yield of fresh water from conventional and stepped solar still with different nanofluids”, *Desalination and Water Treatment*, Vol. 100, pp. 243-249, 2017, Taylor and Francis, IF: 1.234.
66. B.Madhu, E.Balasubramanian, A.E.Kabeel, S.A.El-Agouz, A.Muthu Manokar, N.Prakash, Ravishankar Sathyamurthy (2018) “Experimental investigation on the effect of sensible heat energy storage in inclined solar still with baffles”, *Desalination and Water Treatment*, Vol. 116, pp.49-56, 2018, Taylor and Francis, IF: 1.234.
67. Arunkumar P, Balasubramanian E, Mahesh Anand P, Rahul Sai Y, Finite Element Analysis of Nano Satellite Structure, National conference on Small Satellite Technology and Applications, Chennai, 15th – 16th Dec. 2017
68. Arunkumar P, Balasubramanian E, Velu R, Sessa Sai Charan Tej K, Vinay kumar K J, Design of Nano satellite structure, National conference on Small Satellite Technology and Applications, Chennai, 15th – 16th Dec. 2017.
69. G. Surendar, E. Balasubramanian, P. Vikram , M. Silambarasan, Computational Fluid Dynamic Analysis of Unmanned Amphibious Aerial Vehicle for Drag Reduction, Intl. Conf. on Intelligent Unmanned Systems, Jeju, South Korea, 20-23 August, 2018
70. Nikhil Panchal, Ai-Lien Feng, Chih-Yu Jen, Sankarasrinivasan Seshadri, Balasubramanian Esakki and Lung-Jieh Yang, Soap-Film Flow Visualization of a Flapping Wing, Intl. Conf. on Intelligent Unmanned Systems, Jeju, South Korea, 20-23 August, 2018
71. Harsh Rathod, Rishi Gupta, Yavuz Kaya, Balasubramanian Esakki, “Condition Assessment of Bridges using Non-Contact Vibration Measurement: A Pilot Study”, 1st International Conference on New Horizons in Green Civil Engineering (NHICE-01), Victoria, BC, Canada, April 25 – 27, 2018.
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Conference on Innovative Design, Analysis and Development Practices in Aerospace and Automotive Engineering”, 24-26 Feb, 2020, Springer Proceedings, Scopus.

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Surendar Ganesan, Balasubramanian Esakki, Silambarasan Mathiyazhagan and Vikram Pandimuthu, Design Conception and Evaluation of an Unmanned Amphibious Aerial Vehicle using Systematic Approach, Aviation, ESCI, Accepted.
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- A* and MEA* algorithms." International Journal for Simulation and Multidisciplinary Design Optimization 12 (2021): 24.
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126. Balasubramanian. E, Surendar.G, Lung-Jieh Yang, Wei-Chen Wang, Chih-Yu Jen, Sachin Salunkhe Fabrication of Flapping Wing Mechanism Using Various Polymer Based 3D Printing Techniques and Aerodynamic Performance Evaluation, Journal of Materials Engineering and Performance, Accepted, IF:1.819

PhD Guided

Name of the student	Title of the Thesis	Year of Completion
Dr D. Rajamani	Experimental investigations and parametric optimization of selective inhibition sintering process	2019
Dr B Madhu	Experimental approach on improving the yield of fresh water in solar stills	2021
Dr G Surendar	Conceptualization and Evaluation of Unmanned Amphibious Aerial Vehicle for Water Quality Assessment	2021
Dr Tesfaye Kebede Ali	Experimental Investigations and Optimization Studies for Enhancing Compressive and Impact Strengths of SIS Parts	2021
Dr N V S S Sagar	Design of monocoque Quadcopter Structure through integration of Topology Optimization and Additive Manufacturing	2021
Dr Mesfin Sisay Mengesha	Experimental Investigations on Surface Roughness and Fatigue Strength Characteristics of Selective Inhibition Sintered Polyamide 12 Parts	2021

International Visits for Research Collaboration

1. Visited **Tamkang University, Taiwan** to discuss the **Indo – Taiwan** collaborative research project progress during 4th Nov. to 3rd Dec., 2013
2. Visited **Tamkang University, Taiwan** to discuss the **Indo – Taiwan** collaborative research project progress during 29th Oct. 29 to 9th Nov., 2014
3. Visited **Tamkang University, Taiwan** to discuss the **Indo – Taiwan** collaborative research project progress during 1st to 27th Oct., 2015
4. Visited **University of Victoria, Canada** to discuss the **Indo-Canada** collaborative research project progress during 24th May to 9th Jun., 2016.
5. Visited **University of Victoria, Canada** to discuss the **Indo-Canada** collaborative research project progress during 1st to 9th Aug., 2017.
6. Visited **Daegu Gyeongbuk Institute of Science and Technology (DGIST), South Korea** to discuss the Indo – Korea collaborative research project progress during 21st to 28th Mar., 2018.

Workshop Attended and Conducted

- AMM workshop on the "**Design of Mechanisms for Solving Real Life Problems**", October 23-25, 2008, Department of Engineering Design, IIT-Chennai, India.
- Int. workshop on "**Mechatronics and Robotics**", July 4 – 8, 2011, Vel Tech Dr. RR & Dr. SR Technical University, Chennai, India.
- Conducted workshop on "Under actuated Robotic Systems and Control", Aug.17, 2013, Vel Tech Dr.RR & Dr. SR Technical University, Chennai, India.
- Conducted workshop on "Advanced Sensors And Actuators", 23rd and 24th, Dec., 2013, Vel Tech Dr.RR & Dr. SR Technical University, Chennai, India.
- Organized a Workshop on "Ornithopter Mechanism Assembly and Real Time Flying" at ESCI, Hyderabad on Aug. 6, 2014 and Vel Tech University on Aug. 8, 2014
- Organized 3 days lecture series on "MEMS Based Sensors and Actuators" at Vel Tech University on Aug. 4, 5 & 7, 2014.
- Attended work shop on "Design of Experiments" Organized by Sri Chandrasekarendra Saraswathi Viswa Maha Vidyalaya University (SCSVMV), Kanchipuram on 2-3 Feb. 2017
- Organized workshop on "Design Thinking" at Vel Tech Rangarajan Dr Sagunthala R & D Institute of Science and Technology, Avadi, Chennai on 18th April 2018.

- Organized workshop on “Unmanned Aerial Vehicles and Industrial Applications” at TBI - Vel Tech, Vel Tech Rangarajan Dr Sagunthala R & D Institute of Science and Technology, Avadi, Chennai on 20th Nov. 2019
- **Coordinator**, Technology Based Entrepreneurship Development Programme on “**Business Opportunities in Unmanned Aerial Vehicles (UAVs)**”, Sponsored by NSTEDB, DST, Govt. of India, 01st – 13th Feb. 2021.

Invited Talks

- Delivered a talk titled “Research on Unmanned Aerial Vehicles an Overview” during the Ornithopter mechanism assembly and real time flying workshop conducted at ESCI, Hyderabad on Aug. 6, 2014.
- Delivered a talk titled “Design & Development of Unmanned Aerial Vehicles” to the Final Year students of Vel Tech MultiTech Engineering College, Chennai on Sept. 24, 2014.
- **Invited key note speaker** - “ UAV – Multidisciplinary Perspective” on the 2nd International Conference on Multi-Disciplines of Engineering on Advanced Technology and Environmentalism Design at National University of Tainan, Taiwan on Oct.31,2014.
- Delivered a talk titled “Industrial Robotics” for Student Skill Development Activities at Vel Tech University on 29 Jan., 2015.
- Delivered a talk titled “UAV and its Applications”, in a workshop on rubber powered flapping wing MAV and zonal competition for Aerocarnival 2015 held at Vel Tech University on 30 Jan., 2015
- **Invited Key note speaker** - “Glimpses on the Development of UAVs for Diverse Applications” on the International Conference on Biomimetics and Ornithopters, Tamkang University, Taiwan on 28-30 June,2015.
- **Invited Speaker- Inspire Science Camp** funded by DST – Govt. of India Organized by Vel Tech University “Application of Unmanned Aerial Vehicles” - Aug. 2015
- Delivered a talk titled “Micro Aerial Vehicles applications and assembly of Ornithopters” at Vel Tech University on 20 Aug. 2016.
- **Invited Speaker** – Tamilnadu Archaeological Department - “Unmanned Aerial Vehicles for Heritage Structure Inspection and Monitoring” on 29 Sept. 2016.
- Delivered a talk titled “ Unmanned Aerial Vehicles and its applications” at Mekapatti Rajamohan Reddy Institute of Technology and Science, Udayagiri, Nellore on Oct 28, 2016
- **Invited Speaker- Inspire Science Camp** funded by DST – Govt. of India Organized by Vel Tech University “Micro Aerial Vehicles” - Dec. 2016
- Delivered a talk titled “Ornithopter and Unmanned Aerial Vehicle”, at Dhanalaksmi Srinivasan Institute of Technology, Trichy on 7th Feb., 2017

- Delivered a talk titled "Ornithopter and Unmanned Aerial Vehicle", at Imayam Engineering College, Trichy on 8th Feb., 2017.
- **Invited Speaker** : "Unmanned aerial vehicles for inspecting railway bridges and heritage structures", Intl. Conf. on Intelligent Unmanned Systems, Tamkang University, Taiwan on 21-24 Aug., 2017.
- **Key Note Talk**: "Glimpses on Applications of UAV", International Conference on Automobile, Marine and Mechanical Engineering on 4th and 5th May 2018, Sri Venkateswara College of Engineering, Chennai
- **Invited Speaker**: "Application of UAVs and future perspective" at National summer program organized by iSPARK Smart Solutions in association with The Institution of Engineers (India) during 4 -13 June, 2018 at Chennai.
- **Invited Speaker**: "Selective inhibition sintering : Low cost powder based additive manufacturing", NAFEMS 18 India Conference on Engineering analysis, modeling, simulation and 3D Printing, held at Bangalore on 20-21 July, 2018.
- **Invited Speaker- Inspire Science Camp** funded by DST – Govt. of India Organized by Vel Tech University "Micro Aerial Vehicles" – August, 2018.
- Delivered a guest lecture titled "Development of UAVs for Industrial Applications" to UG students of Mining and Machinery Department, IIT – Dhanbad (ISM), Dhanbad on 28th Aug. 2018.
- Delivered a guest lecture titled "Insight on the development of UAVs for multifaceted applications", Sri Venkateswara College of Engineering, Chennai on 9th Jan. 2019.
- Delivered a guest lecture titled "Applications of UAV: Glimpses of UAV Development", Siddhartha Engineering College, Vijayawada on 8th March 2019.
- **Invited talk**: "UAVs Present and Future – Applications", in Time 4.0 – 2019, National Conference on Unmanned Vehicles and Robotics held at Dr MGR Educational and Research Institute on 20th March, 2019.
- **Invited talk**: "Development of Multirotor systems for diverse applications and future prospects in Wild life monitoring", in the workshop on Roles of UAVs for animal census and surveillance in sathyamangalam forest region at Bannari Amman Institute of Technology, Sathyamangalam on 28th March 2019 supported by Tamilnadu State Council for Science and Technology (TNSCST).
- **Key Note Speaker**: "Role of UAVs in Civil and Societal Missions", NCHU International Partnership Forum & Bilateral Conference on Engineering Technology", National Chung Hsing University (NCHU) on 25 and 26th of April 2019, Taichung City, Taiwan.
- **Invited Talk**: "Development of UAVs for Industrial Applications", Drone Club – Inauguration, Karpagam College of Engineering, Coimbatore on 20th Sep. 2019.
- **Invited Talk**: "Insights on UAV development for Multifaceted Environments and Industrial Applications", in the 5th International Conference on Mechanical

Engineering and Renewable Energy (ICMERE), 2019 on 11th - 13th December, 2019 held at Chittagong University of Engineering and Technology (CUET), Chittagong, Bangladesh.

- **Webinar** on "Introduction and Application of UAVs", Organized by Rajarambapu Institute of Technology (RIT), Sangli on 3rd May 2020.
- **Webinar** on "UAVs for Industrial Applications", Mechanical Engineering Association, Rangarajan Dr. Sagunthala R & D Institute of Science and Technology, Chennai on 12th June 2020.
- **Webinar** on "Insight on Development of UAVs for Multifaceted Applications", Premier University, 14th July 2020, Chittagong, Bangladesh
- **Webinar** on "UAV for Real World Applications Beyond 5G", Organized by SRM Institute of Science and Technology, 25th July 2020, Kattankulathur, Tamilnadu, India
- **Webinar** on "Introduction, Classification and Applications of UAVs", Organized by Govt. College of Engineering, Tirunelveli, Alumni Association, 29th July 2020.
- **Webinar** on "Trends, Opportunities and Applications of UAVs", Organized by Vel Tech, 24th August 2020.
- **Webinar** on "Glimpses of UAV and its Applications, 9th Sep. 2020, Airoospace Pvt. Ltd., Chennai
- **Webinar** on "AM based drone development & deployment in bridge monitoring and water quality monitoring", Shri Vishnu Engineering College for Women, Bhimavaram, Andhra Pradesh, AICTE Sponsored Short-term training program (26th – 31st Oct 2020) on Additive Manufacturing for Medical and Aerospace Applications, 28th Oct 2020.
- **Webinar** on "UAV's for Multifaceted Environments" in the AICTE sponsored online mode Short term training programme (Slot-1) on 16th Dec. 2020, Rajagopal Polytechnic college, Vellore
- **Webinar** on "Development of Flapping Wing Vehicle: An Overview" in the AICTE sponsored online mode Short term training programme (Slot-2) on 07th Jan. 2021, Rajagopal Polytechnic college, Vellore
- **Webinar** on "UAV's for Industrial Perspective" in the AICTE sponsored online mode Short term training programme (Slot-4) on 15th Feb. 2021, Rajagopal Polytechnic college, Vellore
- **Jury** for VISAI-2021, 24th Feb., 2021, National Level Student Competition, Vel Tech Rangarajan Dr. Sagunthala R & D Institute of Science and Technology, Avadi, Chennai
- **Delivered a talk** on "Introduction and Application of UAVs", 1st Feb 2021, Technology Based Entrepreneurship Development Programme on "Business Opportunities in Unmanned Aerial Vehicles (UAVs)", Sponsored by NSTEDB, DST, Govt. of India
- **Webinar** on "Future Career in Drones and Applications", 2nd June 2021, Bharath Institute of Higher Education and Research.

- **FDP on** " Introduction to UAVs and Applications", 21st July 2021, College of Science and Humanities, Dept. of CSE, SRM Institute of Science and Technology, Ramapuram Campus
- **Workshop** on "Drone / UAV Technology", 10th and 11th Dec 2021, Sanghamam College, Dindivanam

International Faculty Exchange

Delivered short term course on "Robot Manipulator Kinematics and Dynamics" as a visiting faculty to Tamkang University, Taiwan during Oct. – Nov. 2015.

Awards and Merits

1. GATE – 2000 Scholarship.
2. National Overseas Scholarship by Govt. of India – 2006 to pursue Ph.D. at abroad through which completed Doctoral Studies at Concordia University.
3. National Level Competition - Secured 1st Prize for the development of Hexacopter UAV to inspect the power line cables – Organized by Power Grid Corporation Ltd., <http://www.veltechuniv.edu.in/Achievements.html>.
4. Dedicated faculty Award – Vel Tech University – 2013.
5. International Travel Grant – 2014 (DST–SERB under International Travel Support Scheme)
6. Aegis Graham Bell Award in the category of "Best Innovative Business Model - 2014" for Telecom tower structure inspection and on-line radiation measurement. <http://veltechuniv.edu.in/Achievements.html>
7. National Competition - VISAI 2015 - Won Best Project Award in Mechanical Stream competing over 50 Colleges / Universities.
8. World Wide Competition - Secured 2nd Prize under the category of "Future of Technology"- Organized by Future Ideas Foundation, 2015.
9. Reviewer for Journal of Applied Science and Engineering, Tamkang University, Taiwan.
10. Reviewer for Journal of Advances in Mechanical Engineering, SAGE publications.
11. Reviewer for Science China Technological Sciences, Springer
12. Session Chair for "IEEE Madras Section Student Paper Contest 2016" held at Vel Tech University on 21 and 22 Oct, 2016.
13. National Competition - VISAI 2017 - Won First Prize in Clean water Stream and Won Third Prize in Environmental theme.

I, do here by confirm that the information given above is true to the best of my knowledge and belief.

Sincerely,

(E.BALASUBRAMANIAN)