

# **ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**Shobhavan Campus, Mijar, Moodbidri - 574225**

(Affiliated to Visvesvaraya Technological University, Belagavi)

Approved by AICTE, New Delhi & Recognized by Government of Karnataka)



Research Activity Report on

## **“ALVA'S CENTER FOR ADVANCED RESEARCH”**

(Common Research Facility for UG-PG-PhD Projects)

**Academic Year**

**2022 - 2023**

**PRINCIPAL**

**Alva's Institute of Engg. & Technology,  
Mijar, MOODBIDRI - 574 225, D.K**

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## **1. Research Activity Report of ACAR during Academic year 2022-23**

At ACAR, our collaborative efforts with TIFR and IIT Bombay have resulted in 2 Elsevier publications, while partnerships with neighboring institutes such as MIT-Manipal, NMAMIT, and Alva's College have led to an additional 26 publications in 2022-23. Our research encompasses diverse areas, including the development of a breath ammonia sensor for early renal disease detection, the enhancement of theoretical knowledge in quantum chemical calculations, the creation of electrochemical discharge machined micro-channels for hydrogen evolution in fuel cells, the achievement of superhydrophobicity on copper surfaces through electrochemical etching, and the advancement of piezoelectric micro-cantilevers and beams for low-frequency vibration sensors and energy harvesting applications.

## **2. Research Student Details of academic year 2022-23**

### **Internal Ph.D Student Details**

Sl.No.	Name of Ph.D Student	Research Guide details
1)	Mrs. Rashmi K.R USN: Department of Physics Alva's institute of engineering and technology	Dr. Jayarama A Associate Professor Department of Physics Alva's institute of engineering and technology Shobhavan Campus, Mijar, Moodbidri – 574225
2)	Mrs. Shubhava Shetty USN: Department of Physics Alva's institute of engineering and technology	
3)	Mr. Ganesh V.N Assistant Professor Mangalore Institute of Engineering and Technology Moodbidri	
4)	Mrs. Niju Rajan Department of Electronics and Communication Engineering Alva's institute of engineering and technology	Dr. Manjunatha D.V Professor and Head Dept of Electronics And Communication Engineering Alva's institute of engineering and technology

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### External Ph.D Student details

Sl.No.	Name of Ph.D Student	Research Guide details
1)	Mr. Sandesh Kumar Rai Research Student Dept, of ECE MIT Manipal	Dr. Jayarama A (Co-Guide) Associate Professor Department of Physics Alva's institute of engineering and technology Shobhavan Campus, Mijar, Moodbidri – 574225

### 3. Submitted Research Proposals:

Submitted Research Proposals:						
Sl. No	Funding Agency	Title	Budget (Lakhs)	Date of Submission	Status	Investigators
1	DST-SERB	Design, development and Experimental Evaluation of a novel high efficiency hydrogen fuel cell - supercapacitor Hybrid Power Source	69.3	19-02-2023	Under Review	Dr. Shounak De (MIT Manipal-PI) Dr. SOMASHEKARA BHAT (MIT Manipal-Co-PI) Dr. Jayarama A (AIET-PI) Dr. Richard Pinto (AIET-Co-PI)
2	DRDO	Development of novel prototype high performance hydrogen fuel cell stacks	94.6	05-05-2023	Under Review	Dr. Jayarama A (AIET-PI) Dr. Richard Pinto (AIET-Co-PI) Dr. Prashant

		powered by photo-catalytic green hydrogen				S Kulkarni, DIAT (Collaborator)
3	CPRI	Photocatalytic Generation of Green Hydrogen and Development of Novel Low Cost, High Performance Hydrogen Fuel Cell Stacks	62.3	21-02-2023	Presented, decision is pending	Dr. Satyanarayan (AIET-PI) Dr. M G Ananda Kumar (CPRI-Co-PI) Dr. Jayarama A (AIET-Co-PI) Dr. Richard Pinto (AIET-Co-PI)
4	DST (INDO-SWEDEN)	Development of smart dustbins powered by hydrogen fuel cells for plastic degradation	149.5	16-08-2022	Under Review	Dr. Siddhartha Duttgupta (IITB-PI) Dr. Arnab Dutta (IITB-Co-PI) Dr. Jayarama A (AIET-Co-PI) Dr. Richard Pinto (AIET-Co-PI) Dr. Jiayin Yuan (SU-PI) Dr. Ola Wendt (LU--Co-PI) Dr. Mikhail Vagin (LPU--Co-PI)
5	MNRE	Development of prototype street light integrated with solar powered ex-situ hydrogen fueled high performance	80.2	17-07-2022	Under Review	Dr. Siddhartha Duttgupta (IITB-PI) Dr. Sanjog Nagarkar (IITB-Co-PI) Dr. Jayarama

		hydrogen fuel cell stacks				A (AIET-Co-PI) Dr. Richard Pinto (AIET-Co-PI)
6	VGST KFIST-II	Creation of nanostructured Stainless Steel and Aluminium surfaces for realizing Superhydrophobicity using Neodymium doped Yttrium Aluminum Garnet (Nd: YAG) laser	30	05-05-2023	Submitted	Dr. Satyanarayan (PI) Dr. Jayarama (Co-PI)
7	VGST KFIST-I	A Cost-Effective and Eco-Friendly Solution for Enhanced Plastic Degradation, Upcycling, and Fuel-Compost Generation in Urban and Rural Areas"	20	05-05-2023	Submitted	Dr. H.G Umeshchandra (PI) Dr. Jayarama (Co-PI)
8	VGST-GRE	Real-time non-destructive detection of freshness of food items  using artificial nose based on FT-IR spectroscopy	40	10-05-2023	Submitted	Dr. Damodaran (PI) Dr. Jayarama (Co-PI)
9	VGST-GRE	Enabling Clean Energy Independence: Transforming Household Waste into Hydrogen for Urban and Rural	40	19-05-2023	Submitted	Dr. Yuvaraj (PI) Dr. Jayarama (Co-PI)

		Communities				
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#### 4. Collaborations

**ACAR has active collaboration with following Research faculty**

Sr.No	Name	Designation	Address
1	Dr. Shriganesh Prabhu	Associate Professor, TIFR Mumbai	FOTON Group, TIFR Mumbai, Dr. HomiBhabha Road, Navy Nagar, Colaba, Mumbai, Maharashtra 400005, Phone: 022 2278 22782932, C-224 Email : prabhu@tifr.res.in
2	Prof. Siddhartha P. Duttagupta	Professor, IIT Bombay	Electrical Engineering IIT Bombay, Powai Mumbai 400 076 India Phone:+91-22-2576-7866 Ph: 9833886730 Email: sdgupta@ee.iitb.ac.in
3	Dr. Pradeep Dixit	Assistant Professor, IIT Madras	Department Of Mechanical Engineering Indian Institute Of Technology Bombay , IIT Powai, Mumbai, Mumbai City, Maharashtra-400076 Email: dixit.pradeep@gmail.com
4	Dr. Poornesh KK	Assistant Professor, NITK, Surathkal	Department of Mechanical Engineering, National Institute of Technology, Karnataka, Surathkal
5	Dr. Y. Narayana	Professor, Mangalore University	Department of Physics, Mangalore University Konaje, D.K District, Karnataka Tel:

6	Dr. Iddya Karunasagar.	Advisor (Research and Patents)	Advisor (Research and Patents) Nitte University University Enclave, Medical Sciences Complex, Deralakatte Mangalore-575018, India Tel: 9481202750
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## 5. Research outcome/Publications

- 1) S. Shetty, D. Kumar Mishra, P. Dixit, S.S. Shetty, A. Jayarama, A.P. shah, M.R. gokhale, S. Prabhu, S.P. Duttagupta, R. Pinto, Etching of micro-channels in fused quartz for novel device applications, Mater. Today Proc. (2023). <https://doi.org/https://doi.org/10.1016/j.matpr.2023.07.253>.
- 2) V. Patil, P. V Reshmi, S. Prajna, Yashaswi, Yashaswini, D. Haleshappa, A. Jayarama, R. Pinto, Degradation mechanisms in PEM fuel cells: A brief review, Mater. Today Proc. (2023). <https://doi.org/https://doi.org/10.1016/j.matpr.2023.03.603>.
- 3) K. Deekshitha, M.S. Rao, N. Rebello, A.T. Ramaprasad, A. Jayarama, R. Pinto, A novel cross-linked PVA-Chitosan composite membrane for heavy metal filtration applications, Mater. Today Proc. 66 (2022) 2493–2498. <https://doi.org/https://doi.org/10.1016/j.matpr.2022.06.487>.
- 4) V.N. Ganesh, S. Tejaswini, A. Jayarama, S. Bhat, C. Shantharama Rai, R. Pinto, Optical and photoluminescence studies of precursor stabilised Aluminium-Gallium Zinc oxide thin films, in: Mater. Today Proc., 2022. <https://doi.org/10.1016/j.matpr.2021.12.571>.
- 5) S. Anil Lobo, D. V Manjunatha, A. Jayarama, R. Pinto, Simulation & analysis of PZT/ P (VDF-TrFE) cantilever beams for health monitoring of building and structures, Mater. Today Proc. 66 (2022) 2594–2597. <https://doi.org/https://doi.org/10.1016/j.matpr.2022.07.151>.
- 6) S. V. S., S.S. Shetty, S. Bhat, J. A., R. Pinto, Effect of precursor dilution solvents on the growth of V2O5 thin films using spray pyrolysis, Mater. Today Proc. 66 (2022) 2499–2503. <https://doi.org/https://doi.org/10.1016/j.matpr.2022.06.488>.



- 7) V.N. Ganesh, Swathi, A. Jayarama, S. Bhat, C.S. Rai, R. Pinto, Optical and photoluminescence studies of precursor stabilized gallium zinc oxide thin films, in: Mater. Today Proc., 2022. <https://doi.org/10.1016/j.matpr.2022.01.194>.
- 8) V.N. Ganesh, D. Kavya, A. Jayarama, S. Bhat, C. Shantharama Rai, R. Pinto, Optical band gap and photoluminescence studies of precursor optimized Indium-Gallium Zinc oxide thin films, in: Mater. Today Proc., 2022. <https://doi.org/10.1016/j.matpr.2022.01.189>.
- 9) V.N. Ganesh, C.M. Sanil, A. Jayarama, S. Bhat, C.S. Rai, R. Pinto, Growth of precursor stabilized IZO thin films and study of their optical and photoluminescence properties, in: Mater. Today Proc., 2022. <https://doi.org/10.1016/j.matpr.2022.01.182>.
- 10) V.N. Ganesh, K.R. Anila, A. Jayarama, S. Bhat, C. Shantharama Rai, R. Pinto, Spray pyrolysis deposited aluminium-indium zinc oxide thin films and study of their electrical and photoluminescence properties, Mater. Today Proc. 55 (2022). <https://doi.org/10.1016/j.matpr.2022.01.053>.



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**Signature of the Coordinator**