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KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE
Opp : Yerragattu Gutta, Hasanparthy (Mandal), WARANGAL - 506015, TELANGANA, INDIA
काकतीय प्रौद्योगिकी एवं विज्ञान संस्थान, वरंगल - ५०६०१५, तेलंगाना, भारत
కాకతీయ సాంకేతిక విజ్ఞాన శాస్త్ర విద్యాలయం, వరంగల్ - ౫౦౬ ౦౧౫ తెలంగాణ, భారతదేశము
(An Autonomous Institute under Kakatiya University, Warangal)
(Approved by AICTE, New Delhi; Recognised by UGC under 2(f) & 12(B); Sponsored by EKASILA EDUCATION SOCIETY)
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Annual Report for Academic Year 2018-19

Center of Excellence

INDO-AMERICAN ARTIFICIAL HEART PROJECT (IAAHP)

IAAHP TEAM

				
Prof. K. Eswaraiah **Dept. of ME**	**Prof. K. VenuMadhav** **Dept. of EIE.**	**Dr. G. Ganesh Kumar** **Dept. of ME**	**Dr. A. Madhukar Rao** **Dept. of EEE**	

by
IAAHP Team KITSW

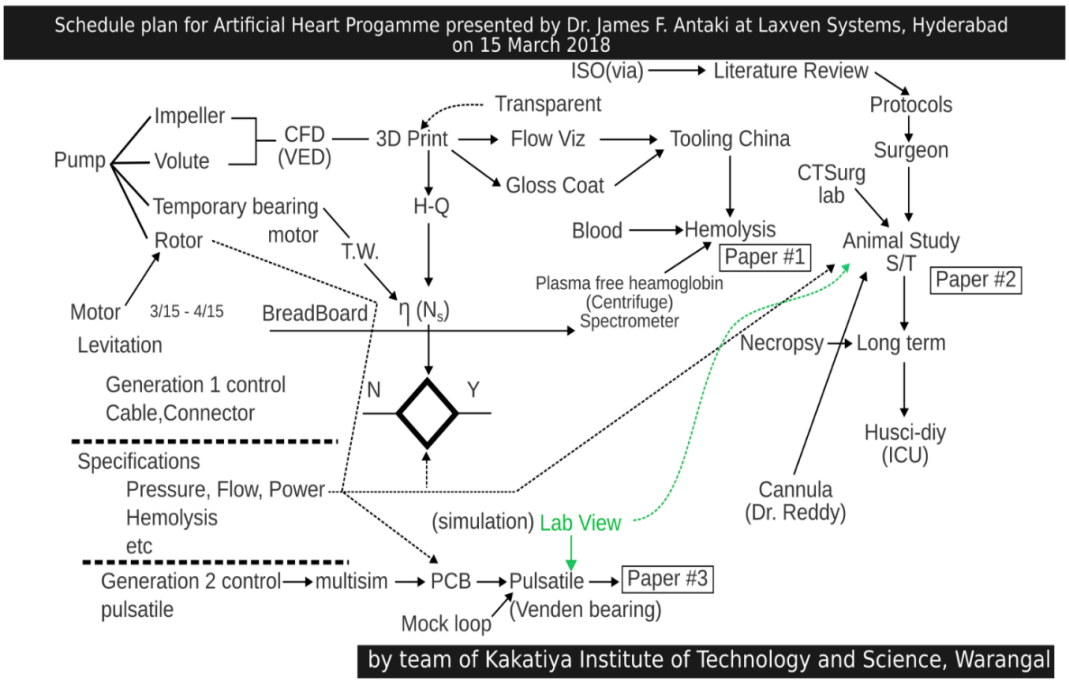
EXPECTED OR TARGET FROM KITSW:

AIM OF THE PROJECT:

THE TEAM IS STRIVING HARD TO DESIGN, DEVELOP, MARKET THE CENTRIFUGAL PUMP IN INDIA WITH LOW COST.

1. Perform CFD analysis and generate H-Q curves.
2. Design and develop Mock up Loop Test rig for testing of Blood
3. Execute Hydrodynamic test on Mocjk Up loop Test Set up
4. Design a 3-D Centrifugal pump in CATIA used in Centrimag pump.
5. Perform Computational Fluid Dynamics (CFD) Analysis using ANSYS Fluent software (Research Version purchased by KITSW) and run the program in Work station (purchased by KITSW) to generate H-Q Curves.
6. Plot the Simulation curves and 3-D printing models of a Centrimag Pump used in Total Artificial Heart (TAH).
7. Develop a 3-D printed models using Mark forge Mark Two/Form 3B+ 3D-Printing Machine
8. Perform the trail runs (both hydrodynamic and Haemolysis test) on the mock up setup.
9. Support PBS to perform an Animal Testing at Palamuru Bio Sciences (PBS) to modify and remodel the pump

METHODOLOGY IN REACHING THE TARGETS:



VARIOUS STAGES TO REACH THE TARGET:

I. Installation of Laboratory and Literature Survey
II. Design the Ex Corporeal Pump Model using Modelling Software
III. Perform the CFD Analysis using H-Q Curves
IV. Install Mock-up Loop test Set Up for performing hydrodynamic and Hemolysis test
V. Remodel the pump based on results obtained in hydro-dynamic test
VI. Complete the Hemolysis test and analyse the plasma generated from the Hemolysis test using Spectrometer. Remodel until NIH reaches 0.0001
VII. Perform the Animal Testing and remodel the pump based on the survival rate of the animal
VIII. Perform the test on human being
IX. Patent the product
X. Release the product into the market

WHERE ARE WE NOW:

We are now in Stage VI i.e., Completed the Hemolysis test and analysed the plasma generated from the Hemolysis test using Spectrometer. We have remodelled the pump to reach NIH reaches 0.0001

TARGETS ALREADY COMPLETED BY KITSW TEAM:

1. Installed a Mock Loop Test rig at KITSW for performing Hydrodynamic testing of an ex-corporal centrifugal pump.
2. Developed a Mock up loop test rig for Haemolysis test for Centrimag pump.
3. Supported PBS to perform an Animal Testing at Palamuru Bio Sciences (PBS) for number of times with the help of IAAHP Team.Now the animal was able to survive for 7 hours.
4. Performed a vast Literature Survey on Patents and publications pertaining to Centrimag pump to publish a patent.
5. Installed a test rig to study the properties of a Ring Magnet used in Left Ventricular Assisted Device (Centrimag Motor).
6. Developed a CAD Program to assemble the designed pump model using glue and further automated the gluing process using Hyrel 3 D printing Machine which reduced the gluing time to 30 seconds.
7. Made a Memorandum of Understanding (MoU) with Share India.

8. Sponsored One student (B19ME126L - Mr. Rahul) from our institute to study the properties of Ring Magnet used Centrimag Motor.
9. Fabricating a Die for manufacturing the Pump in collaboration with Vasantha Tool Crafts for performing Hemolysis Test

Tasks being in performed by KITSW team:

1. Developing a Von Willebrand Factor (vWF) test rig for evaluation of vWF with the collaboration with Dr. P. Naveen Chander Reddy, MAD, AIG Hospitals and Dr. Suman Kapoor, BITS, Hyderabad.
2. Striving hard to reduce the gluing time to 3 seconds
3. A student Mr. Rahul Vennam (B19ME127) was sponsored to perform his B. Tech Project at Laxven Systems, Cherlapally, Hyderabad to study the properties of a Ring Magnet.
4. Performing Haemolysis tests on Centrifugal pump made of Poly Carbonate which was developed by Karthik Moulds using Poly Carbonate to reduce NIH to 0.0001.
5. Trying to Automate Gluing Process on a 3D printing Model of a Centrifugal pump using Poly Carbonate.

OUTCOMES

Organized Three Faculty Development Programmes.

1. Organized "A One Week Faculty Development Programme on **Research Methodology (RM-18)** from 7-11 January, 2019" atKakatiya Institute of Technology and Science, Warangal**.**
2. Organized "A One Week Short Term Training Programme on **Hands on Programme on ANSYS Software (HPAS)** from 12-16 November, 2018", Kakatiya Institute of Technology and Science, Warangal.

Publications:

3. **KarthikNaganathan, LavanithTogaru**, "Design and Optimization of Formula Car Suspension System", JETIR June 2019, Volume 6, Issue 6.

Details of Expenditure for Academic Year 2018-19:

S. No	Details of Expenditure	Item Details	Amount in INR
Expenditure Spent:			
1	Major Equipment Purchased/ Purchase of Software:	Personal Computer, HP Work station, ANSYS Software, UPS	₹22, 64, 298.00
2	Incentives/ Sponsorship/TA-DA/ Rent Allowance etc., to	Eg. Visit to USA by Dr. K. Venu Madhav and Dr. G. Ganesh Kumar, Onyx	₹6, 516.00

	Faculty/others	Material	
Total (Twenty Two Lakhs Seventy Thousand Eight Hundred and Fourteen only)			**₹ 22,70,814.00**

List of Major equipment available /Facilities Available in IAAHP Lab till this academic Year:

S. No	Name of the Equipment/ Software	Cost of the equipment/ Software in ₹	Purpose of the equipment
3D Printer			
1	Flash forge Dreamer Dual Extruder -Think 3D	85,000-00	To generate the experimental models of an artificial heart pump
2	ANSYS 19.2	5, 01, 500-00	To Simulate the fluid flow through pump
3	WORKSTATION-HP Z8 Work Station	10,68,000-00	To Generate H-Q Curves of an Artificial Heart Pump
Approximately Total Cost Spent Till Now including Sponsored faculty is about (Twenty Two Lakhs Seventy Thousand Eight Hundred and Fourteen only)			**₹ 22,70,814.00**

Activities performed as a part of IAAHP:

S. No.	Mile Stone with Date	Details
1	First visit of Dr. PS Reddy to KITSW on 12.02.2018	

2	Initiation of IAAHP at KITSW on 15/03/2018	

3	Visit to CBIT to attend meeting with International members of IAAHP on 18.03.2018	 

4	Second Meeting at KITSW during Second Visit of PS Reddy scheduled on 04.08.2018	 
5	Visit to USA by Dr. K. Venu Madhav and Dr. G. Ganesh Kumar to attend 64th ASAIO Conference during 16-18 June 2018 AND attend 3rd International Symposia, Pittsburgh, @ USA 3 Day Symposia at Pittsburgh 19 June 2018	 

6	Interaction with Department Faculty to bring the awareness on IAAHP	  Prof. K. Eswaraiah, Head, MED, KITSW and Dr. G. Ganesh Kumar, Associate Professor, MED addressing the gathering in the department faculty meeting about IAAHP held on 28.07.2018 in MSH, B-III 210 at 3.30 PM
7	Establishment of IAAHP Laboratory on 14-Oct-2018	 

5	Conduction of FDP on HPAS from 10-Nov-2018 to 16-Nov-2018	 

Visited Sipra Labs, Palamur Bio Science to select the appropriate location for Animal Testing 28.01.2020

Visited Vasantha Tool Crafts to understand the equipment available for the purpose

IAAHP KITSW team Members:

The following are the members involved in IAAHP in KITSW during 2022-23:

1. Prof. K. Eswaraiah, Prof. & HoD, ME, IAAHP, Chairman, KITSW
2. Dr. K. Venu Madhav, Prof. &HoD, EIE, IAAHP, Member, KITSW
3. Dr. G. Ganesh Kumar, Assoc. Prof., of ME, IAAHP, Member, KITSW
4. Dr. A. Madhuka Rao, Assistant Prof., of EEE, IAAHP, Member, KITSW