Dr. Raja Munusamy's Profile

Academic Qualification

Year	Degree	University/Institution
1985	B.Sc	Madras University, Madras
1987	M.Sc	Indian Institute of Technology, Madras
1990	M.Tech	Indian Institute of Technology, Delhi
2002	Ph.D	Indian Institute of Technology, Madras

Professional Experience

Period	Organization	Designation
5.2021 – till date	Reliance Industries Ltd	Senior Vice President
	Hydrogen Supply System	
10.2019 – 4.2021	Mahindra Electric Mobility Ltd.	Senior General Manager(L3)
	Head, System Engineering, Verification & Validation	
09.2017-10.2019	Tata Motors Ltd	Senior General Manager(L2)
	Head Advanced Engineering - Technology Development	
06.2015 - 07.2017	Tata Motors Ltd	Assistant General Manager(EG3)
	Head Advanced Engineering - Technology Development	
08.2012 - 06.2015	Tata Motors Ltd	Assistant General Manager(EG3)
	Head Tata Motors Research Centre	
07.2009 - 07.2012	Tata Motors Ltd	Assistant General Manager(EG4)
	Head Tata Motors Research Centre	
08.2004 - 07.2009	Tata Motors Ltd	Divisional Manager
	Head Tata Motors Research Centre	
08.2003 - 07.2004	National Taiwan University of Science & Technology	Postdoctoral Researcher
02.1991 - 07.2003	SPIC Science Foundation, Chennai	Senior Scientist

Skills and Competencies

Technical / functional

- Hybrid vehicles
- Electric Vehicles
- Fuel Cell vehicles
- Fuel Cell Systems

- Hydrogen Systems for bus applications
- Power Electronics(Hardware and control algorithms)
- Motors for traction applications
- Batteries and Battery Management systems(Hardware and control algorithms)
- Control Systems for hybrids, EVs and fuel cell bus
- Power Electronics-Inverter, DC-DC Converter
- EV charging facility for EVs
- System Engineering of Hybrid and EV power train development
- Functional safety – ISO 26262
- EMI&EMC – Ensuring compliance in design and aggregate selection and certification of hybrids, EVs
- Design and development of Diagnostics & prognostics on hybrids, EVs and fuel cell EVs

Development of hybrid and EV power train aggregates and indigenisation

- Motor controller
- Various Motor Technologies
- DC-DC Converter
- On-board charger
- Electronic controller with functional safety for EVs
- Fuel Cell power system aggregates
- Fuel Cell stack

Development of hybrid and EV power trains

- Electric power train LCV and SCV
- Electric power train for EV buses
- Electric power train for Passenger cars
- Fuel Cell power train for bus

Leadership Practices

- Innovation Management
- Drive for results
- Functional Excellence
- Strategic capability
- People Development
- Building Effective Teams
- Taking Ownership
- Interpersonal Effectiveness
- Managing vision and purpose

Job Responsibilities at Tata Motors Ltd:

- Lead and managed the Advanced Engineering department to create a competitive edge / strategic advantage for the company in business and to have better negotiating ability with suppliers by more knowledge to save time & costs. Localisation of aggregates of battery and fuel cell power trains for automotive applications
- CollaboratIion with IIT, IISc and ISRO for developing Motor controller, Motor, fuel cell and battery technologies

Work experience:

- Hybrid / Electric / Fuel Cell Vehicle projects (Vehicle System Engineering for xEVs)

- Development of subsystems / components for xEVs through vendors where easily available and through in-house Competency projects for knowledge / low volume requirements.
    - Power Electronics, Electric Motors, Energy Storage Systems (Batteries, Ultra-capacitors)
    - Embedded Systems design and development (Hardware, Software, Verification& Validation)
    - Hybrid, battery and fuel cell Electric Vehicle Control
    - Battery packs and Fuel Cell Systems
    - Plant modelling for Hardware Ii Loop, Software In Loop, Model In Loop with sufficient fidelity as required for the application purpose
    - Thermal Analysis(motor/battery cooling, Fuel Cell System)
- Design and development of control systems for Hybrids, EVs and fuel cell vehicles
- Reduce development and iteration times by deploying advanced tools like Matlab-Simulink, Dymola, Labview, Ansys-Maxwell-Simplorer, COMSOL, CATIA, PRO-E, ORCAD-pSpice, dSpace, Opal-RT, NI-cRIO, Rapid Prototyping Controllers (RPC), and advanced methods like Mathematical Modelling,
- Testing by Model-In-Loop (MIL), Software-In-Loop(SIL) and Hardware-In-Loop Systems (HILS).
- Creation of infrastructure for hybrid Powertrain, Motor & Controller Testbed, Battery testing equipment, Fuel Cell power system Test Bench, etc.
- Encourage and create environment to generate many IPRs (patents, copyrights, papers, etc).
- Encourage continuous learning & create a culture for technical excellence for skilled employee retention
- Manage capital and revenue budgets and allocation of resources to projects as needed
- Rationalize, prioritize and plan the list of projects for effective delivery using available resources

Improvement and implementation of Process

- Create multidisciplinary teams & organization structure for smooth functioning & successful outcomes
- Continuously review progress of projects to give timely guidance for speedy & correct execution
- Reallocate / augment resources if needed to ensure timely completion of high priority projects
- Operated projects of executed multi-locations
- Technology strategy planning and developing strategic technology partner and also development and vendor development
- Adaptation and functional safety – ISO 26262 and recommend change in management and recommend process for ensuring safety in the design, manufacture and service
- Support to other departments to enhance the above competencies & to create new ones as required and also support the vehicle design and development

Aggregates design and development

- Handled disruptive Advanced Technology projects (Fuel Cell systems, Hydrogen systems. Fuel cell power system for fuel cell bus, Electric Vehicles and Range Extended Electric Vehicles)
- Fuel cell power system design and development
- Strategy for design, develop and manufacturing and indigenisation of hybrid and EV aggregates like motor, motor controller, DC-DC converter and on-board charger
- Design and development of Battery packs and Battery management system hardware and control algorithm
- Implementation of prognostics and IVHM system for Hybrids, EVs and fuel cell bus

- Creation EV charger facility for testing of EVs

Vehicle projects – Design, develop and manufacturing

- Diesel Hybrid bus
- Electric cars
- Electric Bus
- Fuel Cell bus

Infrastructure planning and creation

- Creation of infrastructure for testing hybrid, EV, fuel cell power trains and aggregates like Motor, power electronics, Wiring harness and Electronic control units
- Creation HIL based testing facility for testing communication protocol between charger and vehicle
- Development process for performance and quality assurance testing of aggregate like motor, power electronic aggregates
- Creation of EV charging infrastructure and Hydrogen refuelling infrastructure
- Hydrogen refuelling station for testing fuel cell bus

Govt. collaborative Projects handled

- DSIR funded fuel cell bus project – Designed and developed fuel cell power system and Hydrogen systems for fuel cell buses with collaboration of ISRO and IISC, Bangalore
- MNRE projects – Obtained grant for technology demonstration of fuel cell bus
- IISC- Design and development of motor controller under Uchitar Avishkar Yojana program, Govt of India
- IISC- Design and development of methanol based REEV under Uchitar Avishkar Yojana(UAY) program, Govt of India

Coordination with Govt agencies

- ISRO – Principal investigator for the ISRO collaborated fuel cell bus project
- DSIR – Presented fuel cell bus development project under Technology development and demonstration and executed the project
- MNRE &IOCL- Presented fuel cell bus Technology demonstration project and
- IISc and IIT – Identification collaborative projects and execution
- SIAM – Member of Frontier Technology group and represented TML
- PESO – Represented TML for obtaining necessary approvals for Hydrogen storage on-board and off-board, hydrogen refuelling and testing of fuel cell bus in TML Sanand
- ARAI – Coordination with ARAI for formulation standards for fuel cell power system and hydrogen system aggregates and Certification of fuel cell bus
- CIRT – Provisional certification of fuel cell bus technology demonstration in public

Patents filed and papers published

- No of patents : 6 nos
- No of papers: 6 Nos

Regards
Raja M