

SANKAR BALASUBRAMANIAN

Design Researcher — XRAI Developer — Mechanical Engineer

E-mail: sankarb@iisc.ac.in
Phone: +91 94889 64408
LinkedIn: [Sankar Balasubramanian](#)
GitHub: [sankar-mechengg](#)
Behance: [Design Portfolio](#)
Website: [Personal Website](#)

Address:
VR Space,
SCALE Lab,
Department of Design and Manufacturing (DM),
Indian Institute of Science (IISc), Bangalore,
Karnataka, India. Pin: 560012

1. Career Objective

A Dynamic Mechanical Engineer and Dedicated Design Researcher specialising in Computational Product Design, Artificial Intelligence and Extended Reality. With a strong commitment to continuous learning & constantly exploring opportunities to expand my skill set and evolve as an expert in human-computer interaction. Captivated by & currently en route in using Generative AI for enhancing the conceptual phase, which is the early stages of the engineering design process. A firm believer in a future envisioned through XRAI (Extended Reality (XR) and Artificial Intelligence (AI), which will revolutionise human perception and our everyday activities.

2. Academic Information

Ph.D. in Product Design & XR (CGPA: 8.30/10) (2020-present)

- Applied Geometry & Mechanisms Lab (AGML), Mechanical Engineering, Indian Institute of Science (IISc), Bangalore.
- *Title of Thesis:* GEMINI: An Active Ideation System using Creative Machines
- *Supervisor:* Prof. Dibakar Sen

M.E. in Engineering Design (CGPA: 9.34/10) (2015-2017)

- Department of Mechanical Engineering, Government College of Engineering (GCE), Tirunelveli.
- *Title of Thesis:* Experimental Study on the Mechanical Behaviour of *Prosopis juliflora* Fibres as a Potential Reinforcement for Fibreglass Boat Hull
- *Supervisor:* Prof. Selwin Rajadurai

M.B.A. in Professional Management (*Part Time*) (2015-2017)

- Department of Management Studies, M.S. University, Tirunelveli.

B.E. in Mechanical Engineering (CGPA: 8.91/10) (2010-2014)

- Department of Mechanical Engineering, Government College of Engineering (GCE), Tirunelveli.
- *Title of Project:* CFD Analysis to Understand the Performance Enhancement of a Newly Designed Helical Coil Heat Exchanger in the Tuticorin Thermal Powerplant
- *Supervisor:* Prof. Selwin Rajadurai

HSC (94.33%) & SSLC (93.80%) (2008-2010)

- A.V.Rm.V. Matriculation Higher Secondary School, Tirunelveli.
- *Stream:* Mathematics, Physics, Chemistry, and Biology

3. Work Experience	<p>Assistant Professor — Mechanical Engineering (Jul 2017 - Aug 2020)</p> <ul style="list-style-type: none"> • <i>Institute:</i> Thiagarajar College of Engineering, Madurai - 625015 • <i>Courses Taught:</i> Machine Design, Design Thinking, Product Design and Development, Lateral Thinking, Engineering Mechanics, Kinematics and Dynamics, Solid Mechanics, Finite Element Analysis <p>Teaching Assistant (Jan 2023 - Apr 2023)</p> <ul style="list-style-type: none"> • <i>Institute:</i> Indian Institute of Science (IISc), Bangalore - 560012 • <i>Course:</i> PD235 - Mechanism Design <p>Teaching Assistant (Jan 2024 - Apr 2024)</p> <ul style="list-style-type: none"> • <i>Institute:</i> Indian Institute of Science (IISc), Bangalore - 560012 • <i>Course:</i> ME200 - AI Assisted Programming
4. Skills:	
4.1. Technical Skills	<ul style="list-style-type: none"> • Unity Game Engine & C# Programming • Graphics - OpenGL & C++ Programming • Computer Vision - OpenCV & Python Programming • UI & Graphics Design - Figma & Blender • CAD Modelling & Simulation - Solidworks & Fusion 360 • Scientific Computation - Matlab
4.2. Fields of Interest	<ul style="list-style-type: none"> • Human-Computer Interaction • Product Concept Sketching • eXtended Reality(VR/AV/MR/AR) • Creative Engineering Design • Computer Graphics • Product Design • Computer-Aided Design • Computational and Applied Geometry • Computer Vision
4.3. Soft Skills	<ul style="list-style-type: none"> • Work Ethics • Leadership • Consistency • Self Discipline
4.4. Other Skills	Git, Gravity Sketch, ShapesXR, Sketchbook Pro, Concepts, Meshroom, Meshlab, Grasshopper, Processing, Rhino, Qt Design Studio, Tableau, Photoshop
4.5. Courses Credited	<i>Computer Graphics and Scientific Visualisation, Human-Computer Interaction, Data Structures and Algorithms, Computer-Aided Design (CAD), Creative Engineering Design (CED), Robotics, Algorithmic Art and Visualisation, Dynamics and Control of Mechanical Systems, Engineering Mathematics</i>

5. Projects:

5.1. Design Projects

Product Design & Development:

- *An Automated Device for Removal of 3D-Printed Parts from Build Platforms*
- *Resistive Stretch Sensor (RSS) Band for Interaction in Virtual Environments*
- *GAITMATE: A Portable Device for In-place Locomotion in Virtual Environments*
- *3DTTT: A 3-Dimensional Tic Tac Toe Game that never ends in a draw*
- *An Upper Limb Exoskeleton for Stroke Patients*

Application Design & Programming:

- *Ghost Basketball: A VR-based Basketball Simulation Game with a Ghostly Twist*
- *ZenVR: A VR-based Game for Anxiety Management, First Prize in IEEE SSH24*
- *HerbVRium: A VR-based Simulation for Understanding Medicinal Plants in AYUSH*
- *AuraTouch: An App for 3D Model Navigation using IMU and Flex Sensor.*
- *Typing Signature: A Novel Biometric-based authentication system using piezoelectric sensors*
- *GENIE: A Moodboard-cum-Sketching Application for designers using Generative AI to generate new ideas and develop concepts*
- *EUPHORIA: A VR-based Application for automated selection of form elements using Eye-tracking and Implicit attention mechanism*
- *MAGICS: An Idea Evaluation Application using Vector Embeddings and Clustering Techniques*
- *DIMES: A Version Management Application for recording the sketch strokes and the thoughts of the designer during concept sketching*
- *Ballet Sketch: A Virtual Reality-Based Application for Mid-Air Direct 3D Sketching*
- *RoboSense: A Matlab-based Application for Controlling a Virtual Robotic Serial Manipulator using Mobile Phone Sensors*
- *SenseiAI: A Web application for evaluating and enhancing sustainability of products*
- *LoadGenX: An Application for Automatic Generation of CAD Models and Drawings of Standard Joints, Shafts and Couplings based on external loading conditions*
- *HAMOT: A Matlab-based App to Understand the Effect of Position and Velocity Control Modalities for a Bionic Device*
- *FAMOT: An Open-Source Virtual Reality Application for Target Achievement Control Evaluation of Upper Limb Motor Functions*
- *An Augmented Reality-Based Application for tracking outlines of real-world objects into 3D sketches*
- *Visualization of Vortex Shedding in 3D Flow Around a Confined Square Cylinder using Tracking Graphs*

- 5.2. Research Projects**
- Application of Knowledge-Based Engineering (KBE) for Rapid Design of Right Angled Valves and Heat Exchangers** (2019-2020)
- *Skills used:* Product Design, Python, Solidworks
- Evaluation of Honeycomb Layer as a Reinforcement in the Design and Fabrication of a Novel Foldable Helmet** (2019-2020)
- *Skills used:* Fusion 360, Composites, Generative Design
- An Inquisitive Study on the Mechanical Behaviour of Al6061-SiC Metal Matrix Composite Using Conventional and Microwave Heating** (2018-2019)
- *Skills used:* Comsol, Stir Casting, Heat Treatment
- Experimental Investigation and Numerical Simulation of Anti-vibration Gloves to Prevent HAVS in Human Labour Handling Industrial Power Tools** (2017-2018)
- *Skills used:* Product Design, Comsol, Arduino
- Experimental Validation and Numerical Simulation of Residual Stresses in Rotary Friction Welding** (2017-2018)
- *Skills used:* Rotary Friction Welding, Ultrasonic Diffraction Method, Comsol
- 6. Publications**
- Sankar B et al. (2025), "**FAMOT: An Open-Source Virtual Reality Application for Target Achievement Control Evaluation of Upper Limb Motor Functions**", *International Society for Virtual Rehabilitation (ISVR) - RehabWeek 2025*, (Book Chapter Name), Chapter No., DOI.:
 - Joe Thomas, Muzammil Bagewadi, Sankar B, Rajath S and Vishal Singh (2025), "**Design Principles as a Lens for Dimensions of User Experience: A Case Study using a New 3D Tic Tac Toe Game**", *25th International Conference on Engineering Design (ICED)*, (Book Chapter Name), Chapter No., DOI.:
 - Sankar B et al. (2025), "**From h-index to AIMS: A Multi-dimensional Model for Comprehensive Research Impact Assessment**", *10th International Conference on Research into Design (iCoRD)*, (Book Chapter Name), Chapter No., DOI.:
 - Sankar B et al. (2024), "**Semantic Characterization and Expert Validation of AI-Ideation using Vector Embeddings**", *Journal of Engineering Design*, Taylor & Francis, (Submitted & Awaiting Revision)
 - Sankar B et al. (2024), "**A Novel Mathematical Framework for Objective Characterization of Ideas through Vector Embeddings in LLM**", *arXiv*, Cornell University, DOI: 10.48550/arXiv.2409.07578
 - Sankar B et al. (2024), "**A Novel Idea Generation Tool using a Structured Conversational AI (CAI) System**", *Artificial Intelligence for Engineering Design, Analysis and Manufacturing (AIEDAM)*, Cambridge University Press, (Accepted & Awaiting Publication)
 - Sankar B et al. (2024), "**A Novel Automated Device for Removal of 3D Printed Parts from Build Platforms**", *15th International Conference on Industrial Problems on Machines and Mechanisms (IPRoMM)* - Best Paper Award
 - Sankar B et al. (2024), "**Design and Characterization of a Novel, Low-Cost Resistive Stretch Sensor Band for Interactions in HCI Applications**", *15th International IEEE Conference on Computing, Communication and Networking Technologies (ICCCNT)*, DOI: 10.1109/ICCCNT61001.2024.10724103

- Sankar B et al. (2023), "**A Novel Version Control Scheme for Supporting Interrupted Product Concept Sketching**", *9th International Conference on Research into Design, Design in the Era of Industry 4.0*, Volume 3, Chapter 33, DOI: 10.1007/978-981-99-0428-0-33 - Best Paper Award
- Sankar B et al. (2023), "**Overcoming Ideation Bottlenecks using Conversational AI**", *9th International Conference on Product Lifecycle Modelling, Simulation & Synthesis* - Best Paper Award
- Dubbaka Siri, Sankar B (2023), "**Ethical Decision Making for Social Robots in Elderly Care Scenario: A Computational Approach**", *ICSR 2023, Lecture Notes in Computer Science*, Vol 14453, Springer Nature, Singapore, DOI: 10.1007/978-981-99-8715-3-13
- B. Sankar, M. Saravanan, K. Kumar and S. Dubakka (2023), "**Transforming Pixels into a Masterpiece: AI-Powered Art Restoration using a Novel Distributed Denoising CNN (DDCNN)**", *International Conference on Emerging Techniques in Computational Intelligence (ICETCI)*, Hyderabad, India, 2023, pp. 164-175, DOI: 10.1109/ICETCI58599.2023.10331299
- Supriya S., Selwin Rajadurai J., Sankar B (2015), "**A Numerical Study of Interface Effect on the Effective Thermal Conductivity of Glass Microsphere Filled Polymer Composites**", *International Journal of Applied Engineering Research* 10(4)2015: pp. 8967 – 8980
- Sankar B et al (2013), "**Powering the Car by using Carbon Fibres**", DOI:10.13140/RG.2.1.1451.9926

7. Patents

- Patent (Utility) - A Motorized Device for removal of the 3D printed part from 3D printers - *202441015992*
- Patent (Utility) - Collapsible, Adaptable, Modular and Portable Hangar System for Aircrafts - *202441093394*
- Patent (Utility) - A Protective Covering for Helicopters - *202341080816*
- Patent (Utility) - Biometric Authentication System using Novel Typing Signatures - *202521020306*
- Patent (Utility) - Interactive Recovery Equipment, Device, System and Method for Forearm Rehabilitation using a Gamified Approach - *202521026225*
- Patent (Design) - Interactive Recovery and Rehabilitation Device -
- Patent (Design)- Resistive Stretch Sensing (RSS) Band - Granted - *420267-001*
- Patent (Design)- An Electric Vehicle with a Single Carbon Fibre Body - Granted - *372034-001*
- Patent (Design) - 3D Tic Tac Toe - Granted - *401762-001*
- Patent (Design) - Electric Tic Tac Toe - Granted - *40211-001*
- Patent (Design) - Longitudinal Folding Hangar for Aircrafts - Granted - *411971-001*

8. Achievements & Awards & Recognition

- First Prize in NPCI Pravega Hackathon 2025, IISc Bangalore (For SereneVR)
- Runner-up in Idea Pitch Hackathon at HIVE Conclave 2025, IIT Mandi (For GAITMATE)
- Best Performance Award, Best Innovation Award and Best Coding Award—IEEE SSH 2024 (For ZenVR)
- Second Position in NVIDIA Art Restoration Hackathon at ICETCI 2023 (For DDCNN)
- National Level First Prize in Siemens Healthineers Innovation Think Tank Program (ITTCP), 2021 (For Portable Insulin Unit)

- Best Poster Award at IUCEE EPICS Conference at Hyderabad (For Foldable Helmet)
- Conferred as an Elite Academician from DST and TI Inc.
- University First Rank Holder & Best Outgoing Student (PG)
- University Eleventh Rank Holder (UG)
- GATE-ME Merit Scholarship (2015-17)
- Central Sector Merit Scholarship Scheme for graduate studies

9. Trainings & Programs

- Eminent Resource Person
 - *Workshop:* A One-Day Workshop on "Engineering Design"
Location: iHub, Indian Institute of Technology (IIT), Mandi
Outcome: Participants from industries learnt the process of Engineering Design
 - *Workshop:* A One-Day Workshop on "A Crash Course in Product Design"
Location: Indian Institute of Technology (IIT), Mandi
Outcome: Eight Teams of 4 students each conceptualized and created mock-up prototypes for various design problems
 - *Workshop:* A One-Day Hands-On Workshop on "AR-based Mobile App Development using Unity"
Location: RIPPLES, Open Day 2024, Indian Institute of Science (IISc), Bangalore
Outcome: Participants were taught to develop a Pokemon-Go AR App
 - *Workshop:* A One-Day Hands-On Workshop on "Creative Learning using AR and VR"
Location: Santhanam Vidhyalaya Senior Secondary School (CBSE), Trichy
Outcome: Teachers were given hands-on training on developing AR apps using unity for creative classroom education
- Summer Faculty Research Program (SFRF)
 - Indian Institute of Technology (IIT), Delhi
 - *Project Topic:* Numerical Simulation of Microwave Processing of Metal Matrix Composites using Comsol
- Faculty Development Programs & Short Term Courses
 - Design Thinking Course - Dr William Oakes, EPICS, Purdue University
 - Topper in Python Programming Course - NPTEL
- Certifications
 - Distinguished Paper Award at iCoRD' 23, PLMSS '23, IPRoMM '24
 - Certified Solidworks Professional (CSWP) - Dassault Systems
 - Freehand Outline and Model Drawing - DOTE, Tamilnadu
 - National Level First Prize in Essay Writing Competition - Ministry of Shipping, India
 - Won a Fellowship Grant for PG Project from Tamilnadu State Council for Science and Technology (TNSCST)

10. Roles & Responsibilities

- Life Member - Association for Designers of India (ADI)
- Student Member - ACM (Association for Computing Machinery) (1734505)
- Student Member - AMM (Association for Machines and Mechanisms) (A20240027)
- Associate Member - The Design Society (DS02828)
- Student Member - Design Research Society
- IEEE Member (99648614)
- Founder - Team Eureka - Electric Mobility Design Club
- Secretary - College Science Club (GCE)
- Editor-In-Chief - College Magazine (GCE)

11. Beyond Curriculum

Software Design: Development of applications using AR and VR
Hardware Design: Design and develop products that cater to the needs of society

12. Personal Snippet

Father's name: S. Balasubramanian
Mother's name: S. Angels Rajamani
Date of Birth: 04 Nov 1992
Languages Known: English, Tamil, Hindi

13. References:

- Dr. Dibakar Sen
Professor and Research Supervisor
Department of Design and Manufacturing (erstwhile CPDM)
Indian Institute of Science (IISc), Bangalore-560012
E-mail: dibakar@iisc.ac.in
- Dr. Selwin Rajadurai
Professor and PG Thesis Supervisor
Department of Mechanical Engineering
Government College of Engineering, Srirangam-620012
E-mail: j_selwinrajadurai@yahoo.co.in
- Prof. Somesh Subramanian
Assistant Professor and Faculty Advisor
Department of Mechanical Engineering
Government College of Engineering, Tirunelveli-627007
E-mail: someshsub@yahoo.co.in