

**Dr. E. BALASUBRAMANIAN**

Professor, Department of Mechanical Engineering,  
 Dean – Centre for International Affairs  
 National Institute of Technical Teachers Training and Research  
 (NITTTR), Ministry of Education, Government of India,  
 Taramani, Chennai - 600113  
 balasubramanian@nitttrc.edu.in/ esak.bala@gmail.com  
 Mobile: +91-9445801978  
<http://balasubramanian-uav.co.in/>

**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	Designation	Organization
NOV 2002 - AUG 2006	Teaching Research Associate	AUFRG Institute for CAD/CAM, College of Engineering, Guindy, Anna University, Chennai, India.
AUG 2006 – AUG 2007	Lecturer	Vellore Institute of Technology, Vellore, India.
SEP 2007 – APR 2011	Research Assistant/Teaching Assistant	Concordia University, Montreal, Canada.
JUN 2011 – 25 <sup>th</sup> OCT 2019	Associate Professor	Vel Tech Rangarajan Dr. Sagunthala R & D Institute of Science and Technology, Chennai, India.
26 <sup>th</sup> OCT 2019 – 31 <sup>st</sup> MAY 2023	Professor	Vel Tech Rangarajan Dr. Sagunthala R & D Institute of Science and Technology, Chennai, India.
27 <sup>th</sup> SEP 2021 – 31 <sup>st</sup> MAY 2023	Dean R & D	Vel Tech Rangarajan Dr. Sagunthala R & D Institute of Science and Technology, Chennai, India.
1 <sup>st</sup> JUN 2023 – 31 <sup>st</sup> AUG 2024	Associate Professor	National Institute of Technical Teachers Training and Research (NITTTR), Chennai
1 <sup>st</sup> SEP 2024 – Till Now	Professor	National Institute of Technical Teachers Training and Research (NITTTR), Chennai
1 <sup>st</sup> NOV 2024 – Till Now	Dean - Centre for International Affairs	National Institute of Technical Teachers Training and Research (NITTTR), Chennai

## 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. 201641009924, Patent No. 405612 – Adaptive Traffic Control and Mapping using Unmanned Aerial Vehicle, **Granted** on 2nd Sep. 2022
2. Appln No. 201641000411, Patent No. 417229 – Vision Based Control of Multiple Flapping Wing Micro Aerial Vehicles and Formation Flight, **Granted** on 9th Jan. 2023
3. Appln. No.201841029828, Patent No. 443468, “Medical Assistive Device for Geriatric Care and Orthopedic Rehabilitation”, **Granted** on 07th Aug 2023
4. Appln No. 2237/CHE/2014, Patent No. 439813 – Power Line Inspection Robot, **Granted** on 20th July. 2023
5. Appln. No. 201841044458, Adjustable Frame Unmanned Amphibious Aerial Vehicle With Extended Floats, **Granted** on 12<sup>th</sup> December, 2023.
6. Appln No. 5037/CHE/2014 – Telecom Tower Inspection Using Unmanned Aerial Vehicles, Published
7. Appln. No. 201741029804 - “Elevated Civil Infrastructure Health Assessment Using Rotary Wing UAVs”, **Granted**
8. Amphibian Unmanned Aerial Vehicle for Multi-terrain applications  
PCT Intl. Appln.No. PCT/IN2018/050651; India :201741036299,Patent No. 535827, **Granted** on 29<sup>th</sup> April 2024.
9. Appln. No. 202241052789, An Unmanned Aqueous eDNA sampler with Hybrid UAV, Published
- 10.Reg. No. 202341087966, S. Vijayalakshmi , A. Paramasivam, Pittu Pavan Sai Kiran Reddy, E. Balasubramanian, Devising IoT based Healthcare Medical Container for Transportation of Organs and Healthcare Products, Filed on 25-03-2024.
11. Appln. No. 202441103935, Smart Water Sampler Controller Device for Precision Unmanned Water Sampling Systems, Complete Specification filed.

## 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 Lakhs, 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 Lakhs, PI**, Completed.
3. "Robotic assisted rapid prototyping of near net shape components through indigenous polymers", DST-SERB, Jun- 2014 – 2018, **22.16 Lakhs, 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 Lakhs, 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 Lakhs, 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 Lakhs, 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 Lakhs, PI**, Completed.
11. "Development of 3D Printed flexible patch antennas for enhancement of communication range in UAV", DRDO, ARDB – Unmanned Aero System Panel, **Rs29.06 Lakhs, PI**, May 2020 – 2022, Completed.
12. Target Recognition using UWV in Under water environment, Indo-Korea (Institute Collaboration), Sept. 2022 – Aug. 2023, 5000 USD.
13. "Drone assisted mapping of seaweeds at Chilka lake and development of Value added products from biomass", DBT, **Rs. 61.00 Lakhs, Co-PI**, June 2020 – 2023, Completed.
14. Minimizing the Post Harvesting Loss In Ware Houses Through Examining Rice Kernel / Paddy Quality using Infrared Measurements and Image Processing Algorithms, TNSCST, 2021-2023, **Rs. 2.00 Lakhs, PI**, Completed

15. Devising point-of-care diagnostic microchip biosensor for early diagnosis of cardiovascular disease, DST – GITA, Indo-Taiwan, 2022 – 2025, **Rs 41.23 Lakhs, Co-PI**, On-Going
16. UAV Based In-situ Measurements and Hyper spectral Analysis for Water Quality Mapping and Developing Remediation Strategies, DST- SERB – EQUITY, Feb 2022 – 2026, **Rs 42.54 Lakhs, PI**, On-Going
17. Fabrication of solid propellant using slurry-based 3D printing and experimental investigation on minimizing curing time using various heat sources, DRDO – ARMREB – HEM, **Rs 42.94 Lakhs, PI**, Jan 2024 – 2026, 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. 19.67 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

- BalasubramanianEsakki, **Two Collaborative Robot Manipulators Handling a Flexible Object: Modeling, Control and Analysis**, LAP LAMBERT Academic Publishing GmbH & Co. KG, Germany, 2011, ISBN: 978-3845407272.
- Rama Bhat, JothilakshmiRajendran, BalasubramanianEsakki, **“University Physics”**, Narosa Publishing House Pvt. Ltd, ISBN 978-8184872699 and Alpha Science International Ltd, 2014, ISBN: 978-1842658130.
- Lung – Jieh Yang and BalasubramanianEsakki, **“Flapping Wing Vehicles: Numerical and Experimental Approach”**, CRC Press, Taylor & Francis, ISBN 9780367232573.

## Publications

1. B. Esakki and S. RiyazAhammed, "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. BalasubramanianEsakki, 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. BalasubramanianEsakki, 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. RiazAhammed, 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. RiyazAhammed 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. BalasubramanianEsakki, 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:1.714
7. E. Balasubramanian, S. Abilash and S. Riyazahammed, "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. BalasubramanianEsakki, VasantharajRajagopal and RusendarBabuSrihari "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. Bhuvaneswari, 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 ornithopter 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 : 1.405, 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, BalasubramanianEsakki, Chandrasekhar U, Karthik K and Rishi Gupta, "Health Monitoring of Civil Structures with Integrated UAV and Image Processing System", 11<sup>th</sup> Intl. Multi Conf. on Information Processing, ElsevierProcedia – Computer Science, 21-23 August, 2015, Scopus.
26. BalasubramanianEsakki, S. RiyazAhammed, " 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, 10-13August, 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. SankarasrinivasanSeshardi, BalasubramanianEsakki, Lung-Jieh Yang, Udayagiri Chandrasekhar, PackiriswamySarasu, "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, BalasubramanianEsakki, SarasuPakiriswamy, 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. PonnambalamArunkumar, EsakkiBalasubramanian, "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. ArunachalamAravind, PonnambalamArunkumar, EsakkiBalasubramanian, "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. SankarasrinivasanSeshardi, BalasubramanianEsakki, Rishi Gupta, "Image processing framework for detection and quantification of structural defects", 5th International Structural Specialty Conference, CSCE, London, Canada, 2016.
36. ArunachalamAravind, PonnambalamArunkumar, EsakkiBalasubramanian, "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, BalasubramanianEsakki 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, BalasubramanianEsakki 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, 9-11<sup>th</sup> March 2017, Materials Today : Elsevier Proceedings, Scopus.
39. BalasubramanianEsakki, 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, 9-11<sup>th</sup> March 2017, Materials Today : Elsevier Proceedings, Scopus.
40. BalasubramanianEsakki, 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, 10-12<sup>th</sup> March 2017, Materials Today : Elsevier Proceedings, Scopus.
41. D. Rajamani, BalasubramanianEsakki 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, 17-19<sup>th</sup> March 2017, Materials Today : Elsevier Proceedings, Scopus.
42. D. Rajamani, BalasubramanianEsakki, 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, 17-19<sup>th</sup> March 2017, Materials Today : Elsevier Proceedings, Scopus.
  43. D. Rajamani and BalasubramanianEsakki, 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, 12-14<sup>th</sup> July 2017, Scopus.
  44. Ismael Boulbaz, Sankarasrinivasan S, BalasubramanianEsakki, 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, BalasubramanianEsakki, Rishi Gupta and Karthikeyan, Bridge Structural Health Monitoring Tool using AASTHO guidelines, International Conference on Sustainable Energy and Built Environment, ASCE, 16-17<sup>th</sup> March, 2017.
  46. Rishi Gupta, Harsh Rathod, BalasubramanianEsakki 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. Sankarsrinivasn, Harsh Rathod, BalasubramanianEsakki 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 : 2.372.
  48. A.Tamilarasan, D.Rajamani and BalasubramanianEsakki, "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: .0743
  49. Lung-Jieh Yang, Ai-Lien Feng, Hsi-Chun Lee, BalasubramanianEsakki, 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 : 1.947.
  50. ArunachalamAravind, PonnambalamArunkumar, EsakkiBalasubramanian, "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 EsakkiBalasubramanian, "Preliminary Study on Altitude and Heading Control of FWMVs", Intl. Conf. on Intelligent Unmanned Systems, Tamkang University, Taiwan on 21-24 Aug., 2017.
52. EsakkiBalasubramanian, 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, ShibuGopalakrishnan, EsakkiBalasubramanian, "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 BalasubramanianEsakki, "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, EsakkiBalasubramanian, Lung-Jieh Yang, "Image Processing Framework towards Motion Estimation and Control of Multiple FWMVs", Intl. Conf. on Intelligent Unmanned Systems, Tamkang University, Taiwan on 21-24 Aug., 2017.
56. BalasubramanianEsakki, 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., RavishankarSathyamurthy, 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, BalasubramanianEsakki, Subramanian Suryanarayanan, SachinSalunkhe, 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 11<sup>th</sup> - 14<sup>th</sup>, 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.

62. D. Rajamani, BalasubramanianEsakki, P. Arunkumar, U. Chandrasekhar, SalunkheSachin, Experimental investigation of SHS process variables using NSGA-II and RSM for evaluating mechanical strength characteristics of polyethylene parts, International Journal of Manufacturing Technology Research, Vol. 10, No. 1, Nova Science Publishers, USA, 2018, Scopus.
63. SachinSalunkhe, 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.
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### PhD Guided

Sl.No	Name of the student	Title of the Thesis	Year of Completion
1	Dr D Rajamani	Experimental investigations and parametric optimization of selective inhibition sintering process	2019
2	Dr B Madhu	Experimental approach on improving the yield of fresh water in solar stills	2021
3	Dr G Surendar	Conceptualization and Evaluation of Unmanned Amphibious Aerial Vehicle for Water Quality Assessment	2021
4	Dr Tesfaye Kebede Ali	Experimental Investigations and Optimization Studies for Enhancing Compressive and Impact Strengths of SIS Parts	2021
5	Dr N V S SSagar	Design of monocoqueQuadcopter Structure through integration of Topology Optimization and Additive Manufacturing	2021
6	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 4<sup>th</sup> Nov. to 3<sup>rd</sup> Dec., 2013
2. Visited **Tamkang University, Taiwan** to discuss the **Indo – Taiwan** collaborative research project progress during 29<sup>th</sup> Oct. 29 to 9<sup>th</sup> Nov., 2014

3. Visited **Tamkang University, Taiwan** to discuss the **Indo – Taiwan** collaborative research project progress during 1<sup>st</sup> to 27<sup>th</sup> Oct., 2015
4. Visited **University of Victoria, Canada** to discuss the **Indo-Canada** collaborative research project progress during 24<sup>th</sup> May to 9<sup>th</sup> Jun., 2016.
5. Visited **University of Victoria, Canada** to discuss the **Indo-Canada** collaborative research project progress during 1<sup>st</sup> to 9<sup>th</sup> Aug., 2017.
6. Visited **DaeguGyeongbuk Institute of Science and Technology (DGIST), South Korea** to discuss the Indo – Korea collaborative research project progress during 21<sup>st</sup> to 28<sup>th</sup> 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, VelTech Dr.RR & Dr.SR Technical University, Chennai, India.
- Conducted workshop on “Underactuated Robotic Systems and Control”, Aug.17, 2013, Vel Tech Dr.RR & Dr. SR Technical University, Chennai, India.
- Conducted workshop on “Advanced Sensors And Actuators”, 23<sup>rd</sup> and 24<sup>th</sup>, 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 ChandrasekarendraSaraswathiViswaMahaVidyalaya University (SCSVMV), Kanchipuram on 2-3 Feb. 2017
- Organized workshop on “Design Thinking” at Vel Tech RangarajanDrSagunthala R & D Institute of Science and Technology, Avadi, Chennai on 18<sup>th</sup> April 2018.
- Organized workshop on “Unmanned Aerial Vehicles and Industrial Applications” at TBI - Vel Tech, Vel Tech RangarajanDrSagunthala R & D Institute of Science and Technology, Avadi, Chennai on 20<sup>th</sup> 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.
- Organized One Day Event “Research and Industry Symposium on AI / ML / DL Techniques and Applications (RISAI’23)” at Vel Tech, 25<sup>th</sup> March 2023.

### 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 notespeaker-** "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 Dhanalakshmi Srinivasan Institute of Technology, Trichy on 7<sup>th</sup> Feb., 2017
- Delivered a talk titled "Ornithopter and Unmanned Aerial Vehicle", at Imayam Engineering College, Trichy on 8<sup>th</sup> 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 4<sup>th</sup> and 5<sup>th</sup> 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 28<sup>th</sup> Aug. 2018.
- Delivered a guest lecture titled "Insight on the development of UAVs for multifaceted applications", Sri Venkateswara College of Engineering, Chennai on 9<sup>th</sup> Jan. 2019.
- Delivered a guest lecture titled "Applications of UAV: Glimpses of UAV Development", Siddhartha Engineering College, Vijayawada on 8<sup>th</sup> 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 20<sup>th</sup> 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 28<sup>th</sup> 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 26<sup>th</sup> of April 2019, Taichung City, Taiwan.
- **Invited Talk:** "Development of UAVs for Industrial Applications", Drone Club – Inauguration, Karpagam College of Engineering, Coimbatore on 20<sup>th</sup> 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 11<sup>th</sup>- 13<sup>th</sup> 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 3<sup>rd</sup> May 2020.
- **Webinar** on "UAVs for Industrial Applications", Mechanical Engineering Association, Rangarajan Dr. Sagunthala R & D Institute of Science and Technology, Chennai on 12<sup>th</sup> June 2020.
- **Webinar** on "Insight on Development of UAVs for Multifaceted Applications", Premier University, 14<sup>th</sup> July 2020, Chittagong, Bangladesh



- **Webinar** on "UAV for Real World Applications Beyond 5G", Organized by SRM Institute of Science and Technology, 25<sup>th</sup> July 2020, Kattankulathur, Tamilnadu, India
- **Webinar** on "Introduction, Classification and Applications of UAVs", Organized by Govt. College of Engineering, Tirunelveli, Alumni Association, 29<sup>th</sup> July 2020.
- **Webinar** on "Trends, Opportunities and Applications of UAVs", Organized by Vel Tech, 24<sup>th</sup> August 2020.
- **Webinar** on "Glimpses of UAV and its Applications, 9<sup>th</sup> 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 (26<sup>th</sup> – 31<sup>st</sup> Oct 2020) on Additive Manufacturing for Medical and Aerospace Applications, 28<sup>th</sup> Oct 2020.
- **Webinar** on "UAV's for Multifaceted Environments" in the AICTE sponsored online mode Short term training programme (Slot-1) on 16<sup>th</sup> 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 07<sup>th</sup> 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 15<sup>th</sup> Feb. 2021, Rajagopal Polytechnic college, Vellore
- **Jury** for VISAI-2021, 24<sup>th</sup> 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", 1<sup>st</sup> 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", 2<sup>nd</sup> June 2021, Bharath Institute of Higher Education and Research.
- **FDP on** "Introduction to UAVs and Applications", 21<sup>st</sup> July 2021, College of Science and Humanities, Dept. of CSE, SRM Institute of Science and Technology, Ramapuram Campus
- **Workshop** on "Drone / UAV Technology", 10<sup>th</sup> and 11<sup>th</sup> Dec 2021, Sanghamam College, Dindivanam
- **Webinar** on Classification and Application of UAVs, in the FDP Programme on Recent Trends in Robotics and Automation organized by the Electronics and ICT Academies at IIT Roorkee, MNIT Jaipur, NIT Patna, and the Principal Coordinating Academy at PDPM IITDM Jabalpur during July 4 -15, 2022
- **Delivered a talk** on "Insight on Development of UAVs for Industrial Applications", at Rajalakshmi Engineering College, Chennai on 23<sup>rd</sup> September 2022.

- **Delivered a talk** on "Introduction, Classification and Application of UAVs", Karpagam College of Engineering, Coimbatore on 23<sup>rd</sup> November 2022.
- **Delivered a talk** in **ATAL FDP** on "Introduction of UAVs and Industrial Applications", at Amrita School of Engineering, Chennai Campus, AmritaVishwaVidyapeethamon 13<sup>th</sup> December 2022.
- **Delivered a talk on** " How to write research funding proposal", at Vel Tech MultitechEngg. College, Avadi, Chennai on 7<sup>th</sup> March 2023.
- **Delivered a talk** on "UAV Industrial Applications and Perspectives", in the "Skill Development in Electronics for TVET Trainers and Planners" at NITTTR, Taramani, Chennai on 15<sup>th</sup> March 2023.
- **Delivered a talk in ATAL FDP** titled "Applications of Aerial Vehicles", conducted by Sri Eshwar College of Engineering, Coimbatore on 5<sup>th</sup> September 2024.

### 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. Accreditor for Asia Pacific Accreditation and Certification Commission (APACC), Colombo Planning Staff College (CPSC), Philippines.
2. GATE – 2000 Scholarship.
3. National Overseas Scholarship by Govt. of India – 2006 to pursue Ph.D. at abroad through which completed Doctoral Studies at Concordia University.
4. National Level Competition - Secured 1<sup>st</sup> 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>.
5. Dedicated faculty Award – Vel Tech University – 2013.
6. International Travel Grant – 2014 (DST–SERB under International Travel Support Scheme)
7. 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>
8. National Competition - VISAI 2015 - Won Best Project Award in Mechanical Stream competing over 50 Colleges / Universities.
9. World Wide Competition - Secured 2<sup>nd</sup> Prize under the category of "Future of Technology"-Organized by Future Ideas Foundation, 2015.
10. Reviewer for Journal of Applied Science and Engineering, Tamkang University, Taiwan.
11. Reviewer for Journal of Advances in Mechanical Engineering, SAGE publications.
12. Reviewer for Science China Technological Sciences, Springer
13. Session Chair for "IEEE Madras Section Student Paper Contest 2016" held at Vel Tech University on 21 and 22 Oct, 2016.

14. 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)**