Parul™ University

GOPALAKRISHNAMURTHY PAIDIPATI
<gopalakrishnamurthy.paidipati@paruluniversity.ac.in>

Fwd: Global Grand Challenges Summit Satellite Events - SE19\1\16

ENGG DEAN <enggdean@paruluniversity.ac.in> 25 July 2019 at 10:21
To: GOPALAKRISHNAMURTHY PAIDIPATI <gopalakrishnamurthy.paidipati@paruluniversity.ac.in>

Sir, we need to meet regarding the same. Kindly give your convenient time.

-------- Forwarded message --------
From: **Meredith Ettridge** <gms@raeng.org.uk>
Date: Tue, Jul 23, 2019 at 3:09 PM
Subject: Global Grand Challenges Summit Satellite Events - SE19\1\16
To: <enggdean@paruluniversity.ac.in>

Dear UNNATI JOSHI

Scheme: Global Grand Challenges Summit Satellite Events
Reference: SE19\1\16

I am delighted to let you know that your application for funding to host a Global Grand Challenges Summit Satellite Event has been successful, and I write with details of the next steps and some queries:

- We will shortly be sharing a contract so please do sign that as soon as possible so that we can make the first payment

-If beneficial we would be happy to offer a fully funded place to attend the Summit in person and link back to your event, please let me know as soon as possible if useful so that we can start visa processes.

- We note that the event will cost £3500 which you are covering elsewhere alongside the £10,000 from us. It would be a condition that the £3000 budgeted for honorariums would be covered by the additional funding source and not the Academy, I hope that is achievable.

- If you have any concerns regarding the delivery of this event please let me know as soon as possible.

Please do not hesitate to contact us if you have any queries about this email.

Best wishes

The International Team
The Royal Academy of Engineering

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We understand your world

M/S. RAE G C S EVENT 2019 UNIT OF PARUL UNI
C/O PARUL UNIVESITY PARUL AROGYA
SEVA TRUST BH APOLO TYRES LINDA TA
WAGHODIA
VADODARA 391760
GUJARAT INDIA

JOINT HOLDERS :

Nomination : Not Registered

Account Branch : SANGAM CHAR RASTA BRANCH
Address : GROUND FLOOR 35 AND 36, SHAJANAND SOCIETY, NEAR SANGAM CHAR RASTA,HARNI-WARASIYA RD
City : VADODARA 390018
State : GUJARAT
Phone no. :
OD Limit : 0.00
Currency : INR
Email : DRPARUL@PARULUNIVERSITY.AC.IN
Cust ID : 133705141
Account No : 50100311626072 OTHER
A/C Open Date : 28/08/2019
Account Status : Regular
RTGS/NEFT IFSC: HDFC0009277 MICR : 390240031
Branch Code : 9277 Product Code : 145

From : 01/09/2019 To : 18/10/2019

Statement of account

Date	Narration	Chq./Ref.No.	Value Dt	Withdrawal Amt.	Deposit Amt.	Closing Balance
20/09/19	FT - CR - 50100269520370 - R AND D CENTR E UNIT OF PARUL UNIVERSITY	0000000000000163	20/09/19		658,500.00	658,500.00
20/09/19	CASH DEP SANGAM CHAR	000000000000000	20/09/19		100,350.00	758,850.00
30/09/19	CHQ PAID-MICR CTS-MU-PIYU CATERERS	0000000000000002	30/09/19	225,126.00		533,724.00
01/10/19	CREDIT INTEREST CAPITALISED	000000000000000	30/09/19		779.00	534,503.00
07/10/19	NEFT CR-SANGAM CHARRASTABRANCH-371484-98 DR - 57500000322702 - NEFT DUMMY ACCOUN T-GUJARAT	0000000000000003	07/10/19	371,484.00		163,019.00
07/10/19	NEFT RETURN-ACCOUNT DOES NOT EXIST-MR N IKUNJKUMAR M PATEL-RETD191007848597	N280190947854107	07/10/19		2,000.00	165,019.00
07/10/19	FT - DR - 09611460001770 - SAIFULLAH NUR MAMAD BADI	0000000000000004	07/10/19	3,000.00		162,019.00
07/10/19	CHQUE NO-000004 MULTIPLE TRANSFER -6 DR - 50100293421940 - VORA NIKUNJ ARVINDBH AI	000000000000000	07/10/19	2,000.00		160,019.00
07/10/19	CHEQUE NO-000004 MULTIPLE TRANSFER-6 DR - 02111140002323 - PRANAV BHARAT GADHIA	000000000000000	07/10/19	384.00		159,635.00
07/10/19	CHEQUE NO-000004 MULTIPLE TRANSFER-6 DR - 00061140047251 - UPADHYAY CHETANKUMAR DINESHBHAI	000000000000000	07/10/19	2,400.00		157,235.00
07/10/19	CHEQUE NO-000004 MULTIPLE TRANSFER-6 DR - 02111140002323 - PRANAV BHARAT GADHIA	000000000000000	07/10/19	6,000.00		151,235.00
07/10/19	CHEQUE NO-000004 MULTIPLE TRANSFER-6 DR - 00061140047251 - UPADHYAY CHETANKUMAR DINESHBHAI	000000000000000	07/10/19	6,000.00		145,235.00
10/10/19	FT - CR - 50100269520370 - R AND D CENTR E UNIT OF PARUL UNIVERSITY	0000000000000185	10/10/19		200,000.00	345,235.00
10/10/19	NEFT DR-ORBC0101136-MR NIKUNJKUMAR M PAT EL-SANGAM CHAR -N283190950810649	0000000000000017	10/10/19	2,000.00		343,235.00
14/10/19	NEFT CHGS BRN INCL GST 101019-MIR1928523	MIR1928523654810	14/10/19	2.36		343,232.64

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Account Status : Regular
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Branch Code : 9277 Product Code : 145

From : 01/09/2019 To : 18/10/2019

Statement of account

	654810					
15/10/19	CHQ PAID-MICR CTS-MU-STUDIO FILIMGKA	0000000000000012	15/10/19	37,620.00		305,612.64
15/10/19	CHQ PAID-MICR CTS-MU-UMAKANT TRADERS	0000000000000010	15/10/19	108,342.00		197,270.64
15/10/19	CHQ PAID-MICR CTS-MU-ANUBHAV EVENTS	0000000000000016	15/10/19	56,614.00		140,656.64
15/10/19	CHQ PAID-INWARD TRAN-K 10 HOSPITALITY	0000000000000014	15/10/19	30,841.00		109,815.64
17/10/19	CHQ PAID-TRANSFER IN-VIRAL PRODUCTS	0000000000000009	17/10/19	17,700.00		92,115.64

STATEMENT SUMMARY :-

Opening Balance	Dr Count	Cr Count	Debits	Credits	Closing Bal
0.00	15	5	869,513.36	961,629.00	92,115.64

Generated On: 18-Oct-2019 16:38 **Generated By: 126685672** **Requesting Branch Code: NET**

This is a computer generated statement and does not require signature.

HDFC BANK LIMITED
*Closing balance includes funds earmarked for hold and uncleared funds
Contents of this statement will be considered correct if no error is reported within 30 days of receipt of statement.The address on this statement is that on record with the Bank as at the day of requesting this statement.
State account branch GSTN:24AAACH2702H1Z6
HDFC Bank GSTIN number details are available at https://www.hdfcbank.com/personal/making-payments/online-tax-payment/goods-and-service-tax.
Registered Office Address: HDFC Bank House,Senapati Bapat Marg,Lower Parel,Mumbai 400013

الرقم : .....

التاريخ : .....

المرفقات : .....

جامعة حائل
University of Ha'il

المملكة العربية السعودية
وزارة التعليم العالي
Kingdom Of Saudi Arabia
Ministry of Higher Education

To Whom It May Concern

Date: 31st August 2022

This letter is provided on request of **Dr. Mitesh Patel** to confirm his collaborative involvement as a **"Co-Investigator"** in a Group Research Project on **"Hail Development"** titled ***"Development of bioplastics using polyhydroxybutyrate accumulating bacteria from organic wastes of Hail region: Green alternative for sustainable environment".*** The project was awarded by Research Deanship at University of Hail, Saudi Arabia with Grant No. RD-21093 for which I was the Principal Investigator. Duration of the project is 10 months approved on March 2022 and total approved amount was 30000 SAR (Approx. 570000 INR).

If you require further information, please do not hesitate to contact me

Yours Sincerely,

Dr. Mohd Adnan ***(BSc, MSc, PGDip, MRSB, PhD)***
Associate Professor
Department of Biology, College of Sciences
University of Ha'il, Ha'il, PO Box 2440
Kingdom of Saudi Arabia
Ext: 1044, Tel: +966-533642004
E-mail: mo.adnan@uoh.edu.sa
www.uoh.edu.sa

الرقم : .....

التاريخ : .....

المرفقات : .....

جامعة حائل
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Kingdom Of Saudi Arabia
Ministry of Higher Education

To Whom It May Concern

Date: 31st August 2022

This letter is provided on request of **Dr. Mitesh Patel** to confirm his collaborative involvement as a **"Co-Investigator"** in a Group Research Project on **"Molecular Diagnostics and Therapeutics Unit"** titled ***"Anti-Quorum Sensing and Antibiofilm Potential of Saponins Derived from Ajwa Date Fruit (Phoenix dactylifera L.) against Multispecies Biofilm Consortia of Pathogenic Bacteria".*** The project was awarded by Research Deanship at University of Hail, Saudi Arabia with Grant No. MDR-22027 for which I was the Principal Investigator. Duration of the project is 10 months approved on April 2022 and total approved amount was 50000 SAR (Approx. 900000 INR).

If you require further information, please do not hesitate to contact me

Yours Sincerely,

Dr. Mohd Adnan ***(BSc, MSc, PGDip, MRSB, PhD)***
Associate Professor
Department of Biology, College of Sciences
University of Ha'il, Ha'il, PO Box 2440
Kingdom of Saudi Arabia
Ext: 1044, Tel: +966-533642004
E-mail: mo.adnan@uoh.edu.sa
www.uoh.edu.sa

Royal Academy of Engineering Version 02/23

TSP-2325-5-IN\197

Transforming Systems through Partnership 23/25 (India) Contract

This Contract (the 'Contract') is made on the date it is signed by the authorised representative of the Academy and is between:

(A) **The Royal Academy of Engineering** incorporated by Royal Charter of 3 Carlton House Terrace, London SW1Y 5DG, Registered Charity 293074 ('the Academy').

(B) **Parul University**, VADODARA, INDIA ('the Recipient').

Background:

(A) This Contract contains the terms and conditions of an Award to be made by the Academy under its Transforming Systems through Partnership 23/25 (India) programme, the purpose of which is to solve pressing development and sustainability challenges by supporting academics to work with industry, government and the public to build trust, design appropriate solutions and scale their uptake.

(B) The details of the Award are set out in Annex A to this Contract.

(C) N/A

(D) N/A

(E) N/A

It is agreed as follows:

1. Definitions

'the Application' means the original application for the Award made by the Recipient, a copy of which is included in Annex F.

'the Award' means the award of a grant whose details are set out in Annex A.

'Award Start Date' and 'Award End Date' shall mean the dates given in Annex A.

'the Awardee(s)' means any person(s) who is named as Awardee in the Application, as the context may require.

'the Award Letter' means the letter or email from the Academy addressed to the Awardee(s) confirming the Award as detailed in Annex A.

N/A

'the Collaborator(s)' means the individuals or institutions named in the Application (also listed in Annex A) who will work with the Awardee(s) on the Programme of Activities

N/A

'the Co-Recipient' means the university/organisation in the UK that will also be receiving monies as part of the Award.

N/A

'the Recipient' means the university / organisation named above which will be formally receiving the Award.

'Mandatory Activities' means the events and activities referred to in Clause 5.6 and Annex B.

'Not applicable' means this clause is not relevant to this Contract and has been redacted. The clause number remains in place to maintain the accuracy of any clauses which refer to other clauses.

'Online Grant System' means the Academy's online application and assessment software program through which the Application was submitted and assessed, and will be managed and monitored.

N/A

'the Programme of Activities' means those activities specified in the Application, subject to any additional, excluded or amended activities detailed in clause 3.2.

'Report' means any written report required to be submitted by the Awardee(s) under Clause 5.1.

N/A

'Statement of Expenditure' means the statement of expenditure required to be submitted by the Recipient under Clause 5.1.

2. Grant of Award and conditions of Grant

2.1 The Academy undertakes to provide the Award to the Recipient in accordance with the provisions of this Contract. In the event of any conflict or inconsistency between the terms of this Contract and the Award Letter, or any other communication between the parties, the terms of this Contract shall prevail.

2.2 For the avoidance of doubt, the Award will not be activated and the Academy will not be obliged to pay any part of the Award to the Recipient until (a) the Contract has been received by the Academy duly signed by or on behalf of the Recipient; and (b) the Contract has been countersigned by the authorised signatory on behalf of the Academy. The Academy will not accept liability for any expenses incurred prior to the fulfilment of conditions (a) and (b) above.

2.3 The Award is conditional on the Academy being satisfied that the following conditions have been fulfilled:

2.3.1 A contract has been signed between the Recipient and the Collaborators within three months of the Award Start Date committing the Collaborators to contribute to the delivery of the Programme of Activities,

2.3.2 The contract with the Collaborators does not conflict with any of the terms and conditions specified in this contract,

2.3.3 The contract with the Collaborators is to be treated by the Recipient as a contract to provide the Collaborators with sufficient access to resources, including funding where appropriate, to contribute to the delivery of the Programme of Activities and not a consultancy agreement to procure research services.

2.3.4 N/A

2.3.5 N/A

2.3.6 The contract with the Collaborator(s) confirms that the Collaborator(s) will comply with any due diligence checks requested by the Recipient in pursuit of the Programme of Activities, and that the Awardee(s) and Collaborator(s) will align with the Global code of conduct for research in resource-poor settings.

2.4 The Award is conditional on the Awardee(s) being employed by the Recipient in a suitable role or having an alternative legal relationship with the Recipient approved by the Academy in writing. The Recipient will procure that the Awardee(s) will not undertake any other paid work, hold any other form of paid office or employment or interrupt the Award to pursue other activities without the prior written consent of the Academy, except that this consent will not be required for up to a combined total of four hours of teaching duties, administrative duties and consultancy work per week. If any variation is approved the Academy reserves the right to adjust the Monitoring Schedule at Annex B and the Schedule of Payments at Annex C accordingly.

2.5 N/A

2.6 The Recipient shall put in place suitable contractual arrangements with the Awardee(s) and any other relevant third parties and will ensure that the Awardee(s) is made aware of any relevant obligations required to be met by the Recipient under this Contract for which the Awardee(s)'s contribution is required, including but not limited to the provision of any Reports.

2.7 The Award must be acknowledged by the Recipient and the Awardee(s) in any materials or publications regarding or resulting from the Award, and in any written or spoken presentations about the Award, in the following form (or such other form as the Academy has approved in writing): "*This Grant/Award/project was supported by the Royal Academy of Engineering under the* Transforming Systems through Partnership 23/25 (India) *programme.*"

2.8 The Awardee(s) is entitled to take maternity, parental, paternity, or adoptive leave if such leave is in accordance with the terms and conditions of their contract of employment. The Recipient will notify The Academy in writing of any such leave periods as early as reasonably possible.

2.9 The Academy's approval must be sought in advance and in writing for changes detailed below. The Awardee(s) should specify any reasons for the requested changes, and may at the Academy's request be required to provide further information. The Recipient and the Awardee(s) will be notified of the Academy's decision in writing. However, no additional funding will be provided if these variations are made, subject to Clause 2.11 (if applicable).

2.9.1 the Award Start Date.

2.9.2 the Award End Date.

2.9.3 the re-allocation of expenditure between different cost categories, as specified in Annex F.

2.9.4 a change from full to part-time employment, or from part-time to full-time, or any other change in the Awardee(s)'s employment status, or other changed circumstances affecting the Awardee(s)'s ability to work on the Programme of Activities as envisaged in this Award.

2.10 N/A

2.11 Where the Academy is funding a proportion of the award holder's salary the Recipient can claim a proportion of the first six months of additional salary costs from the Academy for each separate maternity, parental, paternity or adoptive leave period. The proportion reimbursed by the Academy must be through application of the Recipients internal policies, pro-rated based on the proportion of salary funded by the Academy and less any statutory contributions. In exceptional circumstances the Academy will consider requests to reimburse at a higher proportion.

2.12 N/A

3. Programme of Activities

3.1 The Recipient will ensure that before the Programme of Activities starts all the necessary legal regulatory and ethical requirements for the conducting of the Programme of Activities are met and that all necessary licences, consents (including visas) and approvals are obtained, and that these are maintained during the period of the Award.

3.2 The Recipient shall procure the carrying out by the Awardee(s) of the Programme of Activities including the additional or amended activities and outputs (if any) specified in Annex F, and shall not use the Award for any of the excluded activities specified in Annex F.

3.3 Where the Programme of Activities is not funded in full by the Award the Recipient shall allow the Awardee(s) to seek additional external funding in order to carry out the Programme of Activities.

3.4 The Recipient undertakes to provide funding for any additional costs not covered by the Award which are necessary for the successful completion of the Programme of Activities.

3.5 The Award is cash-limited and no supplementary funding will be provided by the Academy to complete the Programme of Activities in event of a shortfall.

3.6 The Recipient undertakes to support the Awardee(s) in the Programme of Activities and to ensure access to any facilities specified in the Application and any other facilities necessary for completion of the Programme of Activities.

3.7 The Recipient shall not allow any Award monies to be used other than for the purposes of the Programme of Activities. The Recipient is responsible for ensuring the Academy's Terms and Conditions of Award with respect to these funds are clearly communicated and transferred in writing to any and all collaborating parties in receipt of these Grant funds, regardless of whether transferred directly by the Academy or by the Recipient themselves.

3.8 The Awardee(s) must notify the Academy in writing that the Programme of Activities has started by submitting an Initiation Report, by the date given in Annex B. This notification will be provided through the Online Grant System.

3.9 The Recipient shall not modify or alter the Programme of Activities without the prior written consent of the Academy.

3.10 The Recipient will ensure that the results of the Programme of Activities are disseminated publicly within twelve months of the Award End Date (unless the Academy has agreed in writing to a longer period).

4. Payment of the Award

4.1 The payments to be made by the Academy to the Recipient and Co-Recipient are set out in Annex C.

4.2 Once this Contract has been signed by both parties in accordance with Clause 2.2 and any conditions specified in Clause 2 have been met the Academy shall make payments to the Recipient and Co-Recipient according to Annex C. The Recipient and Co-Recipient will complete Annex D with the necessary banking information required to process the payments. The Recipient and Co-Recipient are not required to submit invoices for payment and all payments will be made to the bank accounts provided.

4.3 Each payment will be conditional upon receipt by the Academy of any and all Reports which fall due prior to the relevant payment date, in accordance with Clause 5.1. Reports must be of a satisfactory standard to release payment, as determined by the Academy.

4.4 The Academy will deduct from the final payment (a) any underspend on the Programme of Activities which is evident from the Statement of Expenditure and (b) any funds not spent exclusively on the Programme of Activities, and if the amount to be deducted exceeds the amount of the final payment then no final payment will be made and the balance due shall be refunded to the Academy by the Recipient and/or Co-Recipient within four weeks of the Award End Date.

4.5 No interest shall accrue on any sums not paid by the Academy on the due dates, or withheld in accordance with the terms of this Contract.

4.6 N/A

5. Reports and Monitoring

5.1 The Awardee(s) will submit written Reports to the Academy of the description, and by the dates specified in Annex B. These Reports shall follow the guidelines provided by the Academy, and include:

5.1.1 a Statement of Expenditure incurred covering the cost categories included in the Application,

5.1.2 a report, or reports, detailing progress made towards the completion of the Programme of Activities and any outputs specified in Annex F. This can include, as required, narrative reports, quantitative information relating to the Programme of Activities, mentoring, training events, outcomes and outputs.

5.1.3 such other information as the Academy may reasonably request.

5.2 N/A

5.3 N/A

5.4 The Recipient and any Collaborators shall cooperate with any evaluation consultant appointed by the Academy to carry out a long-term evaluation of the programme. The Awardee(s) shall liaise and meet with the evaluation consultant as often as the evaluation consultant deems appropriate. The Academy will make the Awardee(s)'s Reports and contact details available to the evaluation consultant for review.

5.5 At the request of the Academy, the Recipient and Co-Recipient will permit the Academy and its representatives access upon reasonable notice to the Recipient's premises and to the Awardee(s) for the purposes of monitoring the progress of the Programme of Activities.

5.6 The Recipient shall ensure that the Awardee(s) shall attend all Mandatory Activities specified in Annex B. The Academy shall reimburse reasonable travel and accommodation expenses related to the Mandatory Activities, and the Awardee(s) must submit the expenses claim to the Academy within four weeks of the event date. If the Awardee(s) fails (without the prior approval of the Academy) to attend any Mandatory Activities, the Academy may at its discretion withhold, reduce or suspend any Award payments due to the Recipient.

6. Other obligations of the Recipient

6.1 The Recipient shall ensure that Awardee(s) shall comply with any policies of the Academy that are brought to its attention in writing including but not limited to those policies referred to in Annex E.

6.2 The Recipient shall comply with all applicable laws and regulations relating to (a) anti-discrimination under the Equality Act 2010 and (b) anti-bribery and anti-corruption under the Bribery Act 2010 and not engage in any activity, practice or conduct which would constitute offences under these Acts and any similar legislation in the UK or overseas.

6.3 The Recipient shall comply with all relevant obligations under the Data Protection Act 2018 and any other UK data protection laws, and in particular will ensure that the Awardee(s) has been notified that their personal data will be shared with the Academy and its external funders for the purpose of the operation and administration of this agreement.

6.4 The Recipient and Co-Recipient will keep complete and accurate accounts of expenditure on the Award (including the expenditure of any sub-contractors) and the Programme of Activities and allow the Academy or its representatives (on reasonable notice) to inspect such accounts and take copies.

6.5 The Recipient will promptly inform the Academy in writing of any change in the status of the Recipient or the Awardee(s) or of any other circumstance which might affect its ability to comply with the terms of this Contract.

6.6 The Recipient shall ensure that the Awardee(s) acknowledge the Academy's financial contribution in all publications regarding or resulting from the Programme of Activities, in the form specified in Clause 2.7 or as otherwise agreed to by the Academy.

6.7 The Recipient shall ensure that all uses of the Academy's logo conform to the Academy's requirements, as notified by the Academy to the Recipient from time to time.

6.8 The Academy may refer to the making of the Award, the names of the Recipient, the Collaborator(s), and the Awardee(s), the general aims of the Award, and may collate data with that of other Awards to summarise progress made, in any reports to its funders and in any publicity material.

6.9 The Recipient will promptly notify the Academy of any formal investigation against the Awardee(s) which is ongoing at the Award Start Date or subsequently which relates to the conduct of the Awardee(s) including (but not limited to) matters such as harassment, bullying, and any breach of the law or applicable Codes of Conduct or any of the terms of the relevant employment contract.

6.10 The Recipient will not without the previous agreement of the Academy dispose of or change the use of any tangible or intangible asset (including copyright) which has a value of £10,000 or more which has been purchased by the Recipient using the Award.

6.11 The Recipient agrees to endorse the commitments of the Concordat to Support Research Integrity and must have in place formal written procedures and policies to promote and ensure compliance with the commitments. In particular the Recipient commits to adhere to the highest standards of professionalism and integrity and agrees to have procedures in place to ensure that the activity is conducted in accordance with standards of best practice; systems to promote integrity; and transparent, robust and fair processes to investigate alleged research misconduct.

6.12 The Recipient and Awardee(s) will have full regard to risks that the technology and know how developed with the programme of activities might be misused by a state to control or repress their population, or adapted by a foreign state's military against UK interests. The Recipient and Awardee(s) should notify the Academy of any concerns that arise that the knowledge is being misused in this way, recognising that the Academy will inform the UK government of these concerns.

6.13 The Recipient and Awardee(s) based in the United Kingdom will take note of the guidance provided by the UK's CPNI on Trusted Research (https://www.cpni.gov.uk/trusted-research), the Export Control Joint Unit on the application of export controls to academic research (https://www.gov.uk/guidance/export-controls-applying-to-academic-research) and Universities UK on Managing Risks in Internationalisation (https://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2020/managing-risks-in-internationalisation.pdf). The Recipient and Awardee(s) will treat these guidelines and the associated risks with the requisite level of care and diligence. The Recipient will ensure that researchers and research staff are aware of and comply with the legal and regulatory frameworks relating to applied research and controlled technology, particularly export controls and the Academic Technology Approval Scheme,

highlighting that they apply to applied research collaborations, and intangible items such as knowledge and IP, as well as physical goods.

6.14 The Recipient shall promptly inform the Academy if the contract between the Collaborator(s) and the Recipient referred to in Clause 2.3 is terminated or otherwise amended for any reason.

6.15 N/A

6.16 N/A

6.17 In the exceptional circumstance that the Academy does not request the return of unspent funds following the completion of the Award, the Recipient will ensure remaining funds are used by the Awardee for purposes aligned with the charitable nature of the Award.

7. Intellectual Property

7.1 The Academy will not own or be granted a licence under any intellectual property rights relating to or resulting from the Programme of Activities.

7.2 The Recipient will ensure that the ownership and use of the intellectual property rights in any results derived from the Programme of Activities are agreed in writing between the Recipient, the Awardee(s) and all other necessary parties before the Award Start Date specified in Annex A. The Recipient will supply details to the Academy on request.

7.3 The Recipient will ensure that all background or existing intellectual property rights required to undertake the Programme of Activities are agreed in writing between the Recipient, the Awardee(s) and all other necessary parties before the Award Start Date. The Recipient will supply details and/or a copy of the agreement to the Academy on request.

7.4 N/A

8. Safeguarding concerning sexual exploitation, abuse or harassment

8.1 The Recipient shall take reasonable steps to prevent actual, attempted or threatened sexual exploitation, sexual abuse or sexual harassment by its employees.

8.2 The Recipient shall take reasonable steps to ensure that individuals are enabled to report concerns and complaints of actual, attempted or threatened sexual exploitation, sexual abuse or sexual harassment.

8.3 The Recipient shall adopt and follow robust procedures for the reporting and investigation of actual, attempted or threatened sexual exploitation, sexual abuse or sexual harassment by its employees, including reporting such matters to the relevant authorities.

8.4 The Recipient shall report to the Academy (to the extent permitted by law) any complaints received of actual, attempted or threatened sexual exploitation, sexual abuse or sexual harassment (a 'Safeguarding Disclosure') about, by or from its

employees or those representing the Recipient, where the complaint is relevant to persons or activities funded by the Grant.

8.5 The Recipient shall report to the Academy (to the extent permitted by law) if the Recipient becomes aware of a Safeguarding Disclosure where the complaint is relevant to persons or activities funded by the Grant.

8.6 Provided that in complying with its obligations under 8.4 and 8.5 above, the Recipient shall provide an outline of the complaint and details of the action being taken by the Recipient but shall not be required to provide any personal data.

9. N/A

10. Termination

10.1 Should the Department for Science, Innovation and Technology (or successor department) (or successor organisation) or any other external funder withdraw or reduce the funding of this Award the Academy reserves the right to terminate or suspend this Contract at any time with immediate effect by giving written notice to the Recipient.

10.2 The Academy may also suspend or terminate this Contract by notice in writing if:

10.2.1 the Recipient or the Awardee(s) has provided any false information in connection with the Application or the Programme of Activities; or

10.2.2 the Recipient, or any other Organisation in receipt of Award monies, fails to apply the Award monies for the purposes specified in this Contract; or

10.2.3 the Recipient is in breach of any other provisions of this Contract; or

10.2.4 the Recipient receives funding for the Programme of Activities from alternative sources which covers the same costs as are funded under this Contract (without the prior agreement of the Academy); or

10.2.5 The Academy considers that the Programme of Activities cannot or will not be fulfilled in accordance with the requirements of this Contract, including (but not limited to) the Awardee(s) being unfit or unable to pursue the Programme of Activities or if the facilities required for the Programme of Activities are not available; or

10.2.6 The Academy considers that the arrangements for the exploitation of the intellectual property rights required for and resulting from the Programme of Activities (as referred to in Clauses 7.2, and 7.3) are not in accordance with the Application; or

10.2.7 The Academy considers, based on the Reports and information supplied to date, that the outputs specified in Annex F will not be met; or

10.2.8 N/A

10.2.9 The Academy considers that by reason of their conduct the Awardees are not a fit and proper person to receive the Award or conduct the Programme of Activities; or

10.2.10 The Awardee or Recipient(s) do not observe any UK law related to National Security, or a National Security related concern is not communicated to the Academy; or

10.2.11 The Awardee or Recipient(s) do not supply a National Security Risk Mitigation plan if formally requested by the Academy by the required date; or

10.2.12 The Academy considers that the contract(s) referred to in Clause 2.3.1 is not in accordance with the requirements of this Contract; or

10.2.13 The Recipient(s) show(s) persistent behaviour in such clear variance with the Academy's commitment to diversity and inclusion or other values as to pose a clear risk of bringing the Academy and its work into disrepute.

10.3 If this Contract is terminated by the Academy under clause 10.1, the Academy will reimburse the Recipient up to the maximum value of the Award for all reasonable expenditure incurred prior to the termination date, provided this expenditure is in accordance with the Programme of Activities and subject to evidence (if requested by the Academy) that the expenditure has been incurred.

10.4 If the Academy gives notice to terminate under clause 10.2, the Academy may (in its absolute discretion) require the Recipient to repay all or part of the Award paid by the Academy to the Recipient.

10.5 The Recipient may terminate this Contract without liability, by notice to the Academy, if the Academy is in breach of the terms of this Contract and remains in breach for more than 30 days after receipt of a notice from the Recipient bringing the breach to the attention of the Academy and requesting that the breach be remedied.

10.6 Where the Award is successfully challenged in any relevant court or tribunal of relevant jurisdiction or regulatory body and found to be an unlawful Subsidy under the term of the Subsidy Control Act 2022, or any similar Subsidy Control regime, or generally, or where the Academy reasonably concludes that the Award is, or is likely to be, an unlawful subsidy, the Academy shall be entitled to take any one or more of the following actions:

10.6.1 suspend or terminate the payment of the Award for such period as the Academy shall determine; and/or

10.6.2 reduce the amount of the Award in which case the payment of the Award shall thereafter be made in accordance with the reduction and notified to the Recipient; and/or

10.6.3 compel the Recipient to repay the Academy the whole or any part of the amount of the Award previously paid to the Recipient along with such interest as is or would be required under applicable law. Such sums shall be recovered as a civil debt; and/or

10.6.4 terminate this Contract

11. Limitation of liability

11.1 Save for the Awards payments to be made by the Academy under this Contract, the Academy accepts no responsibility for any payments, costs, claims, taxes, demands or expenses incurred by the Recipient or an Awardee for which the Recipient or Awardee(s) may be liable as an employer or otherwise as a result of the Award or the Programme of Activities, and the Recipient agrees to indemnify the Academy and hold it harmless against any such costs, claims, demands and liabilities accordingly.

12. Miscellaneous

12.1 Should the Department for Science, Innovation and Technology (or successor department) (or successor organisation) or other external funder amend the conditions upon which it provides the funding to the Academy for the Award the Academy reserves the right to amend the terms and conditions for this Award to the extent necessary to enable the effective continuation of the Award and compliance with the new conditions, which will be notified to the Recipient and Awardee(s) in writing. If it is not prepared to accept the amended terms and conditions, the Recipient may terminate this Contract by notice in writing to the Academy within 30 days of notification. If this Contract is terminated by the Recipient, the Academy shall not be obliged to make any further payments and the Recipient shall refund within four weeks any amount not spent exclusively on the Programme of Activities as at the date of termination. Unless so terminated by the Recipient, this Contract shall be deemed to be varied with effect from receipt of the amended terms and conditions by the Recipient.

12.2 Subject to clause 12.1, this Contract can only be varied or amended by the prior written agreement of both parties.

12.3 For the avoidance of doubt, this is not a contract for the supply of services by the Recipient and nothing in this Contract shall be deemed to create an employment relationship between the Academy and the Awardee(s), or any other person.

12.4 If any provision of this Contract is held to be void or unenforceable or if any provision or part-provision of this agreement is or becomes invalid, illegal or unenforceable, it shall be deemed deleted, but that shall not affect the validity and enforceability of the rest of this agreement.

12.5 Whenever in this Contract the Academy may exercise a discretion or determination, or give or withhold a consent, there shall be deemed to be a requirement that in doing so the Academy must act reasonably.

12.6 This Contract and its Annexes contain the entire agreement and arrangement between the Academy and the Recipient or the Awardee(s) regarding the Award and all other prior agreements, arrangements or understandings are hereby excluded.

12.7 References in this Contract to communications to be made 'in writing' shall be deemed to include email.

13. Governing law and jurisdiction

13.1 This Contract shall be governed by and construed in accordance with English law and all parties agree to submit to the exclusive jurisdiction on the English Courts as regards any claim or matter arising under the Contract.

This Contract was signed by the authorised representatives of the parties on the below dates

.....

Signature on behalf of **Parul University**

Name: Prof. Manish Pandya

Position: .....Registrar.....

Date: 04/11/2023

Stamp (if applicable)

PARUL UNIVERSITY • At. Po. Limda, Tal. Waghodia, Dist. Vadodara. • Gujarat State India

Nick Starkey

.....

Signed on behalf of the **Royal Academy of Engineering**

Name: Nick Starkey

Position: Director, Policy&International

Date: Nov 29, 2023

Non-binding signature only.
For Academy staff only (as appropriate to process for scheme) to confirm to Academy authorised representative that this contract should be signed.

ANNEX A

(details of the Award)

Type of Award:	Transforming Systems through Partnership 23/25 (India)
Award Name:	Advancing Green Hydrogen Production through Electrolysis: Optimization and Renewable Energy Integration
The Awardee(s):	Dr Vishal Sandhwar
Recipient:	Parul University
Total amount of Award:	£65,000.00
The Co-Recipient	The University of Surrey
The Collaborator(s) (if any):	Linde Engineering India
Principal Contact:	Dr Vishal Sandhwar
Sponsor(s) (if any):	
Award Start Date:	08 NOVEMBER 2023
Award End Date:	15 JANUARY 2025
Award Letter Date:	03 NOVEMBER 2023
Award Letter Addressee:	vishal.sandhwar8850@paruluniversity.ac.in
Academy Reference:	TSP-2325-5-IN\197

Annex B

Monitoring Schedule (Clause 5.1)

The Recipient shall ensure that the following Reports are submitted to the Academy by the dates shown below:

Report	Date
Initiation Report	20 November 2023
TSP on-track report	13 February 2024
Report	01 April 2024
TSP on-track report	02 September 2024
Report	29 January 2025
Follow-up Report	29 July 2025

Mandatory Activities (Clause 5.6)d

N/A

Annex C

Schedule of Payments

Subject to the prior submission of the necessary Reports as detailed in Annex B, the Academy shall ensure that payments are made to the Recipient and Co-Recipient for the following amounts on or by the dates shown:

Payment description	Payment recipient	Reference	Date	Value	Pre-requisite Reports and outputs
Initial payment to Parul University (India)	Parul University	IP-TSP2325-5-IN\197-IN	21 November 2023	£13,928.00	Signed Contract Completed initiation Report
Initial payment to University of Surrey (UK)	University of Surrey	IP-TSP2325-5-IN\197-UK	21 November 2023	£2,181.00	Signed Contract Completed initiaiton report
Mid-term payment for Parul University (India)	Parul University	MTP-TSP2325-5-IN\197-IN	22 April 2024	£31,772.00	Signed Contract Satisfactory mid-term Report
Mid-term payment for University of Surrey (UK)	University of Surrey	MTP-TSP2325-5-IN\197-UK	22 April 2024	£4,119.00	Signed Contract Satisfactory mid-term Report
Final payment to Parul University (India)	Parul University	FP-TSP2325-5-IN\197-IN	19 February 2025	£10,500.00	Signed Contract Satisfactory Final Report
Final payment to University of Surrey (UK)	University of Surrey	FP-TSP2325-5-IN\197-UK	19 February 2025	£2,500.00	Signed Contract Satisfactory Final Report
Total		£65,000.00			

NB. VAT is not payable on this Award

Invoices are not required and payment will be made against the banking details provided by the Recipient and Co-Recipient.

It is the Recipient and Co-Recipient's duty to inform the Academy immediately if the banking details change during the Award period.

Annex D - Recipient

BANKING INFORMATION FORM

Please complete all sections and return this form as an Annex to the contract, along with the required proof of bank details. Partially completed Annexes will be returned for completion before being countersigned or payments made.

Please print legibly to avoid delay in payment processing.

Summary

Royal Academy of Engineering reference:	TSP-2325-5-IN\197
Royal Academy of Engineering Finance contact:	finance@raeng.org.uk
Principal Contact:	Dr Vishal Sandhwar
Start date of award:	08 NOVEMBER 2023
Total Award value:	£65,000.00
Total award value due to Recipient	£56,200.00

1 - Reference

The Recipient's internal reference for the award (maximum 25 characters in length):	PU-RAE-GREEN HYDROGEN

2 - Key Finance Administrative Contact for this award:

Name (full):	Dr. Parul Patel
Position:	Vice President (Student Affairs & General Administration) and Chairperson, Admissions Committee
Organisation:	Parul University
Contact email address:	drparul@paruluniversity.ac.in

3 - Bank Information

Organisation Name	**PARUL UNIVERSITY**		
Organisation Address	**AT & PO- LIMDA, TAL. WAGHODIA, DIST-VADODARA**		
	City **VADODARA**	County **GUJARAT**	Postal Code **391760**
	Country **INDIA**		
Bank Name	**CENTRAL BANK OF INDIA**		
Bank Address	**PIET, LIMDA, TA. : WAGHODIA, DIST- VADODARA**		
	City **VADODARA**	County **GUJARAT**	Postal Code **391760**
	Country **INDIA**		
Beneficiary Name	**R AND D CENTRE UNIT OF PARUL UNIVERSITY**		
Bank Account Number	3 7 9 3 1 5 0 7 4 5		
Bank Account Currency	Please specify: **INR**		
Sort Code			
BIC or SWIFT code	**CBININBBOSB**		
IBAN			

4 - Payment Notification Details:

Email Address*	drparul@paruluniversity.ac.in

*An email notification will be sent to this address as confirmation of payment, including the amount, date of payment and invoice number(s).

5 – Proof of Bank Details

As a fraud prevention measure and to enable us to check for mistakes, you must also return one of the following documents to confirm the bank account details. Please indicate which of the following you have included and insert it as the next page. We only need to see proof of the account details, you may remove any information relating to the current balance, payments etc.

	Void cheque
	Paying in slip
	Copy bank statement

6 – Authorise Payment

I hereby authorise the Royal Academy of Engineering to process payment to the above bank account and I confirm that the above information is correct. This account will remain in effect until written authorisation to stop and/or change the instructions is received by the Royal Academy of Engineering.

I have authority to sign this Form on behalf of the organisation.

	Authorised Signature 1	**Authorised Signature 2**
Signed:		
Date:	4/11/23	4.11.2023
Name (full):	Dr. Parul Patel	Dr. Geetika Madan Patel
Position:	Vice President (Student Affairs & General Administration) and Chairperson, Admissions Committee	Vice President (Quality, Research and Health Sciences)
Organisation:	Parul University	Parul University
Email address:	drparul@paruluniversity.ac.in	vicepresident_86@paruluniversity.ac.in

Note before any payments are made this form must be signed by **two** authorised signatories at the Recipient to confirm that the payment details are correct.

Proof of Bank details to be inserted here, and this page removed.

सेन्ट्रल बैंक ऑफ इंडिया
Central Bank of India

PARUL INSTITUTE OF ENGG TECH BRANCH (04063), GUJRAT - 391760
पारुल इंस्टिट्यूट ऑफ़ इंजीनियरिंग और टेक शाखा (04063) , गुजरात - 391760
IFSC: CBIN0284063

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अदा करें ₹

खा.सं. A/c No. 3793150745

FOR R & D CENTRE UNIT OF
PARUL UNIVERSITY

TRUSTEE/AUTHORISED SIGNATORY

कृपया हस्ताक्षर ऊपर करें / Please sign above

Cancelled

⑈110406⑈ 390016016⑆ 006858⑈ 31

Annex D – Co-Recipient

BANKING INFORMATION FORM

Please complete all sections and return this form as an Annex to the contract, along with the required proof of bank details. Partially completed Annexes will be returned for completion before being countersigned or payments made.

Please print legibly to avoid delay in payment processing.

Summary

Royal Academy of Engineering reference:	TSP-2325-5-IN\197
Royal Academy of Engineering Finance contact:	finance@raeng.org.uk
Principal Contact:	Professor Satheesh Krishnamurthy
Start date of award:	08 NOVEMBER 2023
Total Award value:	£65,000.00
Total award value due to Co-Recipient	£8,800.00

1 - Reference

The Co-Recipient's internal reference for the award (maximum 25 characters in length):	

2 - Key Finance Administrative Contact for this award:

Name (full):	
Position:	
Organisation:	
Contact email address:	

3 - Bank Information

Organisation Name			
Organisation Address			
	City	County	Postal Code
	Country		
Bank Name			
Bank Address			
	City	County	Postal Code
	Country		
Beneficiary Name			
Bank Account Number			
Bank Account Currency	Please specify:		
Sort Code			
BIC or SWIFT code			
IBAN			

4 - Payment Notification Details:

Email Address*	

*An email notification will be sent to this address as confirmation of payment, including the amount, date of payment and invoice number(s).

5 – Proof of Bank Details

As a fraud prevention measure and to enable us to check for mistakes, you must also return one of the following documents to confirm the bank account details. Please indicate which of the following you have included and insert it as the next page. We only need to see proof of the account details, you may remove any information relating to the current balance, payments etc.

	Void cheque
	Paying in slip
	Copy bank statement

6 – Authorise Payment

I hereby authorise the Royal Academy of Engineering to process payment to the above bank account and I confirm that the above information is correct. This account will remain in effect until written authorisation to stop and/or change the instructions is received by the Royal Academy of Engineering.

I have authority to sign this Form on behalf of the organisation.

	Authorised Signature 1	**Authorised Signature 2**
Signed:		
Date:		
Name (full):		
Position:		
Organisation:	The University of Surrey	The University of Surrey
Email address:		

Note before any payments are made this form must be signed by **two** authorised signatories at the Recipient to confirm that the payment details are correct.

Proof of Bank details to be inserted here, and this page removed.

Annex E

ROYAL ACADEMY OF ENGINEERING POLICIES AND POSITIONS (clause 6.1)

1. Safeguarding Policy
2. Anti-Bullying and Harassment Policy
3. Anti-Bribery Policy
4. Equality and Diversity Policy
5. Modern Slavery Policy
6. Privacy Policy
7. Academy Open Access Position Statement
8. Academy statement and Action Plan - Researcher Development Concordat
9. Concordat to Support Research Integrity
10. Good Data Management Practices
11. Code of Conduct for Enterprise Hub Members (not applicable for this grant scheme)
12. Global Code of Conduct for Research in Resource-poor Settings
13. Policy on National Security-Related Risks

Copies of these policies may be found by following this link: https://raeng.org.uk/about-us/who-we-are/our-policies

Annex F: APPLICATION FORM and REQUIRED OUTPUTS

(Application form attached after this page)

Additional, Amended, or Excluded Activities (if any) (see clause 3.4)

Additional: Not applicable.
Amended: Not applicable
Excluded: Not applicable/

Required Outputs: Not applicable

Engineering X Transforming Systems through Partnership Contract

This Contract (the 'Contract') is made on the 10th day of MARCH 2021 between:

(A) **The Royal Academy of Engineering** incorporated by Royal Charter of 3 Carlton House Terrace, London SW1Y 5DG, Registered Charity 293074 ('the Academy')

(B) **PARUL UNIVERSITY**, VADODARA, INDIA ('the Recipient')

Background:

(A) This Contract contains the terms and conditions of an Award to be made by the Academy under its Transforming Systems through Partnership programme whose purpose is to solve pressing development and sustainability challenges by supporting academics to work with industry, government and the public to build trust, design appropriate solutions and scale their uptake.

(B) The details of the Award are set out in Annex A to this Contract.

(C) N/A

It is agreed as follows:

1. Definitions

'the Application' means the original application for the Award made by the Recipient, a copy of which is included in Annex B

'The Award' means the award of a grant whose details are set out in Annex A.

'Award Start Date' and 'Award End Date' shall mean the dates given in Annex A.

'The Awardee(s)' means any person(s) who is named as Awardee in the Application, as the context may require

'The Award Letter' means the letter or email from the Academy addressed to the Awardee(s) confirming the Award as detailed in Annex A

'Mandatory Activities' means the events and activities referred to in Clause 5.6 and Annex C

'Not applicable' ('N/A') means this clause is not relevant to this Contract and has been redacted. The clause number remains in place to maintain the accuracy of any clauses which refer to other clauses

'Online Grant System' means the Academy's online application and assessment software program through which the Application was submitted and assessed, and will be managed and monitored

‘The Programme of Activities’ means those activities specified in the Application, subject to any additional, excluded or amended activities detailed in Clause 3.2.

‘The Recipient’ means the university named above which will be formally receiving the Award.

‘Report’ means any written report required to be submitted by the Awardee under Clause 5.1

‘Statement of Expenditure’ means the statement of expenditure required to be submitted by the Recipient under Clause 5.1.

2. Grant of Award and conditions of Grant

2.1 The Academy undertakes to provide the Award to the Recipient in accordance with the provisions of this Contract. In the event of any conflict or inconsistency between the terms of this Contract and the Award Letter, or any other communication between the parties, the terms of this Contract shall prevail.

2.2 For the avoidance of doubt, the Award will not be activated and the Academy will not be obliged to pay any part of the Award to the Recipient until (a) the Contract has been received by the Academy duly signed by or on behalf of the Recipient; and (b) the Contract has been countersigned by the authorised signatory on behalf of the Academy. The Academy will not accept liability for any expenses incurred prior to the fulfilment of conditions (a) and (b) above.

2.3 N/A

2.3.1 N/A

2.3.2 N/A

2.3.3 N/A

2.4 The Award is conditional on the Awardee being employed by the Recipient in a suitable role or having an alternative legal relationship with the Recipient approved by the Academy in writing. The Recipient will procure that the Awardee will not undertake any other paid work, hold any other form of paid office or employment or interrupt the Award to pursue other activities without the prior written consent of the Academy. If any variation is approved the Academy reserves the right to adjust the Monitoring Schedule at Annex C and the Schedule of Payments at Annex D accordingly.

2.5 The Award is given to the Recipient only and is solely in respect of the Awardee and is not transferable to any third party (including the Awardee) without the written agreement of the Academy. The Academy’s decision on any requested transfer is final, as is the consequential distribution or allocation of any remaining Grant funds.

2.6 The Recipient shall put in place suitable contractual arrangements with the Awardee(s) and any other relevant third parties and will ensure that the Awardee(s) is made aware of any relevant obligations required to be met by the Recipient under this Contract for which the Awardee(s)'s contribution is required, including but not limited to the provision of any Reports.

2.7 The Award must be acknowledged by the Recipient and the Awardee(s) in any materials or publications regarding or resulting from the Award, and in any written or spoken presentations about the Award, in the following form (or such other form as the Academy has approved in writing): ''*This project was supported by the Royal Academy of Engineering through the Engineering X Transforming Systems through Partnership programme."*

2.8 The Awardee(s) is entitled to take maternity, paternity, or adoptive leave if such leave is accordance with the terms and conditions of their contract of employment. The Academy will extend the duration of the Award to account for the leave taken, and adjust the Monitoring Schedule (Annex C) and the Schedule of Payments (Annex D) accordingly. The Recipient will notify The Academy in writing of any such leave periods as early as reasonably possible.

2.9 The Academy's approval must be sought in advance and in writing for changes to any of the following:

2.9.1 the Award Start Date

2.9.2 the Award End Date

2.9.3 the re-allocation of expenditure between different cost categories, as specified in Annex B

2.9.4 a change from full to part-time employment, or from part-time to full-time, or any other change in the Awardee's employment status, or other changed circumstances affecting the Awardee's ability to work on the Programme of Activities as envisaged in this Contract.

The Awardee(s) should specify any reasons for the requested changes and may at the Academy's request be required to provide further information. The Recipient and the Awardee(s) will be notified of the Academy's decision in writing. However, no additional funding will be provided if these variations are made, subject to Clause 2.8 (if applicable).

2.10 N/A

2.11 N/A

2.12 N/A

3. Programme of Activities

3.1 The Recipient will ensure that before the Programme of Activities starts all the necessary legal regulatory and ethical requirements

for the conducting of the Programme of Activities are met and that all necessary licences, consents (including visas) and approvals are obtained, and that these are maintained during the period of the Award.

3.2 The Recipient shall procure the carrying out by the Awardee of the Programme of Activities including the additional or amended activities (if any) specified in Annex B, and shall not use the Award for any of the excluded activities specified in Annex B.

3.3 N/A

3.4 The Recipient undertakes to provide funding for any additional costs not covered by the Award which are necessary for the successful completion of the Programme of Activities.

3.5 The Award is cash-limited and no supplementary funding will be provided by the Academy to complete the Programme of Activities in event of a shortfall.

3.6 The Recipient undertakes to support the Awardee(s) in the Programme of Activities and to ensure access to any facilities specified in the Application and any other facilities necessary for completion of the Programme of Activities.

3.7 The Recipient shall not allow any Award monies to be used other than for the purposes of the Programme of Activities.

3.8 The Awardee(s) must notify the Academy in writing that the Programme of Activities has started by submitting an Initiation Report, by the date given in Annex C. This notification will be provided through the Online Grant System.

3.9 The Recipient shall not modify or alter the Programme of Activities without the prior written consent of the Academy.

3.10 The Recipient will ensure that the results of the Programme of Activities are disseminated publicly within twelve months of the Award End Date (unless the Academy has agreed in writing to a longer period).

4. Payment of the Award

4.1 The payments to be made by the Academy to the Recipient are set out in Annex D.

4.2 Once this Contract has been signed by both parties in accordance with Clause 2.2 and any conditions specified in Clause 2 have been met the Academy shall make payments to the Recipient according to Annex D. The Recipient will complete Annex E with the necessary banking information required to process the payments. The Recipient is not required to submit invoices for payment and all payments will be made to the bank account provided.

4.3 Each payment will be conditional upon receipt by the Academy of any and all Reports which fall due prior to the relevant payment date, in accordance with Clause 5.1. Reports must be of a satisfactory standard to release payment, as determined by the Academy.

4.4 The Academy will deduct from the final payment (a) any underspend on the Programme of Activities which is evident from the Statement of Expenditure and (b) any funds not spent exclusively on the Programme of Activities, and if the amount to be deducted exceeds the amount of the final payment then no final payment will be made and the balance due shall be refunded to the Academy by the Recipient within 4 weeks of the Award End Date.

4.5 No interest shall accrue on any sums not paid by the Academy on the due dates or withheld in accordance with the terms of this Contract.

4.6 N/A

5. Reports and Monitoring

5.1 The Awardee(s) will submit written Reports to the Academy of the description, and by the dates specified in Annex C. These Reports shall follow the guidelines provided by the Academy, and include:

5.1.1 a Statement of Expenditure incurred covering the cost categories included in the Application;
5.1.2 a summary of progress on the aims of the Award and the outputs specified in Annex B;
5.1.3 such other information as the Academy may reasonably request.

5.2 N/A

5.3 N/A

5.4 The Recipient shall cooperate with any evaluation consultant appointed by the Academy to carry out a long-term evaluation of the scheme. The Awardee(s) shall liaise and meet with the evaluation consultant as often as the evaluation consultant deems appropriate. The Academy will make the Reports and contact details of the Awardee(s) available to the evaluation consultant for review.

5.5 At the request of the Academy, the Recipient will permit the Academy and its representatives access upon reasonable notice to the Recipient's premises and to the Awardee for the purposes of monitoring the progress of the Programme of Activities.

5.6 The Recipient shall ensure that the Awardee shall attend all Mandatory Activities specified in Annex C. The Academy shall reimburse reasonable travel and accommodation expenses related to the Mandatory Activities, and the Awardee(s) must submit the expenses claim to the Academy within four weeks of the event date. If the Awardee fails (without the prior approval of the Academy) to attend any Mandatory Activities, the Academy may at

its discretion withhold, reduce or suspend any Award payments due to the Recipient.

6. Safeguarding

The Recipient shall:

6.1 take reasonable steps to prevent actual, attempted or threatened sexual exploitation, sexual abuse or sexual harassment by its employees;

6.2 take reasonable steps to ensure that individuals are enabled to report concerns and complaints of actual, attempted or threatened exploitation, abuse or harassment;

6.3 adopt and follow robust procedures for the reporting and investigation of actual, attempted or threatened sexual exploitation, abuse or harassment by its employees, including reporting such matters to the relevant authorities;

6.4 report to the Academy if the Recipient receives any complaints of actual, attempted or threatened sexual exploitation, sexual abuse or sexual harassment (a 'Safeguarding Disclosure') about, by or from its employees or those representing the Recipient

6.5 report to the Academy (to the extent permitted by law) if the Recipient becomes aware of a Safeguarding Disclosure where the complaint is relevant to activities funded by the Grant.

Provided that in complying with its obligations under 6.4 and 6.5 above, the Recipient shall provide an outline of the complaint and details of the action being taken by the Recipient but shall not be required to provide any personal data.

6.6 The Recipient and Awardee(s) will have full regard to risks that the technology and know how developed with the programme of activities might be misused by a state to control or repress their population, or adapted by a foreign state's military against UK interests. The Recipient and Awardee(s) should notify the Academy of any concerns that arise that the knowledge is being misused in this way, recognising that the Academy will inform the UK government of these concerns. The Recipient and Awardee(s) will take note of the guidance provided by the UK's CPNI on Trusted Research (https://www.cpni.gov.uk/trusted-research) and Universities UK on Managing Risks in Internationalisation (https://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2020/managing-risks-in-internationalisation.pdf) aimed at preserving the integrity of the system of international research collaboration. The Recipient and Awardee(s) will treat these guidelines and the associated risks with the requisite level of care and diligence. If in the UK, the Recipient will ensure that researchers and research staff must be aware of the legal and regulatory frameworks relating to controlled technology, particularly export controls and the Academic Technology Approval Scheme, highlighting that they apply to intangible items such as knowledge and IP, as well as physical goods. If outside the UK, the Recipient will ensure application of all equivalent regulations and guidance of their national government.

7. Other obligations of the Recipient

7.1 The Recipient shall ensure that Awardee(s) shall comply with any policies of the Academy that are brought to its attention in writing including but not limited to those policies referred to in Annex F.

7.2 The Recipient shall comply with all applicable laws and regulations relating to (a) anti-discrimination under the Equality Act 2010 and (b) anti-bribery and anti-corruption under the Bribery Act 2010 and not engage in any activity, practice or conduct which would constitute offences under these Acts and any similar legislation in the UK or overseas.

7.3 The Recipient shall comply with all relevant obligations under the Data Protection Act 2018 and any other UK data protection laws, and in particular will ensure that the Awardee has been notified that his or her personal data will be shared with the Academy for the purpose of the operation and administration of this agreement.

7.4 The Recipient will keep complete and accurate accounts of expenditure on the Award (including the expenditure of any sub-contractors) and the Programme of Activities and allow the Academy or its representatives (on reasonable notice) to inspect such accounts and take copies.

7.5 The Recipient will promptly inform the Academy in writing of any change in the status of the Recipient or the Awardee(s) or of any other circumstance which might affect its ability to comply with the terms of this Contract.

7.6 The Recipient agrees to endorse the commitments of the Concordat to Support Research Integrity and must have in place formal written procedures and policies to promote and ensure compliance with the commitments. In particular the Recipient commits to adhere to the highest standards of professionalism and integrity and agrees to have procedures in place to ensure that research is conducted in accordance with standards of best practice; systems to promote research integrity; and transparent, robust and fair processes to investigate alleged research misconduct.

7.7 The Recipient shall ensure that the Awardee(s) acknowledge the Academy's financial contribution in all publications regarding or resulting from the Programme of Activities, in the form specified in Clause 2.7 or as otherwise agreed to by the Academy.

7.8 The Recipient shall ensure that all uses of the Academy's logo conform to the Academy's requirements, as notified by the Academy to the Recipient from time to time.

7.9 The Academy may refer to the making of the Award, the names of the Recipient and the Awardee(s), and the general aims of the Award in any reports to its funders and in any publicity material.

7.10 The Recipient will promptly notify the Academy of any formal investigation against the Awardee which is ongoing at the Award Start Date or subsequently which relates to the conduct of the Awardee including (but not limited to) matters such as harassment, bullying, and any breach of the law or applicable Codes of Conduct or any of the terms of the relevant employment contract.

7.11 The Recipient will not without the previous agreement of the Academy dispose of or change the use of any tangible or intangible asset (including copyright) which has a value of £10,000 or more which has been purchased by the Recipient using the Award

7.12 N/A

7.13 N/A

7.14 Awardee(s) must notify the Academy as far in advance as possible of when project activities/events are taking place and provide an opportunity for an Academy representative to attend at least one of the activities/events over the course of the project.

7.15 N/A

7.15.1 N/A

7.15.2 N/A

7.15.3 N/A

7.15.4 N/A

7.15.5 N/A

7.15.6 N/A

7.15.7 N/A

7.15.8 N/A

7.15.9 N/A

8. Intellectual Property

8.1 The Academy will not own or be granted a licence under any intellectual property rights relating to or resulting from the Programme of Activities.

8.2 N/A

8.3 The Recipient will ensure that all background or existing intellectual property rights required to undertake the Programme of Activities are agreed in writing between the Recipient and the Awardee(s) before the Award Start Date. The Recipient will supply details and/or a copy of the agreement to the Academy on request.

8.4 N/A

9. Termination

9.1 Should the Department for Business, Energy and Industrial Strategy (or successor department) or any other external funder withdraw or

reduce the funding of this Award the Academy reserves the right to terminate or suspend this Contract at any time with immediate effect by giving written notice to the Recipient.

9.2 The Academy may also suspend or terminate this Contract by notice in writing if:

9.2.1 the Recipient or the Awardee(s) has provided any false information in connection with the Application or the Programme of Activities; or

9.2.2 the Recipient fails to apply the Award monies for the purposes specified in this Contract; or

9.2.3 the Recipient is in breach of any other provisions of this Contract; or

9.2.4 the Recipient receives funding for the Programme of Activities from alternative sources which covers the same costs as are funded under this Contract (without the prior agreement of the Academy); or

9.2.5 The Academy considers that the Programme of Activities cannot or will not be fulfilled in accordance with the requirements of this Contract, including (but not limited to) the Awardee(s) being unfit or unable to pursue the Programme of Activities or if the facilities required for the Programme of Activities are not available; or

9.2.6 The Academy considers that the arrangements for the exploitation of the intellectual property rights required for and resulting from the Programme of Activities (as referred to in Clause 8.3) are not in accordance with the Application; or

9.2.7 The Academy considers that by reason of his or her conduct the Awardee is not a fit and proper person to receive the Award or conduct the Programme of Activities; or

9.2.8 The Academy considers, based on the Reports and information supplied to date, that the outputs specified in Annex B will not be met; or

9.2.9 The Academy, following the Mid-Term Evaluation, determines to end the Award under Clause 4.6.

9.3 If this Contract is terminated by the Academy under Clause 8.1, the Academy will reimburse the Recipient up to the maximum value of the Award for all reasonable expenditure incurred prior to the termination date, provided this expenditure is in accordance with the Programme of Activities and subject to evidence (if requested by the Academy) that the expenditure has been incurred.

9.4 If the Academy gives notice to terminate under Clause 9.2, the Academy may (in its absolute discretion) require the Recipient to repay all or part of the Award paid by the Academy to the Recipient.

9.5 The Recipient may terminate this contract without liability, by notice to the Academy, if the Academy is in breach of the terms of this Contract and remains in breach for more than 30 days after receipt of a notice from the Recipient bringing the breach to the attention of the Academy and requesting that the breach be remedied.

10. Limitation of liability

10.1 Save for the Awards payments to be made by the Academy under this Contract, the Academy accepts no responsibility for any payments, costs, claims, taxes, demands or expenses incurred by the Recipient or an Awardee for which the Recipient or Awardee(s) may be liable as an employer or otherwise as a result of the Award or the Programme of Activities, and the Recipient agrees to indemnify the Academy and hold it harmless against any such costs, claims, demands and liabilities accordingly.

11. Miscellaneous

11.1 Should the Department for Business, Energy and Industrial Strategy (or successor department) or other external funder amend the conditions upon which it provides the funding to the Academy for the Award the Academy reserves the right to amend the terms and conditions for this Award to the extent necessary to enable the effective continuation of the Award and compliance with the new conditions, which will be notified to the Recipient and Awardee(s) in writing. If it is not prepared to accept the amended terms and conditions, the Recipient may terminate this Contract by notice in writing to the Academy within 30 days of notification. If this Contract is terminated by the Recipient, the Academy shall not be obliged to make any further payments and the Recipient shall refund within four weeks any amount not spent exclusively on the Programme of Activities as at the date of termination. Unless so terminated by the Recipient, this Contract shall be deemed to be varied with effect from receipt of the amended terms and conditions by the Recipient.

11.2 Subject to Clause 11.1, this Contract can only be varied or amended by the prior written agreement of both parties.

11.3 For the avoidance of doubt, this is not a contract for the supply of services by the Recipient and nothing in this Contract shall be deemed to create an employment relationship between the Academy and the Awardee(s), or any other person.

11.4 If any provision of this Contract is held to be void or unenforceable or if any provision or part-provision of this agreement is or becomes invalid, illegal or unenforceable, it shall be deemed deleted, but that shall not affect the validity and enforceability of the rest of this agreement.

11.5 Whenever in this Contract the Academy may exercise a discretion or determination, or give or withhold a consent, there shall be

deemed to be a requirement that in doing so the Academy must act reasonably.

11.6 This Contract and its Annexes contain the entire agreement and arrangement between the Academy and the Recipient or the Awardee(s) regarding the Award and all other prior agreements, arrangements or understandings are hereby excluded.

11.7 References in this Contract to communications to be made 'in writing' shall be deemed to include email.

12. Governing law and jurisdiction

12.1 This Contract shall be governed by and construed in accordance with English law and all parties agree to submit to the exclusive jurisdiction on the English Courts as regards any claim or matter arising under the Contract.

This contract was signed by the authorised representatives of the parties on the above date

.....

Signature of behalf of Parul University

Date: 10/03/2021

Name: Dr. H. S. Vijayakumar

Position: Registrar

REGISTRAR
PARUL UNIVERSITY

Stamp (if applicable)

PARUL UNIVERSITY
At. Po. Limda, Tal. Waghodia, Dist. Vadodara.
Gujarat State
India

.....

Signed on behalf of the **Royal Academy of Engineering**

Date: 17 March 2021

Name: Nick Starkey

Position: Director of Policy

ANNEX A

(details of the Award)

Type of Award:	TSP 20/21 India
Award Name:	AI, IoT and Digital Technologies for Future Sustainable Smart Cities.
The Awardee(s):	Dr Arvind Yadav
The Host Institution (the 'Recipient'):	PARUL UNIVERSITY
Total amount of Award:	£80,000.00
Award Start Date:	01 April 2021
Award End Date:	30 April 2023
Award Letter Date:	08 MARCH 2021
Award Letter Addressee:	arvind.yadav@paruluniversity.ac.in
Academy Reference:	T2I\100048

Annex B: APPLICATION FORM and REQUIRED OUTPUTS

Application Form to be inserted after this page

Additional, Amended, or Excluded Activities (if any) (see Clause 3.4)

Additional: N/A
Amended: N/A
Excluded: N/A

Applicant: **Yadav, Arvind**
Organisation: **Parul University**
Funding Sought: **£80,000.00**
Funding Awarded: **£80,000.00**

T2I\100048

AI, IoT and Digital Technologies for Future Sustainable Smart Cities.

A Smart city is considered a new utopia, the city of the future where technology becomes the interface- the arbitrator among citizens, governments and institutions. As per a study conducted by Ministry of Communications, Government of India, ‘ ICT advantages within Urban Design, Urban Planning and management processes are especially clear today, as maps, data and assessment models are increasingly becoming a common heritage: the integration of sensors, web and wiki based technologies with GIS applications is a very fruitful way to improve the chances of constructive interaction between citizens, policy makers and the skills at stake within the urban planning processes’. So far, Government of India selected 99 cities under Smart Cities Mission. Six cities namely Ahmedabad, Dahod, Gandhinagar, Rajkot, Surat and Vadodara of Gujarat are selected by the Government of India. We will study status of implementation of Smart Cities Mission in Gujarat and ascertain various challenges faced by the Smart Cities in achieving the following objectives and develop innovative technological solutions by using IoT, Artificial Intelligence and Digital Technologies .

1. Assured Portable Water Supply with highest degree of efficacy.
2. Ensuring assured electric supply with enhanced use of Renewable Energy Resources.
3. Improving sanitation, air quality and solid waste management.
4. Efficient transport systems keeping an eye on congestions and air pollution.
5. Improving health care services and disaster management.

LEAD APPLICANT DETAILS

Title	Dr
Name	Arvind
Surname	Yadav
Organisation	Parul University
Tel (Work)	**+912668260345**
Email (Work)	**arvind.yadav@paruluniversity.ac.in**
Address	POST LIMDA TA:WAGHODIA VADODARA INDIA 391760 India

Section 1 - Project details

Project Details:

Project Title:

AI, IoT and Digital Technologies for Future Sustainable Smart Cities.

Please provide a short abstract/summary of the proposed project:

A Smart city is considered a new utopia, the city of the future where technology becomes the interface- the arbitrator among citizens, governments and institutions. As per a study conducted by Ministry of Communications, Government of India, ' ICT advantages within Urban Design, Urban Planning and management processes are especially clear today, as maps, data and assessment models are increasingly becoming a common heritage: the integration of sensors, web and wiki based technologies with GIS applications is a very fruitful way to improve the chances of constructive interaction between citizens, policy makers and the skills at stake within the urban planning processes'. So far, Government of India selected 99 cities under Smart Cities Mission. Six cities namely Ahmedabad, Dahod, Gandhinagar, Rajkot, Surat and Vadodara of Gujarat are selected by the Government of India. We will study status of implementation of Smart Cities Mission in Gujarat and ascertain various challenges faced by the Smart Cities in achieving the following objectives and develop innovative technological solutions by using IoT, Artificial Intelligence and Digital Technologies .

1. Assured Portable Water Supply with highest degree of efficacy.
2. Ensuring assured electric supply with enhanced use of Renewable Energy Resources.
3. Improving sanitation, air quality and solid waste management.
4. Efficient transport systems keeping an eye on congestions and air pollution.
5. Improving health care services and disaster management.

Planned start date:

No Response

Planned end date:

No Response

Total project cost (requested grant value sought + your match contribution):

£166,022.00

Total grant value sought from the Academy (max £80,000):

£80,000.00

In which TSP Partner Country will your project operate?

India

Please provide keywords relating to the project

Wireless networks, Air quality index, 3D hologram, Emergency Response System

What is the proposed project start date

Projects must start in April 2021

01 April 2021

What is the proposed project end date

Projects must end by 30 April 2023.

30 April 2023

Is this a new collaboration OR is this is a pre-existing collaboration (for pre-existing collaborations you will be required to provide further details).

New

Section 2 - Applicant, institution and partnership details

LEAD APPLICANT DETAILS

Title	Dr
Name	Arvind
Surname	Yadav
Organisation	Parul University
Tel (Work)	+912668260345
Email (Work)	arvind.yadav@paruluniversity.ac.in
Address	POST LIMDA TA:WAGHODIA VADODARA INDIA 391760 India

Please provide contact details of the Lead and Co-Applicants

Title	Full Name	Job title	Institution	Email
Dr	Arvind Yadav	Professor	Parul Institute of Engineering & Technology	arvind.yadav@paruluniversity.ac.in
Dr	Gopala Krishna Murthy Paidipati	Professor	Parul Institute of Management and Research	gopalakrishnamurthy.paidipati@paruluniversity.ac.in
Dr	Unnati Joshi	Professor	Parul Institute of Engineering & Technology	unnati.joshi2846@paruluniversity.ac.in
Dr	Bhavesh Mewada	Principal	Parul Institute of Technology	bmewada@paruluniversity.ac.in

Dr	Vishal Sandhwar	Asst Professor	Parul Institute of Technology	vishal.sandhwar8850@paruluniversity.ac.in
Dr	Shivendu Saxena	Asst Professor	Parul Institute of Technology	shivendu.saxena8938@paruluniversity.ac.in
Dr	Chiranjib Bhowmik	Asst Professor	Parul Institute of Engineering & Technology	chiranjib.bhowmik270068@paruluniversity.ac.in
Mrs	Seema Nihalani	Asst Professor	Parul Institute of Technology	seema.nihalani@paruluniveristy.ac.in
Mrs	Falguni Talajiya	Asst Professor	Parul Institute of Engineering & Technology	falguni.bhavsar@paruluniveristy.ac.in
Mr	Divyeshkumar Mangroliya	Asst Professor	Parul Institute of Engineering & Technology	divyesh.mangroliya@paruluniveristy.ac.in
Mr	Rutvik Mehta	Asst Professor	Parul Institute of Engineering & Technology	rutvik.mehta@paruluniversity.ac.in
Mr	Dheeraj Kumar Singh	Asst Professor	Parul Institute of Engineering & Technology	dheeraj.singh@paruluniveristy.ac.in
Mr	Prashant Sahatiya	Asst Professor	Parul Institute of Engineering & Technology	prashant.sahatiya270187@paruluniveristy.ac.in
Mr	Prasad Sant	Co_Founder and CEO	Nirvedha Technology Solutions LLP	Prasad.sant@nirvedhatech.com

Mr	Anand Deshpande	Co-Founder and CTO	Nirvedha Technology Solutions LLP	anand.deshpande@nirvedhatech.com
Mr	Milind Godbole	Co-Founder and Sr. Partner	Nirvedha Technology Solutions LLP	Milind.Godbole@nirvedhatech.com
Mr	Shishir Athale	Sr. Partner	Nirvedha Technology Solutions LLP	shishir.athale@nirvedhatech.com
Mr	Jignesh Chokshi	Joint General Manager and Head of Digital Technologies	L&T Sargent & Lundy Ltd	Jignesh.Chokshi@lntsnl.com
Mr	Yogendra Mishra	General Manager & Head of Engineering	L&T Sargent & Lundy Ltd	yogendra.mishra@lntsnl.com
Mr	Dharmendrasinh J Raj	Asst General Manager-C&I Department	L&T Sargent & Lundy Ltd	raj.dharmendrasinh@lntsnl.com
Mr	Harishkumar Raj	Asst Manager - Mechanical department	L&T Sargent & Lundy Ltd	harishkumar.r@lntsnl.com
Dr	Ravi Silva	Distinguished Professor and Director	Advanced Technology Institute, University of Surrey	s.silva@surrey.ac.uk
Dr	Jose Anguita	Clean Room and Laboratories Manager	Advanced Technology Institute, University of Surrey	J.Anguita@surrey.ac.uk
Dr	Bhaskar Dudem	Research Fellow (Post-Doc)	Advanced Technology Institute, University of Surrey	b.dudem@surrey.ac.uk

Mr	Amit Saluja	Senior Director and Center Head	NASSCOM, CoE Gandhinagar	asaluja@nasscom.in
Mr	Amit Borundia	Technology Head	NASSCOM, CoE Gandhinagar	ABorundiya@nasscom.in
Mr	Ankit Jain	Industry Engagement Lead	NASSCOM, CoE Gandhinagar	t-ankit@mail.nasscom.in

Please upload the CVs of participating collaborators

CV Dr Jose Anguita
17/01/2021
13:54:48
pdf 188.94 KB

CV Prof S R P Silva
17/01/2021
13:52:43
pdf 140.9 KB

CV Dr Arvind Yadav-PU
13/01/2021
08:11:09
pdf 185.29 KB

CV Dr VISHAL SANDHWAR PU
13/01/2021
08:11:01
pdf 57.02 KB

CV Dr. Chiranjib Bhowmik-PU
13/01/2021
08:10:27
pdf 140.68 KB

CV Jignesh V Chokshi_L&T Sargent
13/01/2021
08:10:10
pdf 144.74 KB

CV YD Mishra - L&T Sargent
13/01/2021
08:10:10
pdf 103.09 KB

CV - Anand Deshpande-Nirvedha
13/01/2021
08:09:43
pdf 236.47 KB

CV - Prasad Sant-Nirvedha
13/01/2021
08:09:21
pdf 271.49 KB

CV - Amit Saluja_NASSCOM
13/01/2021
08:09:06
pdf 18.21 KB

Organisation details

Organisation details
15/01/2021
06:10:05
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Role, contribution and benefits to industry partner

Choice , Role of & Benefits to Nirvedha Technology Solutions (StartUp). Nirvedha Technology Solutions is a Pune based Start-up setup by Technocrats with wide range of experience in Industrial & Building Automation, IOT and Software Solutions. Nirvedha is located in Pune and provides Internet of Things (IOT) solutions and services for Industrial and Buildings sectors. In this Smart City Project, we will be working very closely with Parul University to apply our knowledge and experience of IOT, AI, ML and related technologies, along with domain knowledge related to smart cities for successful implementation of this project. Some of the areas where we can contribute on this project include: • Provide technical guidance to Parul University staff and students • Jointly work on various deliverables which will be required as part of the project implementation. • Design, develop and implementation of the IOT platform for consolidation of all data for this project. • Design, develop and implementation of the IOT Applications for Smart Water System, Air Quality Monitoring System, Smart Buildings, Energy Management etc. Our experienced engineers will give their quality time to drive this project as per the schedule. We will interact with the U.K. based partner University as required to find the appropriate workable approaches & solutions. This project fits in very well with the Vision and Objectives of the company which is to Orchestrate IIOT Digital Transformation Projects, Deliver Benchmark Efficiency, Productivity Enhancements and Superior ROI to our customers in Manufacturing, Buildings and Infrastructure domains.

Please check here if there are additional industry partners

Checked

Role, contribution and benefits to further industry partner(s)

NASSCOM CoE, Gandhinagar Center is focused on driving adoption of IoT and AI led solutions in the industries. Center is also actively supporting Gujarat Government's initiatives around increasing the use of technologies to create positive impact to citizen services.
NASSCOM CoE, Gandhinagar appreciates the efforts taken by Parul University to assess and deploy smart cities solutions in different cities of the Gujarat. We are happy to join this initiative to share our expertise and provide advisory services during the execution of this program. Areas where NASSCOM CoE, Gandhinagar can contribute will be
• Advice areas where AI & IoT solutions can be deployed to manage the city operations
• Review project proposal created by Startup in collaboration with Parul University and share recommendations
• Review and share feedback on the progress made in the development of the solutions
• Provide access to NASSCOM CoE, Gandhinagar infrastructure to the startup and Parul University for solution development
• Technical experts will be available for any consultations needed for the smooth execution of the project

L&T-S&L is committed to Industry-Academia collaboration and its success. This project fits in very well with the objective of our company-To enable and improve ongoing digital transformation journey in our organization. Areas where L&T-S&L can contribute will be:
• Our team of senior engineers will be working with faculty and PG students of Parul University (PU) to explain technologies involved and to evaluate various options to find an optimum solution.
• Jointly prepare the road map, schedule and periodically review the work done by PU team.
• Give specific inputs to define the problem statement.
• Share the required process parameters based on our experience of working on many coal based super-critical thermal power projects.
• Allow the students to use our technical resources like library, codes & standards as well as provide technical supervision and guidance to the team.
• Our experienced engineers will give their quality time to drive this project as per the schedule. Interact with the Indian and U.K. based partner University as required to find the appropriate approaches & solutions.

Role, contribution and benefits to UK partner

The Advanced Technology Institute (ATI) is a multidisciplinary research centre with 150 researchers at the University of Surrey, focusing on advanced technologies particularly suitable for the circular economy, renewable energy, advanced sensors, water management, smart grids, IoT, and artificial intelligent systems, etc. Prof. Ravi Silva, Director of the ATI, and his team has a strong interest in the application of advanced technologies for the sustainable development of smart cities and green solutions for energy. Moreover, the Uni. Surrey has a Living Lab to support the implementation of new sustainable technologies within its community and campus that allows for the collaboration of academics, community partners, and other stakeholders to apply current research and innovation to address real-world issues. This will allow many developments to be transposed to our Indian partners and obtain feedback of these solutions from a much larger community as part of this programme. Accessing outputs from smart technologies applied to preserve freshwater or sanitation solutions for the waste/polluted water treatment is precious and essential for future agriculture, energy generation, life and ecosystems, etc. In this context, the Uni. Surrey has been working towards the provision of safe water for more than 30 years and it was also awarded the Queen's Anniversary Prize in 2011 for its wide-ranging and global work improving access to safe drinking water and sanitation. Parul Uni. has worked collaboratively with the Uni. Surrey on two research projects, which were focused on preservation of freshwater in energy solutions and using solar energy in green refrigeration systems. Further, colleagues such as Prof. Prashant Kumar, Director of the Global Centre for Clean Air Research (GCARE) is an expert in clean air engineering/science, human health and smart/sustainable living in cities/megacities will also help support this project. Uni. Surrey partners are interested to attend the technical steering meetings and provide their suggestions to develop the smart cities as well as to enable quality publications. With this collaboration, the Uni. Surrey and partners will implement their smart technologies in large cities and regions to get valuable feedback and experience. Such demonstrations can be helpful for

Partner Country and UK University Letters of support

UK University Letters of support-Jan 2021
10/01/2021
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UK Partners National Security Declaration

RAEng TSP UK Partners National Security Declaration
15/01/2021
06:34:48
pdf 122.11 KB

Letter of support from the industry partner(s) and other stakeholder partners

L&T Letter of Support
14/01/2021
15:15:10
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Nirvedha Parul Letter of Support
14/01/2021
15:14:55
pdf 409.16 KB

Letter_of_Support_NASSCOM CoE_Gandhinagar-signed
14/01/2021
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Section 3 - Goals, Objectives, Outcomes and Impact

Goals and Objectives

1. Exploring the Use of Artificial intelligence, IoT and Block Chain technologies for planning, design and development of smart cities through by
• exploring existing techniques and its utilization for development of smart city,
• designing the smart water meter systems for better water management,
• developing smart sewage management and distribution System,
• designing smart traffic surveillance system for reducing traffic congestion and roadside accident mitigation,
• preparing effective urban air quality management plan,
• designing unified response system for health, fire and other uncalled for emergencies, and
• developing a general controlled oriented guiding principle and methodology in the design of sustainable energy future for smart cities.
2. To provide hands on experience to faculty members, PhD scholars, Post-Graduate and graduate students of Parul University on role of AI, IOT & block chain in the domain of smart city, working jointly with professionals of Larsen & Toubro Ltd., and Advanced Research Institution, University of Surrey and of Starts Up .
3. To share research experiences and knowledge arising out of research project with managements of Smart Cities in India and with faculty members, PhD scholars, Post-Graduate and Graduate students of engineering colleges of Tier 2 and Tier 3 Universities and also with various players in industry.

What is the technical and national context of your collaboration and what makes it unique?

Cities are engines of growth for the economy of every nation, including India. Nearly 31% of India's current population lives in urban areas and contributes 63% of India's GDP (Census 2011). With increasing urbanization, urban areas are expected to house 40% of India's population and contribute 75% of India's GDP by 2030. This requires comprehensive development of physical, institutional, social and economic infrastructure. Recognising the need, Government of India launched Smart Cities Mission in 2015. Under the mission, 100 Smart Cities are being developed with a total project cost of Rs.2050.18 billion split into Rs.389.14 billion on Total Plan City Solutions and Rs.1642.04 billion on Total Area Development. Smart Cities Mission may impact Urban Population 100 million. Six cities of Gujarat namely Ahmedabad, Dahod, Gandhinagar, Rajkot, Surat and Vadodara have been identified by Government of India under Smart Cities Mission. The Smart Cities Mission essentially calls for formulating and applying smart solutions to overcome the challenges confronting various urban sectors such as water supply, sanitation, electricity, mobility, housing, energy and environment. As Report of Ministry of Communications, Government of India noted most of these are brownfield cities, with existing systems and processes. They have unique economic potential, cultural or heritage strengths and demographics strengths and constraints. Each city is not an island, rather the epicenter of its urban-rural spread that must consider the hinterland that surrounds it

and gives it additional advantages or constraints. Hence ICT designs must necessarily fit into existing systems and infrastructures, while reimagining it in parts or re-visualizing it anew but with appreciation of the complicated network of system, process or people interdependencies.

Our Study of selected Smart Cities of Gujarat has special importance as we would finding out innovative ways of using IoT, Artificial Intelligence, ICT and Digital Technologies to improve quality of life in smart cities.

Novelty

We may experiment the idea of reuse and recycling of sewage using efficient and intelligent solar driven Smart Rotary Membrane Bioreactor technique. Further, a smart water meter system is to be employed for optimized water distribution for 24*7, and minimal wastage of water. The smart traffic management system shall analyze congestion in one lane and implement adaptive virtual 3D-holographic pole-based traffic signals to overcome congestion. An emergency response teams will be connected to centralized infrastructure for smooth conduction of response plans. Emergency vehicles will be equipped with routers and connected with mesh network, will receive blueprints and plans of incident site for preparing mitigation plan well in advance. The enormous amount of data generated by IoT sensors will be stored using cloud and fog based architecture, and processed in an efficient way by artificial intelligence machine. Security of the data will be ensured with the help of block chain technology. Further, development of a general control-oriented model considering technical and economical parameters enables the design of an efficient energy management system for short-term and long-term goals.

What is the scale of the challenge you are addressing and, if successful, what extent of the challenge do you hope to address?

We are going to address enormous challenges as the total population of six smart cities as per Census 2011 was 14.5 million and expected to be over 20 million by 2021. Total area of these cities is 1781.33 sq kms. To interact with selected officials and citizens living in these cities for the purpose of understanding ground realities regarding water supply, energy, transportation, sewage, health and disaster management and also appreciate technologies used by smart cities will demand lot of time, energy and travelling .To promote and drive the successful achievement of sustainable smart city programmes, it is important to address all issues. Therefore, it is important to identify these challenges in order to efficiently allocate efforts and resources to abate the key obstacles hindering effective action (Figure 1. Scale of challenges).

• Clean water supply and the potential to handle waste water, along with how to properly control waste, are growing challenges for cities. Water depletion and flooding, with the consequences of climate change and rapid urbanization, are also a growing threat. Urban planners are being pushed into modernizing drainage schemes for ageing. Smart technologies, including leakage and emissions detection and predictive maintenance preparation, must be brought to the forefront.

• On an average 1000 liter water is supplied to a household in the society. A study suggest 50 to 100 liter water gets wasted due to leakage, human negligence and ignorance, all because of nominal price charged for water supply by local municipality. The installation of smart water meter system comprising of sensors will keep record of resources used and water leakage. The municipality can recommend varying tariff system which may motivate household and consumers for optimized usage of water. Since the water bill will be generated, the consumer is expected the conserve the water resource to the extent of 10-15%. The loses in the distribution system are anticipated to be around 15-20%, the small metering system shall help the municipality in identifying the leakage points and rectifying it within stipulated duration.

• A lab scale model of sewage treatment system will be developed for an efficient and smart sewage treatment. The model shall consist of primary screening unit followed by membrane bioreactor and final disinfection unit. It is expected to have sewage recycle efficiency of about 75-80%.

• Estimation of Air quality index and identification of local hotspots shall help the local authority in framing

effective urban air quality management plan to bring down the emissions within the national ambient air quality standards or WHO standards.
• In India, literature review suggest on average people spend 60% extra travel time because of traffic congestion. With the help of smart traffic solutions and adaptive traffic signals, extra travel time for a traveler can be reduced to a great extent. As per statistics, daily 62 pedestrian casualties are recorded because of the poor notification system. With the help of an audio-based broadcasting system, this number can be brought down to significant level.
• For a better understanding, the challenges and implementation barriers for sustainable smart city have been enumerated likely: Policy– India lacks long-term and consistent sustainable smart city (SSC) plans and policies. Because of overlapping policies and complex urban governance arrangements, SSC governance in India remains fragmented and lacks political commitment and support on the long term. Administrative– There is a lack of portfolio alignment between different sectors, and lack of good cooperation and acceptance amongst partners remains a major challenge. Long and complex procedures for authorization of project activities, complicated and non-comprehensive public procurement, difficulties in the coordination of high number of partners and authorities, and fragmented ownership are major barriers for scaling-up of projects. Public participation is rare and resources (institutional mechanisms, human, infrastructure, and skills) to disseminate information are limited. Legal and Regulatory– The extent of favorable and effective regulations, and financial incentives for innovative and new technologies is insufficient. The lack of consistent regulations to standardize technologies is a major barrier. Market and Financial– Limited access to capital and insufficient external financial support/funding for projects combined with economic crisis, risks and uncertainty in new technologies, and high costs of products and materials remain impediments for large-scale application of SSC solutions. Socio-Environmental– Government-led initiatives, such as demonstration and pilot projects, are needed for the majority of SSC actions in India. Negative effects of SSC related (e.g., solar and wind projects) project interventions on the social and natural environment may create inertia and interest in public. Technical– Procurement businesses, skilled and trained personnel, and proven and tested solutions and examples are insufficient. Industry interest in sustainable smart city projects is limited, voluntary, and without strong influences, as the area is new, and full of risks and planning deficiencies. Information and Awareness– There are very few information tools and educational resources to help public and businesses uptake sustainable smart city solutions. Awareness amongst public authorities, potential users, and consumers is very weak. Sustainable smart city solutions are commonly perceived as complicated and expensive by governments, industry, and the public.
• This requires that the chosen region, city and municipality need to situate themselves within national and international contexts in order to make a coherent strategy to transition to for instance 100% green energy.

What are the expected outcomes and impacts of the project for your Department, University and the wider engineering community and general public in your country?

1. Departments of Civil Engineering, Computer Engineering, Chemical Engineering, Electrical Engineering, Electronics & Communication Engineering, Information Technology Engineering, Mechanical Engineering of Faculty of Engineering and Technology and Faculty of Management will continue to interact with Nirvedha Technology Solutions LLP, NASSCOM CoE Gandhinagar, L&T Sargent & Lundy Ltd, Advanced Technology Institute, University of Surrey, UK for carrying forward the research further on “AI, IoT and Digital Technologies for Future Sustainable Smart Cities” and propagate across various relevant stakeholders.
2. Dissemination of information about new developed technologies among all relevant stakeholders.
3. Commercial Exploration of the resulting technologies.
4. All institutions namely Parul University, Nirvedha Technology Solutions LLP, NASSCOM CoE Gandhinagar, L&T Sargent & Lundy Ltd, Advanced Technology Institute, University of Surrey, UK will file application for patents for intellectual property created out of the project.
5. Further research will carried forward with funding support from concerned Government agencies in India and UK.
6. Knowledge and experience gained will be further shared with larger number of faculty members, B. Tech,

M. Tech and PhD Students of Engineering colleges in Western India.

What metrics for success would you consider suitable for the project?

1.Design and development of
a) a novel and solar energy operated Smart Rotary Membrane Bioreactor for effective treatment of sewage wastewater, and
b) General control oriented model for efficient energy management system of smart city.
2. Employing combination Geographic Information system, Artificial Intelligence, IoT and block chain technology for optimal functioning of Smart Water Management System, Smart Rotary Membrane Bioreactor for effective treatment of sewage wastewater, strategy for efficient energy management system, traffic management, pollution management and mitigation, and disaster management.
3. Publication of research output from the project in peer reviewed journals.
4. Dissemination of knowledge through workshops.

How will the collaboration continue following the exchange and how will the outcomes be built upon?

1. Departments of Civil Engineering, Computer Engineering, Electrical Engineering, Electronics & Communication Engineering, Information Technology and Mechanical Engineering will continue with Nirvedha Technology Solutions LLP, Pune, NASSCOM CoE, Gandhinagar, Larsen & Toubro Ltd and Advanced Research Institute of University of Surrey for carrying forward the research further on “use of AI, IoT and Digital Technologies for future sustainable smart cities”.
2. All five institutions namely Parul University, Nirvedha Technology Solutions LLP, Pune, NASSCOM CoE, Gandhinagar, L&T Sargent & Lundy Ltd and University of Surrey will file application for patents for intellectual property created out of the project.
3. Based on positive outcomes from the use of AI, IoT and Digital Technologies for future sustainable smart cities further research work will be carried forward to build upon the prototypes of “Sustainable Smart Cities” made out of the project.
4. Further research will be carried forward with funding support from concerned Government agencies in India and UK.
5. Knowledge and experience gained will be further shared with larger number of faculty members, under graduate, post graduate and PhD Students of Engineering colleges.

Stakeholder analysis and engagement

Following are some of the stack holders of smart cities:

Stakeholders:
• Government & Public Sector, PPP, Political Institutions, Local and regional administrations: The outcomes of the project will be helpful in efficient smart urban planning and smooth functioning of the services to the citizens.
• University Academics, Research & Innovation sector: Shall pave the way for further research and innovation for the betterment of the future smart cities.
• Energy suppliers & ICT sector representatives: The city business environment is changing quickly with the day-to-day escalation of big-data and the rise of integrated platforms that can be seen as monopolies due to their network effects. The project outcome shall be helpful in establishing the right policy and regulatory frameworks to avoid unfair competition, protect consumers and ensure social equality requires revisiting to be addressed.
• Property developers, Planners, Policy Makers, NGO’s and Associations: The data collected and processed form the smart city may be utilized by the interested organizations for planning and execution of the respective task.
• Media: The resultant output of data driven city may help them to plan, prepare and execute the programs to enrich their customer base.
• Financial and Founding Partners: For identifying the funding needs for specific task under a given

situation.
• Experts and scientists: Opportunity to work for further betterment of the smart city.
• Startups, Micro-small and Medium sized enterprises: May bring newer opportunity for expanding the services and business based upon the processing of the data generated by the smart cities.

Public:
Civil Society: The citizens' involvement process is composed of following key phases:
• Phase-1: General information about the project.
To disseminate the information of smart city project and the facilities and services to be provided to the citizen for betterment of their life.
• Phase-2: General presentation of the project evolution, dialogue with citizens and collecting feedback for enhancement, and employing citizens in testing and improving the prototypes and products. The citizens involvement at society, ward, and city level shall be helpful in getting the exact problems to be addressed at the varied levels and may provide suggestions helpful in the solution of the problem.

Section 4 - Project planning and resourcing

Provide a detailed description of the activities to be undertaken

At different stages of the project, workshops, seminars etc, will be organized inviting faculty members and students from different Engineering Colleges situated in the State of Gujarat and in neighboring States like Madhya Pradesh, Rajasthan and Maharashtra within a radius of 250 km from the city of Baroda.
For carrying out research and development work, the project will be broken down into sub projects which would be carried out simultaneously by B Tech, M-Tech and PhD students.
The schedule of project work shall be as below:
1. Time frame - 01 days, Dates: 01-04-2021, Milestone – Team formation,
Tasks -Interactions with Members of Teams from L&T- Sargent and Lundy Ltd, Nirveda Technologies LLP, NASSCOM CoE, Gandhinagar and Advanced Technology Institute, University of Surrey on the project and exchange ideas on the project,
Responsible team members- Faculty members of Engineering and R&D of Parul University along with L&T-Sargent and Lundy Ltd, Nirveda Technologies LLP, NASSCOM CoE, Gandhinagar and Advanced Technology Institute, University of Surrey.

2. Time frame -60 days, Dates -02-04-2021 to 31-05-2021, Milestone - Resource Acquisition and Allocation, Literature Review
Tasks - Distribution of work among teams of Parul University, L&T- Sargent and Lundy Ltd, Nirveda Technologies LLP, NASSCOM CoE, Gandhinagar and Advanced Technology Institute, University of Surrey, and Review of Literature of Research Work done in India, in UK and in world at large,
Responsible team members –As Above

3. Time frame -60 days, Dates -01-06-2021 to 30-07-2021, Milestone - Survey of GIS Maps and Data Collection: Smart Cities of Ahmedabad, Dahod, Gandhinagar, Rajkot, Surat and Vadodara and Effluent Characterization,
Tasks - Study of GIS maps of Vadodara city, Understanding architecture of surveillance system, survey of caching techniques and technologies for efficient energy management system, Investigation of Air quality Index Tasks - Survey and Data Collection,
Responsible team members –As Above

4. Time frame -60 days, Dates -31-07-2021 to 27-09-2021, Milestone, Data analysis, development of smart water meters and sensors and
Task- Sampling and Characterization of STP effluent, Data analysis, development and purchase of smart water meter, sensors, controllers, routers, and other networking equipment and Software(s): HOMER Pro,

XLSTAT, AERMOD/CALINE
Responsible team members –As Above

5. Time frame -01 day, Dates -28-09-2021, Milestone – Workshop on existing state of the art smart city, challenges
6. Time frame -01 day, Dates -29-09-2021, Milestone – Workshop on Advance Wastewater Treatment Techniques.
Responsible team members –As Above

7. Time frame -179 days, Dates -30-09-2021 to 27-03-2022, Milestone - Design and development of membrane reactor, and water meter system
Task:
a. Design and development of Primary Treatment Unit
b. Design and development of Rotary Membrane Bioreactor
c. Design and development of adsorption bed
d. Design and development of UV assisted disinfection Unit
Responsible team members –As Above

8. Time frame -01 day, Dates -28-03-2022, Milestone – Workshop on Cyber physical systems and block chain technology
9. Time frame -01 day, Date -29-03-2022, Milestone – Workshop on Artificial Intelligence in the context of smart city
10. Time frame -01 day, Date -30-03-2022, Milestone – Workshop on HOMER Pro
11. Time frame -01 day, Date -31-03-2022, Milestone – Workshop on Use of ICT technologies for Water management system
Responsible team members –As Above

12. Time frame -89 days, Dates -01-04-2021 to 28-06-2021, Milestone – Development of Alert system for heavy traffic and air pollution
Task:
a. To implement adaptive traffic signal by integrating AI and 3d holographic virtual poles to reduce the chance of accidents at zebra crossing
b. To analyze the data collected from air pollution monitoring system for future infrastructure developments like town planning schemes and roan and bridges development
c. To send the alternative routes to the drivers to reduce air pollution
Responsible team members –As Above

13. Time frame -01 day, Date -29-06-2022, Milestone – Workshop on Biological treatment techniques for wastewater
14. Time frame -01 day, Date -30-06-2022, Milestone – Workshop on Zero liquid discharge
15. Time frame -01 day, Date -01-07-2022, Milestone – Workshop on Traffic data interpretation using ML
Responsible team members –As Above

16. Time frame -225 days, Dates -02-07-2022 to 11-02-2023, Milestone – Design and development of a unified emergency response Centre
Tasks –
a. To understand the working methodology of all the emergency response teams
b. To develop unified emergency response Centre to provide seamless coordination
c. To integrate block chain model with emergency response application to secure the transmission between departments
d. To setup mesh topology based wireless network to send the map and blueprint of the site of incident to the emergency vehicles well in advance for quick response plan

e. Bio remediation (Activated Sludge Process)
f. Membrane remediation (Rotary membrane reactor)
g. Adsorption and UV assisted disinfection Treatment
h. Analysis and interpretation of IoT sensor data collected from STP
Responsible team members –As Above

17. Time frame -07 day, Date -12-02-2023, Milestone-Workshop on Membrane filtration techniques
18. Time frame -01 day, Date -13-02-2023, Milestone-Workshop on Environmental Friendly Strategy for Waste Management
19. Time frame -01 day, Date -14-02-2023, Milestone-Workshop on Solid waste management in industries
20. Time frame -01 day, Date -15-02-2023, Milestone-Workshop on Using programmable 3d Hologram projectors.
21. Time frame -01 day, Date -16-02-2023, Milestone-Workshop on AERMOD/CALINE.
22. Time frame -01 day, Date -17-02-2023, Milestone-Workshop on Data analysis and visualization techniques
23. Time frame -01 day, Date -18-02-2023, Milestone-Workshop on XLSTAT for analyzing the energy statistical data.
Responsible team members –As Above

24. Time frame -71 days, Dates -19-02-2023 to 30-04-2023, Milestone-Report Writing & Submission
Task: Report Writing & Submission
Responsible team members –As Above

25. Time frame -29 days, Dates -02-04-2023 to 30-04-2023, Milestone-Exploration of Patent Filing
Task: Exploration of Patent Filing
Responsible team members –As Above

Images and diagrams

RAE PROJECT DIAGRAM
14/01/2021
18:27:23
pdf 480.04 KB

Gantt Chart/ Activity Plan

Gantt-chart-RAE4
14/01/2021
15:48:15
pdf 188.13 KB

Breakdown of funding request

RAE TSTP Budget_17-01-2021
17/01/2021
17:34:02
pdf 1.16 MB

Justification of costs for grant value sought

1. Salary Costs (in Pound Sterling taken GBP = INR 100)

a. At Parul University: 64,958
b. At L&T Ltd: 17,250
c. At University of Surrey: 15,000
d. Nirvedha Technology Solutions LLP, Poona, India: 14,400
e. NASSCOM: 7,200

2. Consumables: 500
3.Software and Appliances: 10,634.45
4.. Travel and Sustenance Costs
a. At PU Travel-International ,Domestic, Stay and Food Expenses -10,800
b. At L&T Sargent & Lundy Ltd: 3500
c. At University of Surrey: 11,400
d. Nirvedha Technology Solutions LLP, Poona, India: 3,000
e. NASSCOM, CoE, Gandhinagar: 500
4. Workshops 6880

Total: 166022

Please refer uploaded excel sheet, under Breakdown of funding request for detailed information

Matched Funding Details

Funding to the Tune of UK Pound Sterling 49352 by Parul University,
Pound Sterling 13,750 to be borne by L& T Sargent and Lundy Limited
Pound Sterling 15000 to be borne by University of Surrey
Pound Sterling 4320 to be borne by Nirvedha Technology Solutions LLP
Pond Sterling 3600

Total funding of UK Pound Sterling 86022 to be borne by Parul University, L&T Sargent and Lundy, Nirvedha Technology Solutions , NASSCOM and University of Surrey.

Refer excel sheet uploaded under Breakdown funding request for detailed information.

Lead contracting partner

Partner country

Funding Allocation

Single Partner Allocation

Funding Allocation

Partner country

Please provide details on the ownership of any pre-existing or future Intellectual Property to be used/ generated and any formal agreements to this effect (input N/A if not applicable)

Broadly, Parul University, L&T Sargent and Lundy, Nirvedha Technology Solutions LLP , NASSCOM and University of Surrey, UK shall arrive at agreement to share the Intellectual Property Rights that may accrue from the project equally. There has been clarity among three institutions Parul University, L&T Sargent and Lundy and University of Surrey as three as a Team have successfully completed two industry defined research projects funded by Royal Academy of Engineering, UK. An agreement in writing will be entered into immediately after obtaining letter of sanction from RAE.

Section 5 - Lead Applicant Declaration

Lead University declaration

PU DECLARATION AND ANNEXURE 13-01-2021
14/01/2021
16:08:38
pdf 1.74 MB

Applicant declaration

Dr. Arvind R Yadav, Professor

☑ By ticking this checkbox I agree to be bound by the conditions for this scheme.

Section 6 - Marketing

Where did you hear about the scheme?

Please select all of the relevant options. The information provided will help us improve our communication strategy.

☑ From a website/social media

If you have selected 'other' above please specify

No Response

Annex C

Monitoring Schedule (Clause 5.1)

The Recipient shall ensure that the following Reports are submitted to the Academy by the dates shown below:

Report	**Date**
Initiation Report	16 March 2021
Report	01 December 2021
Report	01 June 2022
Report	01 December 2022
Report	30 May 2023

Mandatory Activities (Clause 5.6)

N/A

Annex D

Schedule of Payments

Subject to the prior submission of the necessary Reports as detailed in Annex C, the Academy shall ensure that payments are made to the Recipient for the following amounts on the dates shown:

Action	**Date**	**Value**	**Pre-requisite Report**
Initial payment to Parul University	01 April 2021	£72,000.00	Signed Contract
Final payment to Parul University	30 April 2023	£8,000.00	Satisfactory Final Report
Total	£80,000.00		

n.b. VAT is not payable on this Award

Invoices are not required and payment will be made against the banking details provided by the Recipient.

It is the Recipient's duty to inform the Academy immediately if the banking details change during the Award period.

Annex E

BANKING INFORMATION FORM

Please complete all sections and return this form as an Annex to the contract, along with the required proof of bank details. Partially completed Annexes will be returned for completion before being countersigned or payments made.

Please print legibly to avoid delay in payment processing.

Summary

Royal Academy of Engineering reference:	T2I\100048
Royal Academy of Engineering Finance contact:	finance@raeng.org.uk
Principal Contact:	Dr Arvind Yadav
Start date of award:	**01 April 2021**
Total Award value:	£80,000.00

1 - Reference

The Recipient's internal reference for the award (maximum 25 characters in length):	**PU-RAE-AI-SMART CITY**

2 - Key Finance Administrative Contact for this award:

Name (full):	**Dr. Parul Patel**
Position:	**Managing Trustee**
Organisation:	**Parul University**
Contact email address:	**drparul@paruluniversity.ac.in**

3 - Bank Information

Organisation Name	**PARUL UNIVERSITY**		
Organisation Address	**AT & PO- LIMDA, TAL. WAGHODIA, DIST-VADODARA**		
	City **VADODARA**	County **GUJARAT**	Postal Code **391760**
	Country	**INDIA**	
Bank Name	**CENTRAL BANK OF INDIA**		
Bank Address	**PIET, LIMDA, TA. : WAGHODIA, DIST- VADODARA**		
	City **VADODARA**	County **GUJARAT**	Postal Code **391760**
	Country	**INDIA**	
Beneficiary Name	**R AND D CENTRE UNIT OF PARUL UNIVERSITY**		

Bank Account Number	3	7	9	3	1	5	0	7	4	5

Bank Account Currency	Please specify: **INR**						
Sort Code							
BIC or SWIFT code	**CBININBBOSB**						
IBAN							

4 - Payment Notification Details:

Email Address*	drparul@paruluniversity.ac.in

*An email notification will be sent to this address as confirmation of payment, including the amount, date of payment and invoice number(s).

5 – Proof of Bank Details

As a fraud prevention measure and to enable us to check for mistakes, you must also return one of the following documents to confirm the bank account details. Please indicate which of the following you have included.

- [x] VOID CHEQUE
- [ ] PAYING IN SLIP
- [ ] COPY BANK STATEMENT

6 – Authorise Payment

I hereby authorise the Royal Academy of Engineering to process payment to the above bank account and I confirm that the above information is correct. This account will remain in effect until written authorisation to stop and/or change the instructions is received by the Royal Academy of Engineering.

I have authority to sign this Form on behalf of the organisation.

	Authorised Signature 1	**Authorised Signature 2**
Signed:		
Date:	09/03/2021	09/03/2021
Name (full):	DR. PARUL PATEL	DR. DEVANSHU J. PATEL
Position:	MANAGING TRUSTEE	PRESIDENT
Organisation:	PARUL UNIVERSITY	PARUL UNIVERSITY
Email address:	drparul@paruluniversity.ac.in	president@paruluniversity.ac.in

PARUL UNIVERSITY • At. Po. Limda, Tal. Waghodia, Dist. Vadodara. Gujarat State India

सेन्ट्रल बैंक ऑफ़ इंडिया
Central Bank of India

PARUL INSTITUTE OF ENGG TECH BRANCH (04063), GUJRAT - 391760
पारुल इंस्टिट्यूट ऑफ़ इंजीनियरिंग और टेक शाखा (04063), गुजरात - 391760
IFSC: CBIN0284063

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D	D	M	M	Y	Y	Y	Y

26-10-2020

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अदा करें ₹

खा.सं. A/c No. 3793150745

FOR R & D CENTRE UNIT OF
PARUL UNIVERSITY

TRUSTEE/AUTHORIZED SIGNATORY
PARUL UNIVERSITY

कृपया हस्ताक्षर ऊपर करें / Please sign above

Cancelled

⑈110406⑈ 390016016⑆ 006858⑈ 31

Date : March 09, 2021

TO WHOM IT MAY CONCERN

Bank Account Name	:	R AND D CENTRE UNIT OF PARUL UNIVERSITY
Bank Account Number	:	3793150745
Bank Name	:	CENTRAL BANK OF INDIA
Bank Branch	:	PIET, LIMDA, TA. : WAGHODIYA DIST. : VADODARA GUJARAT, INDIA
IFSC	:	CBIN0284063
Branch Code	:	284063
MICR Code	:	390016016
SWIFT Code	:	CBININBBOSB

FOR R & D CENTRE UNIT OF
PARUL UNIVERSITY

TRUSTEE/AUTHORIZED SIGNATORY

Annex F

ROYAL ACADEMY OF ENGINEERING POLICIES (Clause 6.1)

1. Safeguarding Policy
2. Bullying and Harassment Policy
3. Anti-Bribery Policy
4. Equality and Diversity Policy
5. Modern Slavery Policy
6. Data Privacy Policy

Awardees to be notified of policies 1, 3 and 5 at a later date.

T2I_100048 - Partially Signed Award Offer Letter

Final Audit Report 2021-03-17

Created:	2021-03-16
By:	International Partnerships (internationalpartnerships@raeng.org.uk)
Status:	Signed
Transaction ID:	CBJCHBCAABAAJ2IaPy1joejZUxq8Idf07TESabiDwPUm

"T2I_100048 - Partially Signed Award Offer Letter" History

Document created by International Partnerships (internationalpartnerships@raeng.org.uk)
2021-03-16 - 5:35:17 PM GMT- IP address: 185.68.1.35

Document emailed to Nick Starkey (nick.starkey@raeng.org.uk) for signature
2021-03-16 - 5:35:52 PM GMT

Email viewed by Nick Starkey (nick.starkey@raeng.org.uk)
2021-03-17 - 7:42:01 AM GMT- IP address: 80.189.148.165

Document e-signed by Nick Starkey (nick.starkey@raeng.org.uk)
Signature Date: 2021-03-17 - 7:43:29 AM GMT - Time Source: server- IP address: 80.189.148.165

Agreement completed.
2021-03-17 - 7:43:29 AM GMT

Adobe Sign

Industry Academia Partnership Programme - India Contract

This Contract (the 'Contract') is made on the 14th March, 2016 between:

(A) **The Royal Academy of Engineering** incorporated by Royal Charter of 3 Carlton House Terrace, London SW1Y 5DG, Registered Charity 293074 ('the Academy')

(B) **Parul University**, Vadodara (Dist), India, 391760, India ('the Recipient')

Background:

(A) This Contract contains the terms and conditions of an Award to be made by the Academy under its Industry Academia Partnership Programme scheme, whose purpose is support the aims of the UK government's Newton Fund by facilitating international visits and exchanges between industry and academic partners in the UK and their counterparts in selected Newton Fund Partner Countries.

(B) The details of the Award are set out in Annex A to this Contract.

It is agreed as follows:

1. Definitions

'The Award' means the award of a grant whose details are set out in Annex A.

'The Award Letter' means the letter or email from the Academy addressed to the Awardee(s) confirming the Award as detailed in Annex A.

'The Recipient' means the university / organisation named above which will be formally receiving the Award.

'The Principal Contact' means the Awardee who is the principal contact at the Recipient who is named in Annex A.

'The Programme of Activities' means those activities specified in the Application, attached as Annex B, subject to any additional, excluded or amended activities detailed in clause 3.4

'The Awardee(s)' means the Principal Contact and any other person(s) who is named in the original Application, as the context may require.

'Online Grant System' means the Academy's online application and assessment program through which the Award application was submitted, assessed, and will be monitored.

'Statement of Expenditure' means the statement of expenditure required to be submitted by the Recipient under Clause 5.1.

'Report' means any formal written update concerning the Programme of Activities required to be submitted by the Awardee under Clause 4.5.

'Not applicable' means this clause is not relevant to this Contract and has been redacted. The clause number remains in place to maintain the accuracy of any clauses which refer to other clauses.

2. Grant of Award

2.1 The Academy undertakes to provide the Award to the Recipient in accordance with the provisions of this Contract. In the event of any conflict or inconsistency between the terms

of this Contract and the Award Letter, or any other communication between the parties, the terms of this Contract shall prevail.

2.2 The Recipient shall be bound by the terms and conditions set out in this Contract. For the avoidance of doubt, the Award will not be activated and the Academy will not be obliged to pay any part of the Award to the Recipient until (a) the Contract has been received by the Academy duly signed by or on behalf of the Recipient; and (b) the Contract has been countersigned by the authorised signatory on behalf of the Academy. The Academy will not accept liability for any expenses incurred prior to the fulfilment of conditions (a) and (b) above.

2.3 Not Applicable.

2.4 The Recipient shall procure that the Awardee(s) performs all activities necessary for the fulfilment of the terms of this Contract. The Recipient shall put in place suitable contractual arrangements with the Awardee(s) and any third parties and will ensure that the Awardee(s) is made aware of any relevant obligations required to be met by the Recipient for which the Awardee(s)'s contribution is required, including but not limited to the provision of any Reports.

2.5 The Awardee(s) will be employed by the Recipient on a full-time basis and will not undertake any other paid work, hold any other form of paid office or employment or interrupt the Award to pursue other activities without the prior written consent of the Academy, acting reasonably, except that this consent will not be required for up to a combined total of 4 hours of teaching duties and consultancy work per week. If any variation is approved the Academy reserves the right to adjust the Monitoring Schedule at Annex C and the Schedule of Payments at Annex D accordingly.

2.6 The Awardee(s) must notify the Academy in writing that the Programme of Activities has started by submitting an Initiation Report, by the date given in the Monitoring Schedule, Annex C. This notification will be provided through the Online Grant System.

2.7 The Award is given to the Recipient only and is solely in respect of the Awardee and is not transferable to any third party (including an Awardee(s)) without the written agreement of the Academy. The Academy's decision on any requested transfer is final, as is the consequential distribution or allocation of any remaining Grant funds.

2.8 The financial support received from the Academy must be acknowledged by the Recipient and the Awardee(s) in any materials or publications regarding or resulting from the Award, and in any written or spoken presentations about the Award, in the following form (or such other form as the Academy has approved in writing): "*This [projectname] was supported by the Royal Academy of Engineering under the* Industry Academia Partnership Programme - India *scheme*"

2.9 Not applicable.

2.10 The Awardee(s) is entitled to take maternity, paternity, or adoptive leave if such leave is accordance with the terms and conditions of their contract of employment. The Academy will extend the duration of Award to account for the leave taken, and adjust the Monitoring Schedule (Annex C) and the Schedule of Payments (Annex D) accordingly.

2.11 The Recipient will notify The Academy of any such leave periods as early as reasonably possible.

2.12 Not applicable.

2.13 Not applicable.

2.14 The Award is given to the Recipient by the Academy as part of the UK's Official Development Assistance (ODA).

3. Programme of Activities, and timetable

3.1 The Recipient shall procure the carrying out of the Programme of Activities as described in Annex B.

3.2 The Recipient shall not modify or alter the Programme of Activities without the prior written consent of The Academy.

3.3 The Academy's approval must be sought in advance and in writing for changes to any of the following:

3.3.1 the Start Date
3.3.2 the End Date
3.3.3 the re-allocation of expenditure between different cost categories, as specified in Annex B
3.3.4 a change from full to part-time employment, or from part-time to full-time, as applicable.

The Awardee(s) should specify any reasons for the requested changes, and may at the Academy's request be required to provide further reasonable information. The Recipient and the Awardee(s) will be notified of the Academy's decision in writing. However, no additional funding will be provided if these dates are varied, subject to Clause 2.12 (if applicable).

3.4 The Recipient shall undertake the additional or amended activities (if any) specified in Annex B, and shall not use the funding for the activities excluded (if any) in Annex B.

3.5 Not applicable.

4. Payment of the Award

4.1 The amount of the Award to be paid to the Recipient is set out in Annex D.

4.2 The Recipient undertakes to provide funding for any additional costs not covered by the Award which are necessary for the successful completion of the Programme of Activities. The Award is cash-limited and no supplementary funding will be provided by the Academy to complete the Programme of Activities in event of a shortfall.

4.3 The Recipient will provide the Awardee(s) with sufficient access to funds to enable the successful completion of the Programme of Activities.

4.4 Once this Contract has been signed by both parties in accordance with Clause 2.2 and any conditions specified in Clause 2.3 have been met the Academy shall make payments to the Recipient according to the Payments Schedule shown in Annex D. The Recipient will complete Annex E with the necessary banking information required to process the payments. The Recipient is not required to submit invoices for payment and all payments will be made to the bank account provided.

4.5 Each payment will be conditional upon receipt by the Academy of any and all Reports which fall due prior to the payment date, in accordance with Clause 5.1. Reports must be submitted in a timely manner and be of a satisfactory standard to release payment, as determined by the Academy, acting reasonably. Reports submitted more than 60 days after the due date are unlikely to be considered timely and no further payment will be made.

4.6 The Academy will deduct from the Final Payment (a) any underspend on the Programme of Activities which is evident from the Statement of Expenditure and (b) any funds not spent exclusively on the Programme of Activities, and if the amount to be deducted exceeds the amount of the Final Payment then no Final Payment will be made and the balance due shall be refunded to the Academy by the Recipient within 4 weeks of the Award End Date.

4.7 The Academy reserves the right to withhold or delay any payment if the Academy is not satisfied (acting reasonably) that the Programme of Activities will proceed, or has proceeded in accordance with this Contract.

4.8 No interest shall accrue on any sums not paid by the Academy on the due dates, or withheld in accordance with the terms of this Contract.

5. Reports

5.1 The Awardee(s) will submit written Reports through the Online Grant System to the Academy of the description, and by the dates specified in Annex C. These Reports shall follow the guidelines given within the Online Grant System, and include:

5.1.1 a Statement of Expenditure incurred covering the cost categories included in the application, attached as Annex B

5.1.2 such other information as the Academy may reasonably request.

5.2 Not applicable.

5.3 Not applicable.

6. Other obligations

6.1 The Recipient will ensure that before the Programme of Activities starts all the necessary legal and regulatory requirements for the conducting of the Programme of Activities are met and all necessary licences, visas and approvals are obtained, and maintained during the period of the Award.

6.2 The Recipient undertakes to support the Awardee(s) in the Programme of Activities and to ensure access to facilities specified in Annex B and any other facilities necessary for completion of the Programme of Activities.

6.3 The Recipient shall not allow any Award monies to be used other than for the purposes of the Programme of Activities.

6.4 The Awardee(s) shall comply with any policies of the Recipient and all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010 and not engage in any activity, practice or conduct which would constitute an offence under the Bribery Act 2010 and other legislation in the UK or overseas.

6.5 The Recipient will keep complete and accurate accounts of expenditure on the Award and the Programme of Activities and allow the Academy or its representatives (on reasonable notice) to inspect such accounts and take copies. Should the Academy request it the expenditure statement must include all of the cost categories as submitted in the Application, attached as Annex B.

6.6 At the request of the Academy, the Recipient will permit the Academy and its representatives access upon reasonable notice to the Recipient's premises and to the Awardee(s) for the purposes of monitoring the progress of the Programme of Activities.

6.7 The Recipient will ensure that the results of the Programme of Activities are disseminated publicly within twelve months of the Award End Date (unless the Academy has agreed in writing to a longer period).

6.8 The Recipient agrees to endorse the commitments of the Concordat to Support Research Integrity and must have in place formal written procedures and policies to promote and ensure compliance with the commitments. In particular the Recipient commits to adhere

to the highest standards of professionalism and integrity and agrees to have procedures in place to ensure that research is conducted in accordance with standards of best practice; systems to promote research integrity; and transparent, robust and fair processes to investigate alleged research misconduct.

6.9 The Recipient shall ensure that the Awardee(s) acknowledge the Academy's financial contribution in all publications regarding or resulting from the Programme of Activities, in the form specified in Clause 2.8 or as otherwise agreed to by the Academy.

6.10 The Recipient shall ensure that all uses of the Academy's logo conform to the Academy's requirements, as notified by the Academy to the Recipient.

6.11 The Academy may refer to the making of the Award, the names of the Recipient and the Awardee(s), and the general aims of the Award in any reports to its funders and in any publicity material.

6.12 Not applicable.

6.13 Not applicable.

6.14 Not applicable.

7. Intellectual Property and equity rights

7.1 The Academy will not own or be granted a licence under any intellectual property rights relating to or resulting from the Programme of Activities.

7.2 The Recipient will ensure that the intellectual property rights in any results derived from the Programme of Activities are shared between the Recipient, the Company and the Awardee(s) and agreed in writing between the Recipient, the Company and the Awardee(s) before the Award Start Date. The Recipient will supply details to the Academy on request.

7.3 The Recipient will ensure that all existing intellectual property rights required to undertake the Programme of Activities are agreed in writing between the Recipient and the Awardee(s) before the Award Start Date. The Recipient will supply details to the Academy on request.

7.4 Not applicable.

8. Termination

8.1 Should the Department for Business, Innovation and Skills (or successor department) reduce the funding of this Award the Academy reserves the right to terminate this Contract at any time with immediate effect by giving written notice to the Recipient.

8.2 The Academy may also terminate this Contract by notice in writing if:

8.2.1 the Recipient or the Awardee(s) has provided any false information in connection with the Award application or the Programme of Activities; or

8.2.2 the Recipient fails to apply the Award monies for the purposes specified in this Contract; or

8.2.3 the Recipient is in breach of any other provisions of this Contract;

8.2.4 the Awardee(s) cease(s), in the reasonable opinion of the Academy to have suitable employment for the completion of the Programme of Activities; or

8.2.5 the Recipient receives funding from alternative sources for the Programme of Activities which covers the same costs as are funded under this Contract (without the prior agreement of the Academy): or

8.2.6 The Academy, acting reasonably, considers the Awardee(s) unfit or unable to pursue the Programme of Activities in accordance with the requirements of this contract, if the

facilities required for the Programme of Activities are not available, or if for any other reason the Programme of Activities cannot be fulfilled: or

8.2.7 The Academy determines (acting reasonably) that the Recipient's and/or the Awardee's performance has fallen below an acceptable standard; or

8.2.8 The Academy, acting reasonably, considers that the arrangements for the exploitation of the intellectual property rights required for and resulting from the Programme of Activities (as referred to in Clauses 7.2 and 7.3)) are not in accordance with the Award application approved by the Academy.

8.3 If this Contract is terminated by the Academy under clause 8.1, the Academy will reimburse the Recipient up to the maximum value of the Award for all reasonable expenditure incurred prior to the termination date, provided this expenditure is in accordance with the Programme of Activities and subject to evidence (if requested by the Academy) that the expenditure has been incurred.

8.4 If the Academy gives notice to terminate under clause 8.2, the Academy may require the Recipient to repay all or part of the Award paid by the Academy to the Recipient.

9. Limitation of liability

9.1 The Academy accepts no responsibility for any costs, claims, taxes, demands or expenses incurred by the Recipient or an Awardee for which the Recipient or Awardee(s) may be liable as an employer or otherwise as a result of the Award or the Programme of Activities, and the Recipient agrees to indemnify the Academy and its employees and hold them harmless against any such costs, claims, demands and liabilities accordingly.

10. Miscellaneous

10.1 Should the Department for Business, Innovation and Skills (or successor department) amend the conditions upon which it provides the funding to the Academy for this Award the Academy reserves the right to amend the terms and conditions for this Award to the extent necessary to enable the effective continuation of the Award and compliance with the new conditions, which will be notified to the Recipient and Awardee(s) in writing. If it is not prepared to accept the amended terms and conditions, the Recipient may terminate this Contract by notice in writing to the Academy within 30 days of notification. If this Contract is terminated by the Recipient, the Academy shall not be obliged to make any further payments and the Recipient shall refund within four weeks any amount not spent exclusively on the Programme of Activities as at the date of termination. Unless so terminated by the Recipient, this Contract shall be deemed to be varied with effect from receipt of the amended terms and conditions by the Recipient.

10.2 The Recipient will promptly inform the Academy in writing of any change in the status of the Recipient or the Awardee(s) or of any other circumstance which might affect its ability to comply with the terms of this Contract.

10.3 Subject to clause 10.1, this Contract can only be varied or amended by the prior written agreement of both parties.

10.4 For the avoidance of doubt, this is not a contract for the supply of services by the Recipient and nothing in this Contract shall be deemed to create an employment relationship between the Academy and the Awardee(s), or any other person.

10.5 This Contract and its Annexes contain the entire agreement and arrangement between the Academy and the Recipient or the Awardee(s) regarding the Award and all other prior agreements, arrangements or understandings are hereby excluded.

10.6 References in this Contract to communications to be made 'in writing' shall be deemed to include email.

11. Governing law and jurisdiction

11.1 This Contract shall be governed by and construed in accordance with English law and all parties agree to submit to the exclusive jurisdiction on the English Courts as regards any claim or matter arising under the Contract.

IN WITNESS whereof this Contract was signed on the below date

.....

Signature and stamp of behalf of **Parul University**

Date: March 15, 2017

Name: Dr. A.S. Vijayakumar

Position: REGISTRAR

PARUL UNIVERSITY

Stamp

PARUL UNIVERSITY
At. Po. Limda, Tal. Waghodia, Dist. Vadodara.
Gujarat State
India

.....

Signed on behalf of the **Royal Academy of Engineering**

Date: .....

Name: .....

Position: .....

.....

Signed on behalf of the Royal Academy of Engineering

Date: 22 MAR 2017

Name: P D GREENISH

Position: CHIEF EXECUTIVE

11.1 This Contract shall be governed by and construed in accordance with English law and all parties agree to submit to the exclusive jurisdiction on the English Courts as regards any claim or matter arising under the Contract.

IN WITNESS whereof this Contract was signed on the below date

.....
Signature and stamp of behalf of **Parul University**

Date: .....

Name: .....

Position: .....

Stamp

.....
Signed on behalf of the **Royal Academy of Engineering**

Date: .....

Name: .....

Position: .....

ANNEX A

(details of the Award)

The Award will provide for the support of a Industry Academia Partnership Programme - India to be undertaken
by Dr Gopala Krishna Murthy Paidipati (the 'Principal Contact') and the Awardee(s), to be hosted by Parul University (the 'Recipient')

Dates of Programme of Activities:

from 01/04/2017 (the 'Start Date') to 30/04/2019 (the 'End Date') for the completion of the programme of activities (the 'Programme of Activities') under the title: Industry Defined Research Project " Green Refrigeration System Using Solar Energy "

as detailed in the application, (the 'Application') to the scheme attached at Annex B which was submitted to the Academy by the Principal Contact [and dated: 24 January 2017]

Award letter details:

Date: 09 MARCH 2017
Addressee: pimr.parul@gmail.com

Academy Reference: IAPPI\3

Annex B: APPLICATION FORM

Additional, Amended, or Excluded Activities (if any) (see clause 3.4)

Annex C

Monitoring Schedule

The Recipient shall ensure that the following Reports are submitted to the Academy by the dates shown below:

Report	Date
Initiation Report	15 March 2017
Report	01 June 2017
Report	01 September 2017
Report	01 December 2017
Report	01 March 2018
Report	01 June 2018
Report	01 September 2018
Report	30 May 2019

Annex D

Schedule of Payments

Subject to the prior submission of the necessary Reports as detailed in Annex C, the Academy shall ensure that payments are made to the Recipient for the following amounts on the dates shown:

Action	Date	Value	Pre-requisite Report
IAPPI\3 - IP	20 March 2017	£34,300.00	Condition A
IAPPI\3 - FP	20 March 2017	£14,700.00	Condition A
Total	£49,000.00		

NB. VAT is not payable on this Award

Invoices are not required and payment will be made against the banking details provided by the Recipient. It is the Recipient's duty to inform the Academy immediately if the banking details change during the Award.

Annex E

BANKING INFORMATION FORM

This form must be signed by an appropriate senior member from the central administration of the Recipient. Please return this form together with the signed contract to which this form is attached as an Annex. As an anti-fraud measure, you must also return one of the following to confirm the bank account details: a void cheque, a paying in slip, a copy bank statement.

Summary

The Recipient's internal reference for the award (maximum 25 characters in length):	
Royal Academy of Engineering reference:	IAPPI\3
Principal Contact:	Dr Gopala Krishna Murthy Paidipati
Start date of award:	
Total Award value:	£49,000.00

Key Finance Administrative Contact for this award:

Name (full):	
Position:	
Organisation:	
Contact email address:	

Please type or print legibly the Recipient's bank information to avoid delay in payment processing.

Bank Information

Organisation Name				
Organisation Address				
	City	County	Postal Code	Country
Bank Name				
Bank Address				
	City	County	Postal Code	Country
Beneficiary Name				
Bank Account Number				
Bank Account Currency	Please specify			
Sort Code				
BIC or SWIFT code				
IBAN				

Payment Notification Details:

Email Address*	

*An email notification will be sent as confirmation of payment which includes the amount, date of payment and invoice number(s)

Authorised Signatories

Name	Name
Job Title	Job Title
Signature	Signature
Date	Date

Note: **TWO** Authorised Signatures on behalf of the Finance Department are required.

I hereby authorise the Royal Academy of Engineering to process payment to the above bank account and I confirm that the above information is correct. This

account will remain in effect until written authorisation to stop and/or change the instructions is received by the Royal Academy of Engineering.

I have authority to sign this Form on behalf of the organisation.

I have included a VOID CHEQUE or PAYING IN SLIP or a COPY BANK STATEMENT as evidence of the bank account details.

Signed:	
Date:	
Name (full):	
Position:	
Organisation:	
Contact email address:	

Higher Education Partnership - India Contract

This Contract (the 'Contract') is made on the 17th March, 2016 between:

(A) **The Royal Academy of Engineering** incorporated by Royal Charter of 3 Carlton House Terrace, London SW1Y 5DG, Registered Charity 293074 ('the Academy')

(B) **Parul Univeristy** Faculty of Management Studies, Parul Univeristy POST:Limda,TA:Waghodia,DIST:Vadodara, Baroda, Gujarat, 391760, India , ('the Recipient')

Background:

(A) This Contract contains the terms and conditions of an Award to be made by the Academy under its Higher Education Partnership - India scheme, whose purpose is support the aims of the UK government's Newton Fund by facilitating international visits and exchanges between industry and academic partners in the UK and their counterparts in selected Newton Fund Partner Countries.

(B) The details of the Award are set out in Annex A to this Contract.

It is agreed as follows:

1. Definitions

'The Award' means the award of a grant whose details are set out in Annex A.

'The Award Letter' means the letter or email from the Academy addressed to the Awardee(s) confirming the Award as detailed in Annex A.

'The Recipient' means the university / organisation named above which will be formally receiving the Award.

'The Principal Contact' means the Awardee who is the principal contact at the Recipient who is named in Annex A.

'The Programme of Activities' means those activities specified in the Application, attached as Annex B, subject to any additional, excluded or amended activities detailed in clause 3.4

'The Awardee(s)' means the Principal Contact and any other person(s) who is named in the original Application, as the context may require.

'Online Grant System' means the Academy's online application and assessment program through which the Award application was submitted, assessed, and will be monitored.

'Statement of Expenditure' means the statement of expenditure required to be submitted by the Recipient under Clause 5.1.

'Report' means any formal written update concerning the Programme of Activities required to be submitted by the Awardee under Clause 4.5.

'Not applicable' means this clause is not relevant to this Contract and has been redacted. The clause number remains in place to maintain the accuracy of any clauses which refer to other clauses.

2. Grant of Award

2.1 The Academy undertakes to provide the Award to the Recipient in accordance with the provisions of this Contract. In the event of any conflict or inconsistency between the terms of this Contract and the Award Letter, or any other communication between the parties, the terms of this Contract shall prevail.

2.2 The Recipient shall be bound by the terms and conditions set out in this Contract. For the avoidance of doubt, the Award will not be activated and the Academy will not be obliged to pay any part of the Award to the Recipient until (a) the Contract has been received by the Academy duly signed by or on behalf of the Recipient; and (b) the Contract has been countersigned by the authorised signatory on behalf of the Academy. The Academy will not accept liability for any expenses incurred prior to the fulfilment of conditions (a) and (b) above.

2.3 Not Applicable.

2.4 The Recipient shall procure that the Awardee(s) performs all activities necessary for the fulfilment of the terms of this Contract. The Recipient shall put in place suitable contractual arrangements with the Awardee(s) and any third parties and will ensure that the Awardee(s) is made aware of any relevant obligations required to be met by the Recipient for which the Awardee(s)'s contribution is required, including but not limited to the provision of any Reports.

2.5 The Awardee(s) will be employed by the Recipient on a full-time basis and will not undertake any other paid work, hold any other form of paid office or employment or interrupt the Award to pursue other activities without the prior written consent of the Academy, acting reasonably, except that this consent will not be required for up to a combined total of 4 hours of teaching duties and consultancy work per week. If any variation is approved the Academy reserves the right to adjust the Monitoring Schedule at Annex C and the Schedule of Payments at Annex D accordingly.

2.6 The Awardee(s) must notify the Academy in writing that the Programme of Activities has started by submitting an Initiation Report, by the date given in the Monitoring Schedule, Annex C. This notification will be provided through the Online Grant System.

2.7 The Award is given to the Recipient only and is solely in respect of the Awardee and is not transferable to any third party (including an Awardee(s)) without the written agreement of the Academy. The Academy's decision on any requested transfer is final, as is the consequential distribution or allocation of any remaining Grant funds.

2.8 The financial support received from the Academy must be acknowledged by the Recipient and the Awardee(s) in any materials or publications regarding or resulting from the Award, and in any written or spoken presentations about the Award, in the following form (or such other form as the Academy has approved in writing): "*This [projectname] was supported by the Royal Academy of Engineering under the* Higher Education Partnership - India *scheme*"

2.9 Not applicable.

2.10 The Awardee(s) is entitled to take maternity, paternity, or adoptive leave if such leave is accordance with the terms and conditions of their contract of employment. The Academy will extend the duration of Award to account for the leave taken, and adjust the Monitoring Schedule (Annex C) and the Schedule of Payments (Annex D) accordingly.

2.11 The Recipient will notify The Academy of any such leave periods as early as reasonably possible.

2.12 Not applicable.

2.13 Not applicable.

3. Programme of Activities, and timetable

3.1 The Recipient shall procure the carrying out of the Programme of Activities as described in Annex B.

3.2 The Recipient shall not modify or alter the Programme of Activities without the prior written consent of The Academy.

3.3 The Academy's approval must be sought in advance and in writing for changes to any of the following:

3.3.1 the Start Date
3.3.2 the End Date
3.3.3 the re-allocation of expenditure between different cost categories, as specified in Annex B
3.3.4 a change from full to part-time employment, or from part-time to full-time, as applicable.

The Awardee(s) should specify any reasons for the requested changes, and may at the Academy's request be required to provide further reasonable information. The Recipient and the Awardee(s) will be notified of the Academy's decision in writing. However, no additional funding will be provided if these dates are varied, subject to Clause 2.12 (if applicable).

3.4 The Recipient shall undertake the additional or amended activities (if any) specified in Annex B, and shall not use the funding for the activities excluded (if any) in Annex B.

3.5 Not applicable.

4. Payment of the Award

4.1 The amount of the Award to be paid to the Recipient is set out in Annex D.

4.2 The Recipient undertakes to provide funding for any additional costs not covered by the Award which are necessary for the successful completion of the Programme of Activities. The Award is cash-limited and no supplementary funding will be provided by the Academy to complete the Programme of Activities in event of a shortfall.

4.3 The Recipient will provide the Awardee(s) with sufficient access to funds to enable the successful completion of the Programme of Activities.

4.4 Once this Contract has been signed by both parties in accordance with Clause 2.2 and any conditions specified in Clause 2.3 have been met the Academy shall make payments to the Recipient according to the Payments Schedule shown in Annex D. The Recipient will complete Annex E with the necessary banking information required to process the payments. The Recipient is not required to submit invoices for payment and all payments will be made to the bank account provided.

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4.6 The Academy will deduct from the Final Payment (a) any underspend on the Programme of Activities which is evident from the Statement of Expenditure and (b) any funds not spent exclusively on the Programme of Activities, and if the amount to be deducted exceeds the amount of the Final Payment then no Final Payment will be made and the balance due shall be refunded to the Academy by the Recipient within 4 weeks of the Award End Date.

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5.1.2 such other information as the Academy may reasonably request.

5.2 Not applicable.

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6.2 The Recipient undertakes to support the Awardee(s) in the Programme of Activities and to ensure access to facilities specified in Annex B and any other facilities necessary for completion of the Programme of Activities.

6.3 The Recipient shall not allow any Award monies to be used other than for the purposes of the Programme of Activities.

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6.6 At the request of the Academy, the Recipient will permit the Academy and its representatives access upon reasonable notice to the Recipient's premises and to the Awardee(s) for the purposes of monitoring the progress of the Programme of Activities.

6.7 The Recipient will ensure that the results of the Programme of Activities are disseminated publicly within twelve months of the Award End Date (unless the Academy has agreed in writing to a longer period).

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in place to ensure that research is conducted in accordance with standards of best practice; systems to promote research integrity; and transparent, robust and fair processes to investigate alleged research misconduct.

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7.1 The Academy will not own or be granted a licence under any intellectual property rights relating to or resulting from the Programme of Activities.

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7.4 Not applicable.

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8.2 The Academy may also terminate this Contract by notice in writing if:

8.2.1 the Recipient or the Awardee(s) has provided any false information in connection with the Award application or the Programme of Activities; or

8.2.2 the Recipient fails to apply the Award monies for the purposes specified in this Contract; or

8.2.3 the Recipient is in breach of any other provisions of this Contract;

8.2.4 the Awardee(s) cease(s), in the reasonable opinion of the Academy to have suitable employment for the completion of the Programme of Activities; or

8.2.5 the Recipient receives funding from alternative sources for the Programme of Activities which covers the same costs as are funded under this Contract (without the prior agreement of the Academy): or

8.2.6 The Academy, acting reasonably, considers the Awardee(s) unfit or unable to pursue the Programme of Activities in accordance with the requirements of this contract, if the facilities required for the Programme of Activities are not available, or if for any other reason the Programme of Activities cannot be fulfilled: or

8.2.7 The Academy determines (acting reasonably) that the Recipient's and/or the Awardee's performance has fallen below an acceptable standard; or

8.2.8 The Academy, acting reasonably, considers that the arrangements for the exploitation of the intellectual property rights required for and resulting from the Programme of Activities (as referred to in Clauses 7.2 and 7.3)) are not in accordance with the Award application approved by the Academy.

8.3 If this Contract is terminated by the Academy under clause 8.1, the Academy will reimburse the Recipient up to the maximum value of the Award for all reasonable expenditure incurred prior to the termination date, provided this expenditure is in accordance with the Programme of Activities and subject to evidence (if requested by the Academy) that the expenditure has been incurred.

8.4 If the Academy gives notice to terminate under clause 8.2, the Academy may require the Recipient to repay all or part of the Award paid by the Academy to the Recipient.

9. Limitation of liability

9.1 The Academy accepts no responsibility for any costs, claims, taxes, demands or expenses incurred by the Recipient or an Awardee for which the Recipient or Awardee(s) may be liable as an employer or otherwise as a result of the Award or the Programme of Activities, and the Recipient agrees to indemnify the Academy and its employees and hold them harmless against any such costs, claims, demands and liabilities accordingly.

10. Miscellaneous

10.1 Should the Department for Business, Innovation and Skills (or successor department) amend the conditions upon which it provides the funding to the Academy for this Award the Academy reserves the right to amend the terms and conditions for this Award to the extent necessary to enable the effective continuation of the Award and compliance with the new conditions, which will be notified to the Recipient and Awardee(s) in writing. If it is not prepared to accept the amended terms and conditions, the Recipient may terminate this Contract by notice in writing to the Academy within 30 days of notification. If this Contract is terminated by the Recipient, the Academy shall not be obliged to make any further payments and the Recipient shall refund within four weeks any amount not spent exclusively on the Programme of Activities as at the date of termination. Unless so terminated by the Recipient, this Contract shall be deemed to be varied with effect from receipt of the amended terms and conditions by the Recipient.

10.2 The Recipient will promptly inform the Academy in writing of any change in the status of the Recipient or the Awardee(s) or of any other circumstance which might affect its ability to comply with the terms of this Contract.

10.3 Subject to clause 10.1, this Contract can only be varied or amended by the prior written agreement of both parties.

10.4 For the avoidance of doubt, this is not a contract for the supply of services by the Recipient and nothing in this Contract shall be deemed to create an employment relationship between the Academy and the Awardee(s), or any other person.

10.5 This Contract and its Annexes contain the entire agreement and arrangement between the Academy and the Recipient or the Awardee(s) regarding the Award and all other prior agreements, arrangements or understandings are hereby excluded.

10.6 References in this Contract to communications to be made 'in writing' shall be deemed to include email.

11. Governing law and jurisdiction

11.1 This Contract shall be governed by and construed in accordance with English law and all parties agree to submit to the exclusive jurisdiction on the English Courts as regards any claim or matter arising under the Contract.

IN WITNESS whereof this Contract was signed on the below date

Signature and stamp of behalf of **Parul Univeristy**

Date: 19.3.2016

Name: Dr. A.S.V. JAYAKUMAR

Position:

Stamp **REGISTRAR PARUL UNIVERSITY**

PARUL UNIVERSITY • At. Po. Limda, Tal. Waghodia, Dist. Vadodara • Gujarat State India

Signed on behalf of the **Royal Academy of Engineering**

Date: 22-3-16

Name: P D GREENISH

Position: CEO

ANNEX A

(details of the Award)

The Award will provide for the support of a Higher Education Partnership - India to be undertaken by Dr Gopala Krishna Murthy Paidipati (the 'Principal Contact') and the Awardee(s), to be hosted by **Parul Univeristy** (the 'Recipient')

Dates of Programme of Activities:

From 1 March (the 'Start Date') to 28 February 2018 (the 'End Date') for the completion of the programme of activities (the 'Programme of Activities') under the title: Industry Oriented Research Project To Reduce Water Consumption and Optimize Efficiency of Thermal Power Plants by Using Air Cooled Condensers

as detailed in the application, (the 'Application') to the scheme attached at Annex B which was submitted to the Academy by the Principal Contact [and dated: 12 January 2016]

Award letter details:

Date: 17 MARCH 2016
Addressee: pimr.parul@gmail.com

Academy Reference: HEPI\1516\38

Annex B: APPLICATION FORM

Additional, Amended, or Excluded Activities (if any) (see clause 3.4)

Current application:
Higher Education Partnership - India
(HEPI\1516\38)

100% complete

You have fully completed:
Submitted: 12/01/2016

Applicant and institution details

* Denotes a required field

*

Lead Applicant (main Indian university representative) and Co-Applicant (main UK and Industry collaborator representatives) Contact Details

Dr Gopala Krishna Murthy Paidipati

Lead Applicant
+91 2668 260305 (Work)
pimr.parul@gmail.com (Work)
www.paruluniversity.ac.in (Work)

Parul Univeristy Faculty of Management Studies, Parul Univeristy POST:Limda,TA:Waghodia,DIST:Vadodara, Baroda, Gujarat, 391760, India (Work)

Mr RAJEN S PANDYA

Industry Colaboration

Co-Applicant
+912652453222 (Work)
+919825315961 (Mobile)

rajen.pandya@lntpower.com
www.lnt.com

L&T Power Institute, LNT Knowldge City, NH 8 -Ajwa -Waghodia Crosing, Baroda, India, 390019, India

*

Mr A R Tony Corless

UK Collaborator

Co-Applicant
+44 (0)1483 689848 (Work)
t.corless@surrey.ac.uk (Work)
www.surrey.ac.uk (Work)

Advanced Technology Institute, University of Surrey, Surrey, United Kingdom, GU2 7XH, United Kingdom (Great Britain)

Please include your institution name in the address line

Please provide contact details of the Lead and Co-Applicants

Please enter details for every applicant involved in this proposal, including the Lead Indian university and co-applicants from industry and academia in the UK and India.

Title	Full Name	Job title	Institution	Email
Mr	RAJEN PANDYA	HEAD,L&T POWER TRAINING INSTITUTE	L&T LTD	rajen.pandya@lntpower.com
Mr	A R (TONY) CORLESS	MANAGER,LABORATORY AND BUSINESS DEVELOPMENT	UNIVERSITY OF SURREY	t.corless@surrey.ac.uk
Dr	P.G.K.Murthy	Dean(Doctoral Program),Faculty of Management	PARUL UNIVERSITY	GOPALAKRISHNAMURTHY.PAIDIPATI@paruluniversity.ac.in
Dr	S.F.XAVIER	Director(R&D)	PARUL UNIVERSITY	Rnd@paruluniversity.ac.in
Mr	S M Siddique	HOD(Mechanical)	PARUL UNIVERSITY	pietmechanicalhod@paruluniversity.ac.in
Mr	Sanjoy Paul	Asst Professor	PARUL UNIVERSITY	sanjoy.paul@paruluniversity.ac.in
Mr	Jitendra Chauhan	Asst Professor	PARUL UNIVERSITY	jitendra.chauhan@paruluniversity.ac.in
Mr	Pranith Kumar Reddy	Asst Professor	PARUL UNIVERSITY	p.pranith.reddy@paruluniversity.ac.in
Mrs	Seema Nihalani	HOD,Civil Engineering	PARUL UNIVERSITY	seema.nihalani@paruluniversity.ac.in
Mrs	Suhasini Kulkarni	Asst Professor	PARUL UNIVERSITY	suhisini.kulkarni@paruluniversity.ac.in
Mrs	Falguni Bhavsar	HOD, Electrical Department	PARUL UNIVERSITY	falguni.bhavsar@paruluniversity.ac.in
Dr	Ravi S Silva	Director , Advanced Research Institute	UNIVERSITY OF SURREY	s.silva@surrey.ac.uk

Mr	R K Kushwaha	DGM (E&T)	L&T Power	ramsingh.kushwaha@lntpower.com
Mr	Satish Sambhaji Jadav	Manager(Thermal Power R&D)	L&T Power	satish.jadhav@lntpower.com
Mr	Yogendra Mishra	Senior Deputy General Manager & Group Head - Mechanical Department	L&T Sargent & Lundy Ltd	yogendra.mishra@lntsnl.com
Mr	Somnath Kundu	Joint General Manager (Head of Engineering)	L&T Sargent & Lundy Ltd	somnath.kundu@Lntsnl.com
Mr	Pius Kumar	Deputy General Manager- Head - Mechanical System Design -CCPP	L&T Sargent & Lundy Ltd	pius.kumar@Lntsnl.com
Mr	Maulik Patel	Sr. Engineer	L&T Sargent & Lundy Ltd	maulik.patel@Lntsnl.com
Dr	Barun Chakrbarti	General Manager and Head (R&D)	L&T Hydrocarbon Ltd	bc@lntenc.com
Mrs	Deepa Karvat	Asst Professor , Electrical Engineering	PARUL UNIVERSITY	deepa.karvat@parluniversity.ac.in

Please upload the CVs of participating collaborators *

Each CV should be a maximum of four pages long and submitted as a pdf.

File name	Date uploaded
CV_Somnath Kundu.pdf	09/01/2016 09:04:17
CV Yogendra Mishra.pdf	09/01/2016 09:04:02
CV- Mr. R S Kushwaha.pdf	09/01/2016 09:03:52
Professor Dr. S Ravi P Silva.pdf	09/01/2016 09:03:24
Parul University - Ms. Suhasini M Kulkarni - Civil Enginering Department - Structural Engineering.pdf	09/01/2016 09:02:54
Parul University - Ms. Seema Nihalani - Civil Enginering Department - Environmental Engineering.pdf	09/01/2016 09:02:48
Parul University - Ms. Falguni Bhavsar - Electrical Enginering Department - Structural Engineering.pdf	09/01/2016 09:02:42
Parul University - Mr. Sanjoy Paul - Mechanical Enginering Department.pdf	09/01/2016 09:02:18
Parul University - Mr. Pranith Reddy - Mechanical Enginering Department.pdf	09/01/2016 09:02:11
Parul University - Dr. Francis S Xavier - R&D.pdf	09/01/2016 09:02:02

Organisation details

Please give narrative descriptions of **each** organisation which is applying, including details of the specific departments and their relevance to the Programme.

Descriptions of each organisation should be no more than 200 words.

Project details

* Denotes a required field

Project Details:

Project title:

Industry Oriented Research Project To Reduce Water Consumption and Optimize Efficiency of Thermal Power Plants by Using Air Cooled Condensers

Please provide a short abstract/summary of the proposed project:

As per the World Bank – World Development Indicators , in the world out of total energy 22433 TWH , 8726 TWH constituting 39% was generated using coal and in India , out of total energy of 1118 TWH , 800 TWH constituting 72% was generated using coal in UK , out of total energy of 311 TWH , 101 TWH constituting 32 % . As per United Nations Department of Economic and Social Affairs (UNDESA) 90% of global power generation is water intense and by 2035 global energy consumption will increase by 50% and increasing water consumption by 85% . Today 15% of global water withdrawals are for energy production . As on today , 2.8 billion people live in areas of high water scarcity . (Source : IEA 2012 and UN 2012) . These huge amount of water withdrawal by power sector impact the ecosystem and on the water resources of the region. Withdrawal of water has been significantly reduced at the expense of 5-10% of plant-level efficiency by using Air cooled condenser. But , problem with air cooled condenser is also because of adverse wind condition which affect the fan work, which in turn decreases the overall efficiency of power plant. In addition to this performance of air cooled condenser is sensitive to operating conditions, such as ambient temperature, wind, rain, hail, or solar radiation and turbine back pressure. In this study a model of air cooled condenser will be developed to analyse the operating condition and design parameters. Using Computational Fluid Dynamics (CFD) the ACC will be optimised in terms of the heat transfer rate per unit of pump work, shape of tube, tube diameter, fin spacing and fin height so that heat transfer coefficient gets increased and simultaneously pressure drop decreased

Total project cost: *

£100,830.00

Total value sought from the Academy: *

£50,000.00

Please provide keywords relating to the project. *

This will help us in identifying suitable reviewers

Thermal Power , Water Reduction , Air Cooled Condensers

What is the proposed project start date *

Exchanges must start between **1 March 2016 and 30 March 2016**

01/03/2016 00:00:00

What is the proposed project end date *

Exchanges must end by **28 February 2018.**

28/02/2018 00:00:00

Is this a new collaboration *OR* is this is a pre-existing collaboration (for pre-existing collaborations you will be required to provide further details). *

New

Goals, objectives and outcomes

* Denotes a required field

Goals and Objectives *

Please state three main objectives for the exchange.

1. Carrying out research to reduce water consumption and optimize effciency of Thermal Power Plants using Air Cooled Condensers : As air cooled condenser leads to decrease in plant-level efficiency. Quantitative measure of previous study shows that the dry cooling system leads to increase primary energy consumption to generate the same level of power output. The performance of ACC further reduced during period of high ambient temperature leading to lower power production. The life of a power plant get extended by using ACC i.e. one of the compensation regarding high initial cost. The main aim of this research is to increase the performance of the air cooled condenser.
a. To increase heat transfer coefficient so that heat transfer rate gets increased by studying different fins structure, fin spacing and height.
b. To reduce the pressure drop leads to reduce pump power consumption.
c. To reduce the adverse effect of wind on fan, which increases the fan work by providing wind screen net at optimum height to nullify the effect of hot air recirculation which is a major concern in ACC and to reduce fan work at the same time.
d. Optimization of effect of turbine's back pressure (affect saturation temperature of exit steam).
2. To gain hands on experience for faculty members and students of ME of Parul University on industry defined project working jointly with professionals of Larsen & Toubro Ltd. and of Advanced Research Institution, University of Surrey.

3. To share research experiences and knowledge arising out of research project with faculty members and students of ME of Engineering Colleges of Tier 2 and Tier 3 Universities and also with various players in industry.

The main activities to be undertaken *

This is a key section of the application.

Describe the programme of work to be undertaken during the programme including how novel, realistic/ambitious the project is. **Outline the specific deliverables anticipated and appropriate milestones by which to measure progress**. There is an option to upload any supporting documents, figures and diagrams in the next question. Your description should include:

- a description of the agreed work programme(s), including a breakdown of tasks.
- context of the proposed research, including its application (academic and/or industrial)
- context of the proposed programme and the need it addresses
- a detailed technical case for the programme of work.

Please note: All responsibility for arranging travel and accommodation will lie with researchers and institutions involved

You have up to 1000 words to answer this question.

1. Interactions with Members of Teams from Larsen & Tourbo Ltd and of Advanced Research Institution , University of Surrey on the project and exchange ideas on the project .
2. Preparation of Specific Action Plan .
3. Distribution of work among teams of Parul University , Larsen & Toubro Ltd and Advanced Research Institution , University of Surrey .

4. Review of Literature of Research Work done in India, in UK and in world at large .
5. Focused discussions with heads of Strategic Business Heads of Larsen & Toubro Ltd to know their experiences with use of Air Cooled Condensers in Thermal Power Plants set up by Larsen & Toubro Ltd in India and in different countries of World to be taken up . Also if required interact with reputed ACC equipment suppliers .

6. Data collection from power plant like :
o Steam flow, W (tons/hr)
o Turbine exhausts team quality, x (kg dry steam/kg turbine exhaust flow)
o Turbine backpressure, pb (mm Hga)
o Ambient temperature, Tamb (deg C)
o Site elevation, (m---above sea level)
o Condenser heat load
o Variation of turbine heat rate with condenser pressure .

In addition to these basic quantities, the ACC design (and cost) may be affected by a number of plant and site characteristics which are listed below. Attempt will be made to understand the same and its impact on plant performance .
Site characteristics
Meteorology
Annual temperature duration curves
Prevailing wind speeds and directions
Extreme conditions (hottest day; freezing conditions)

Topography and obstructions
Nearby hills, valleys, etc.
Nearby structures, coal piles, etc.
Nearby heat sources---aux. coolers, plant vents, etc..
Maximum height restrictions
Plant layout as parts like a) "Footprint" constraints (length, width)
b) Location restrictions---distance from turbine exhaust
7. CFD analysis (with the input data collected in step 6 to predict the influence of air recirculation, air side pressure distribution, velocity and temperature characteristics and effects of it on the performance on ACC (air cooled condenser) by employing techniques like CFD .
8. Redesigng with features like wind screen wall, providing minimum distance between walkway, fins structure, spacing (fig 4) to nullify the parameters which affecting the performance found in step 7.
9. For doing the above step project will be broken down into subprojects which would be carried out simultaneously.
10. Simulate the Numerical equation (momentum, energy and continuity equations) with proper boundary condition and finally analyze the result .
11. At different stages of the project , workshops , seminars etc., will be organized inviting faculty members and students from different Engineering Colleges situated in State of Gujarat and in neighbouring States like Madhya Pradesh , Rajasthan and Maharashtra within a radius of 250 kms from the city of Baroda .
12. Discuss the result with collaborating universities and industry partner for necessary modification
13. If improvement is necessary , then we will be going with necessary corrections and will again simulate it to check the results.
14. Once the results are obtained from the sub projects, optimization of the parameters will be done and final conclusion will be made.
15. Research Report will be prepared and will be submitted to Royal Academy ..

Outline the specific deliverables anticipated and appropriate milestones:

1. If the pressure drop decreases in the auxiliary component, there will be reduction in fan work. This in turn will increase the overall efficiency of the power plant.

2. If the heat transfer rate increases with respect to unit pump work, then the size of the ACC will get reduced without hindering the power generation.

3. For using air cooled condenser the efficiency of the power plant gets reduced by 5-10%, according to the literature available. By optimizing the turbine back pressure, work output of the turbine will increase without hampering the heat transfer rate of air cooled condenser.
Appropriate Milestones :
1. Development of prototype of improved ACCs
2. Dissemination of knowledge about new technology among different stakeholders .
3. Publication of research output from the project in peer reviewed journals .

Pictures and Diagrams (optional)

Upload any images and/or diagrams related to your project. Upload a single document with the images and diagrams in the order you would like them viewed. They should be appropriately referenced in your previous answer.

You can upload a maximum of one file, so if you have multiple images to display then please collate them into a single file, and be sure to arrange them in the order you would like them viewed. A pdf would be the most user-friendly format.

File name	Date uploaded
Images and Diagrams.pdf	09/01/2016 09:16:14

Gantt Chart

Please upload a 1 page Gantt Chart detailing your agreed work programme, including a breakdown of milestones, indicators and target dates for specific elements of the work.

File name	Date uploaded
Gantt Chart.pdf	09/01/2016 09:16:26

*

The expected outcomes and impacts of the project for yours and other Indian engineering universities

Outline the expected outcomes and impacts that will accrue to your university, partnering Indian universities and the wider Indian engineering community and general public as a result of this programme. Please relate these to the Programme's 5 identified outcome areas and specify how Tier 2 and 3 engineering universities in particular will benefit.

You have up to 500 words to answer this question.

- Will provide an opportunity for faculty members and students to demonstrate their engineering skills in a real world setting and it will strengthen their fundamental understanding of the subjects & encourage them to go beyond classroom studies to enrich their academic experience while working jointly with professionals from L&T Ltd and of Advance Research Institute , University of Surrey , UK .
- The faculty members and students will be exposed to latest research in the given area and develops capabilities to work jointly with industry and an International University .
- They can publish outcomes of research in peer reviewed journals and obtain recognition .
- The students can submit outcomes of research by way of dissertations under their ME programs.
- The most important part of the project is that we come to work with diverse culture and as such good bond will be created between two countries which will lead to improvement in quality of engineering education.
- Faculty members and students of various Engineering colleges will participate in workshops , seminars etc., organized by Parul University and L&T Ltd jointly with technical support of Advance Research Institute , University of Surrey .
- The outcome of our project will directly help the country where water resource is an issue, at the same time for any developing country like India where providing electricity to every house hold is need of the hour, that means consumption of water for cooling in thermal power plant will go up (80% of water used in thermal power plant is for cooling purpose), country like India where some of the states are facing acute drought is a tough ask to go with conventional cooling system whether it is thermal power plant or Nuclear power plant.

For elaborating the step
Matimba Power Station got six units, total installed capacity of about 4000 MW.
With incorporating direct dry cooling, water consumption reduces to about 0.1 L/kWh (0.1 m3/MWh). This level is approximately 19 times less than an equivalent wet-cooled power plant. Matimba yearly consumption is 3.5 million m3 of water, as compared to an equivalent wet-cooled power plant, which would have used 50 million m3

outcomes Tier 2 and 3 engineering universities
Carrying out industry defined research Hands on experience for Faculty Members and students
New fund of knowledge through research and innovation Enhances quality of knowledge provided.
Results will be published in articles and journals. Engineering institutes, universities can access those articles, would come to know about methodology and how the project has been approached.
Faculty members of Parul university and Professional from L&T Ltd will offer training program to tier 2 and 3 university. Those university will get exposure to CFD and various analysis software like ANSYS, MATLAB, OpenFOAM.
Videos of few training program will be uploaded on you tube. For better understanding and access to simulation approach at any point of time.

*

Choice, role of and benefits to the industry partner

Provide justification for the choice of industry sponsor including the strategic importance of this relationship to you and your institution. Specify the exact role of the industry partner in this programme. Provide details of what has been achieved so far through any existing collaboration and what is the overall perceived long term vision for this relationship.

You have up to 350 words to answer this question.

Choice , Role of and Benefits to L&T Ltd as Industry Sponsor

Larsen & Toubro limited (L&T) is an Indian multinational having turnover of around USD 15 Bn. They operate in many sectors of the economy. It includes Infrastructure, Power, InfoTech, Finance and Technology Services.

L&T's team of senior engineers will be working with faculty and PG students of Parul University to explore and evaluate various options to find a techno-economical solution. L&T will jointly prepare the road map, schedule and periodically review the work done by Parul University team. L&T will also give them specific inputs to define the problem statement.

L&T's experienced engineers will give their quality time to drive this project as per the schedule. L&T will interact with the U.K. based partner University as required to find the appropriate workable approaches & solutions.

L&T is working on technologies which will help to reduce water consumption. Through this collaborative project, L&T intends to find sustainable technical solutions which will help to improve the efficiency of water usage in thermal power plants. While doing this, L&T also want to ensure that the overall efficiency of the thermal power plant does not get adversely affected significantly.

This project fits in very well with the objective of the company – To provide Power Plants using sustainable technologies to their customers. *

*

Choice, role of and benefits to the UK partner

Provide justification for the choice of the UK partner including the strategic importance of this relationship to you and your institution. Specify the exact role of the UK partner in this programme. Provide details of what has been achieved so far through any existing collaboration and what is the overall perceived long term vision for this relationship along with expected benefits to the UK partner and UK in general which will result from the collaboration.

You have up to 350 words to answer this question.

Choice , Role and Benefits to UK University Partner
Advanced Technology Institute , University of Surrey

The University of Surrey is a leading UK Institution currently the "University of the Year". It is widely recognised for excellence in applied research, for example winning a Queen's anniversary award for water research. The Faculty of Engineering and Physical Sciences has a close match to the range of interests of Larsen and Toubro Ltd. We have many areas of common interest, for example in the integration of information and communication technologies in the built environment.
The delivery of this activity will be led by the Advanced Technology Institute (ATI). This is a strongly inter-disciplinary institute, formally housing researchers from the Electronic Engineering and Physics Departments but with strong links across the faculty. The ATI will foster engagement with other relevant groups, such as the Centre for Environmental Strategy and the Mechanical Engineering Department – which has particular expertise in CFD and operates wind tunnels.
The initial offering is support and advice on coatings technology, especially novel carbon materials such as DLC, which can modify surface properties to control droplet formation and run off. However, we will be delighted to widen the scope of engagement to respond to identified needs and gaps.
University of Surrey is excited to find new applications for our science as applied technology; application of our science to mitigate environmental harm – by reducing water use; extension of our global outreach. It is evident that Larsen and Toubro Ltd has many areas of close fit between their business activities and our strengths and interests. We see this as being an ideal first engagement from which we can grow a sustained relationship to mutual benefit.

*

Intended ways of maximising the benefits, building capacity and sharing lessons resulting from the project

The Academy wishes to support collaborations with wide and lasting impact and requires applicants to reserve 5% of total programme costs toward this end. As such please detail plans for activities you will undertake to maximise the benefits of the programme, particularly amongst other Tier 2 and Tier 3 engineering universities. These may be other/further collaborations, dissemination activities, training workshops, public engagement, teaching, routes to exploitation/commercialisation.

The Academy encourages these activities to be conducted working through FICCI's National Knowledge Functional Hub and its associated networks of industry and university organisations.

You have up to 300 words to answer this question

Intended ways of maximising the benefits , building capacity and sharing lessons resulting from the project :

The following projects will be created for students of Masters of Engineering :

1. Performance characteristic estimation of air cooled condenser for given range of turbine back pressure values using CFD.
2. CFD modeling to optimize the ACC performance and turbine power generation capacity at high ambient temperature conditions.
3. Numerical analysis of A-Frame and V-Frame air cooled condenser: A comparative study
4. CFD analysis to study the effect of windscreen on thermal flow characteristics under adverse wind conditions.
5. Numerical analysis to optimize the fin structure, spacing, fin height to maximize the effectiveness of heat exchanger used in ACC.

The following Workshops to be conducted for the benefit of Faculty Members and Students Engineering Colleges with active support and guidance from L&T Ltd and University of Surrey :

1. workshop on power plants using different cooling system
2. workshop on power plants using ACC
3. workshop on adverse effect of emission from power plants
4. workshop on scarcity of fresh water
5. workshop on Computational Fluid dynamics

6. Workshop on Matlab *
7. Workshop on OpenFOAM
8. workshop on ANSYS
9. workshop on different optimization techniques.
10. workshop on design of ACC
11. workshop on parallel computing
12. workshop on Windtunnel and their uses
13. Mathematical Analysis and its Applications to Engineering
14. Workshop on Water conservation in thermal power plants
15. Workshop on Structural stability in design of ACC
16. Workshop on water consumption in steam condensers and air cooled condensers
17. Workshop for design of thermal walls
18. Workshop on use of smart materials in thermal power plants to increase efficiency.
19. Workshop on control strategy for Induction Motor for ACC
20. Workshop on designing of VFD for Induction Motor

How will the collaboration continue following the exchange and how will the outcomes be built upon? *

Provide details on how you will sustain the outcomes of the project, e.g. how you will maintain collaboration. Please also provide information about how this will be funded.

1. Departments of Mechanical Engineering , Electrical Engineering and Civil Engineering will continue with Larsen & Toubro Ltd and Advanced Research Institute of University of Surrey for carrying forward the research further on " Reducing Water Consumption and Optimize Efficiency of Thermal Power Plants by using Air Cooled Condensers " .
2. All three institutions namely Parul University , L&T Ltd and University of Surrey will file application for patents for intellectual property created out of the project .
3. Based on positive outcomes from suppliers of Air Cooled Condensers , further research work will be carried forward to build upon the prototypes of ACCs made out of the project .
4. Further research will carried forward with funding by suppliers of Air Cooled Condensers and support from concerned Government agencies in India and UK .
5. Knowledge and experience gained will be further shared with larger number of faculty members and students of ME of Engineering colleges .

Please provide details on the ownership of any pre-existing Intellectual Property, and any formal agreements to this effect. *

If the project involves the use of any Intellectual Property, provide the details of any relevant agreements. If no formal agreement exists/is planned, how do you perceive the risk to your Intellectual Property Rights, and how will the risk be mitigated?

Nil

Please provide details on the ownership of any future Intellectual Property which may result from the project, and any formal agreements to this effect. *

Please note: the Academy expects the researchers and institutions to agree in writing on Intellectual Property Rights (IPR) before the start of the exchange. Any agreement should allow for agreed dissemination activity to be undertaken unhindered. The Academy will not have any claim on research funded by the scheme.

Broadly , Parul University , L&T Ltd and University of Surrey , UK have agreed to share the Intellectual Property Rights that may accrue from the project equally . Draft agreement is being studied by all the parties and by end of Jan 2016, a formal agreement duly signed by all concerned parties .

Support requested

* Denotes a required field

Budget Template Upload *

Please upload a detailed, clear budget spreadsheet which outlines the total costs of your work programme and clearly shows the support you are requesting from the Academy and the contribution your partnership will offer.

Funding guidelines:

The total contribution from the Academy cannot exceed £50,000.

- This programme offers **financial support for travel, subsistence and salary support costs** related to your proposed activities amongst industry and academic partners in India and the UK.
- The Academy requires applicants to reserve 5% of **total** project costs for activities related to upscaling programme impact, building capacity and sharing lessons particularly amongst the wider network of Tier 2 and Tier 3 Indian engineering universities. Please cost this in to proposals and propose activities which may promote this end.
- There is no set limit on how much you can claim in any one category apart from consumables and other costs, where no more than 10% of the total cost may be requested. 'Consumables' include project specific costs of small equipment, computer software licenses or publication costs. Examples of 'other costs' are conferences and seminar fees.
- Please note that the funding provided by this scheme is ***not*** calculated on the basis of full economic costs.
- The totals may come to more than the maximum funding you can request under this scheme. Additional costs must be met by the participating Institutions. If the amount noted is higher than the award can provide, please state the contribution to be made by each institution.
- The funding provided cannot be used to pay for purchases of large equipment and research infrastructure.

Please note that budgets submitted at the Expressions of Interest stage were only indicative and are thus non-binding. Budgets may be revised based upon above criteria and detailed project needs.

File name	Date uploaded
ROYAL ACADEMY NKFH Budget R1.xls	09/01/2016 09:41:11

Justification of Costs *

Please provide a brief explanation of all costs, covering both what the funds will be spent on and why. We require evidence that you have researched the costs for which you are seeking support; for example you could include the cost per night of accommodation. Travel costs should be based on the most suitable and economical form of travel. Subsistence costs should reflect the normal rates applied at the host institution/s.

Please Note: This programme offers support for travel, subsistence and salary support costs related to conducting collaborative activities amongst industry and academic partners in India and the UK.

You have up to 300 words to answer this question. *

Salary Costs (in Pound Sterling)

At Parul University 21070
At L&T Ltd 18000
At University of Surrey 15000
Travel and Sustenance Costs

At Parul University 28900
(Towards Domestic Travel for Indians and Professors from UK
At L&T Ltd 3000
Lab , Software and Accessories 9100
Workshops 5760

Additional Funding Details *

Please provide details of any additional funding which will be provided by the partnering organisations or others in support of the project. The Academy requires that at least 40% of the funds being asked for be matched in contribution by applicants. Additional funding above 40% will be viewed positively, being further evidence of the value placed on the collaboration and its potential for impact.

You have up to 300 words to answer this question.

Funding to the Tune of UK Pound Sterling 50829 is being done by Parul University , L& T LTd and University of Surrey . Please refer to excel sheet uploaded for all details .

Letters of support and declaration

* Denotes a required field

University/ Academic Institution Letters of support *

We require letters of support from **each University/ Academic** institution taking part in the programme.

Letters of support should be written by Applicants' respective Heads of Departments (or Heads of Faculty if either of the Applicant is the Head of Department). As a minimum the Author should include:

- Confirmation of their support for the application
- Why they support the project
- How it fits in with the department's aims.
- What form the support will take (financial, staff time, guidance, facilities)

The letters should be on headed paper, a maximum of two pages long, signed by the author, and uploaded by the Applicant as pdfs.

Please note: The quality of institutional support is a key factor in the strength of the application

File name	Date uploaded
Ravi Silva Newton Fund second version on headhead word 050116.pdf	09/01/2016 09:27:29

Industry Partners Letters of support *

We require letters of support from **each Industry partner** institution taking part in the programme.

Letters of support should be written by the head of the relevant business unit with which the programme is to take place. As a minimum the Author should include:

- Confirmation of their support for the application
- Why they support the project
- How it fits in with the business's aims.
- What form the support will take (financial, staff time, guidance, facilities)

The letters should be on headed paper, a maximum of two pages long, signed by the author, and uploaded by the Applicant as pdfs.

Please note: The quality of institutional support is a key factor in the strength of the application

File name	Date uploaded
LNT DECLARATION.pdf	09/01/2016 09:28:18

Lead Indian Institution/University declaration *

The purpose of the declaration is to confirm that the application is acceptable in principle to the Lead Indian research institution/university, and that it has received all necessary internal authorisations.

The declaration terms must be printed on headed paper and be signed by an appropriate officer from the Research Grants Office or equivalent (i.e. the body which administers grant applications) of the Indian Lead applicant's institution/university. A scan of the letter should be uploaded by the Applicant. We do not need the hard copy version to be sent through.

A summary of the terms that the declaration must contain is shown below. A table version of this summary can be found in the Programme's guidance notes. Please copy this table directly into your Institution's Declaration.

- The principal representative will be employed by the institution/university for the duration of the award.
- The applicant and any co-applicant(s) will be given full access to the facilities, equipment, personnel and funding as required by the application.
- The costs submitted in the application are correct and sufficient to complete the award as envisaged. Any shortfall in funding will be met by the institution/university.
- The Indian institution will ensure that the proposed programme of work has been agreed between all institutions involved in the exchange and that all necessary contracts, visas, IPR agreements, financial processes and other necessary arrangements are

in place before the start of the programme. *

- The Indian institution is satisfied that language will not be a barrier in regard to a successful collaboration and, if necessary, sufficient language support and training will be obtained in advance of the exchange visits.

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PU Declaration.pdf	09/01/2016 09:28:28

Applicant declaration *

I understand that should this application be successful I will be required to sign a contract based upon the terms and conditions published on the website. I confirm that all the information submitted herein is wholly accurate at the time of submission, and I will update the Academy of any material changes which may affect the project.

I confirm that I have the permission of any person or persons I have included contact details for, to share their details with the Royal Academy of Engineering for the purposes of administering this application.

Furthermore I acknowledge that the Royal Academy of Engineering will disclose the information contained within this application to external parties for the purpose of assessing the application.

Name and position:

Dr.GOPALA KRISHNA MURTHY PAIDIPATI

*

☑ By ticking this checkbox I agree to be bound by the conditions for this scheme.

Marketing

Where did you hear about the scheme?

Please select all of the relevant options. The information provided will help us improve our communication strategy.

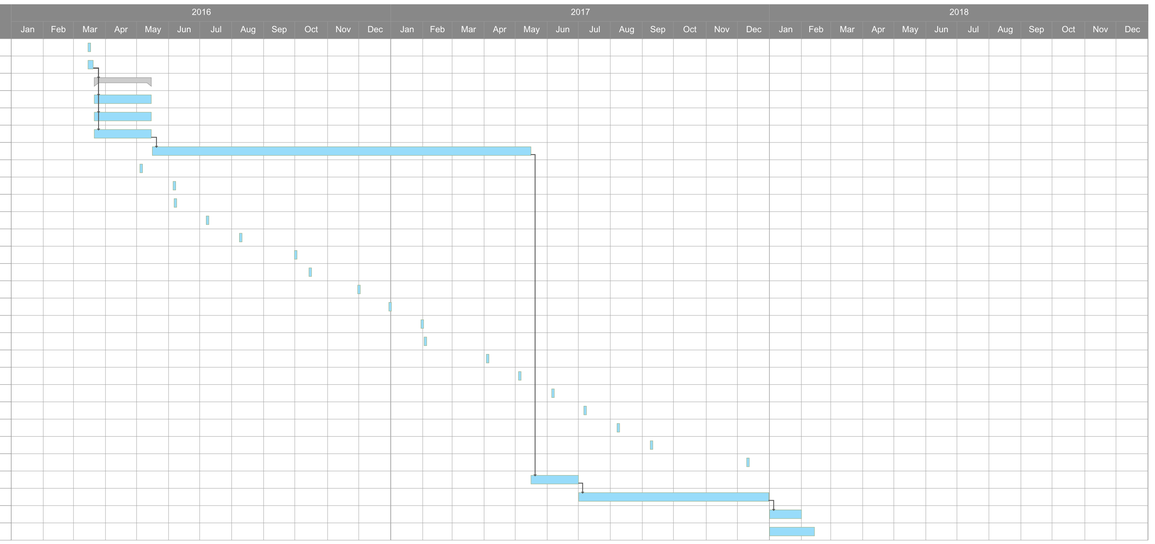
- [ ] From a previous Awardee or Applicant
- [ ] From a Fellow of the Academy
- [ ] From a colleague
- [ ] From my university 'Grants Support Office'
- [ ] From an advert
- [ ] From a website/social media
- [ ] From a news article/media
- [x] Other

If you have selected 'other' above please specify

FICCI -NKFH

ACC

	Task Name	Duration	Start	Finish
1	Team Formation	1d	03/15/16	03/15/16
2	Resource allocation	5d	03/15/16	03/19/16
3	Data Collection	48d	03/21/16	05/14/16
4	Literature Survey	48d	03/21/16	05/14/16
5	L & T plant data	48d	03/21/16	05/14/16
6	Data from other ACC plants	48d	03/21/16	05/14/16
7	Splitting of major project into 3 minor projects	313d	05/16/16	05/15/17
8	Workshop on power plants using different cooling system	1d	05/04/16	05/04/16
9	Workshop on power plants using ACC	1d	06/05/16	06/05/16
10	Workshop on adverse effect of emission from thermal power plants	1d	06/06/16	06/06/16
11	Workshop on causes and impact of scarcity of fresh water	1d	07/07/16	07/07/16
12	Workshop on discretisation techniques in CFD: A finite Volume Approach	2d	08/08/16	08/09/16
13	MATLAB based workshop on computational research technique in thermal I	1d	09/30/16	09/30/16
14	Workshop on OpenFOAM on CFD application	2d	10/14/16	10/15/16
15	Workshop on FVM application in mechanical engineering using ANSYS	1d	11/30/16	11/30/16
16	Workshop on different optimization techniques	1d	12/30/16	12/30/16
17	Workshop on design of ACC	1d	01/30/17	01/30/17
18	Workshop on parallel computing	1d	02/02/17	02/02/17
19	Workshop on Windtunnel and their uses	1d	04/03/17	04/03/17
20	Mathematical Analysis and its Applications to Engineering	1d	05/04/17	05/04/17
21	Workshop on Water conservation in thermal power plants	1d	06/05/17	06/05/17
22	Workshop on Structural stability in design of ACC	1d	07/06/17	07/06/17
23	Workshop on water consumption in steam condensers and air cooled conde	1d	08/07/17	08/07/17
24	Workshop for design of thermal walls	1d	09/08/17	09/08/17
25	Workshop on use of smart materials in thermal power plants to increase effi	1d	12/10/17	12/10/17
26	Results comparison	40d	05/16/17	06/30/17
27	Optimization of different parameters	157d	07/01/17	12/30/17
28	Conclusion	27d	01/01/18	01/31/18
29	Report	37d	01/01/18	02/12/18



Discussions on ACC

workshop on power plants using different cooling system *Row 8*

Started by ppranith.reddy@paruniversity.ac.in on 01/06/16 8:03 PM

workshops supplementing the project work

ppranith.reddy@paruniversity.ac.in on 01/06/16 8:03 PM

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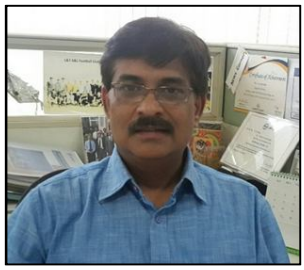

Professional Experience:

L&T-Sargent & Lundy Ltd, Vadodara – Sr. Deputy General Manager & Group Head – Mechanical Department

- Conceptual & Systems Engineering of Main Plant Equipment - Gas Turbines, Waste Heat Recovery Boilers, Steam Turbine and its Auxiliaries, Regenerative Feed Cycle & Equipment sizing namely Feed Water Heaters, Boiler Feed Water Pumps, Deaerators, Condensers, Condensate Extraction Pumps, CW, ACW, CCW and other BOP systems etc.
- Optimization of thermal cycle, Heat Balance Diagrams - Combined Cycle and Thermal Power Plants using Gate Cycle, HTBAL.
- Feasibility Reports, Project Reports - Combined Cycle Power Plant, Coal based Power Plants and Co-Generation power plants
- Possesses working knowledge of other disciplines and areas and is capable to lead projects as project manager.

Responsibilities:

Working as Group Head Mechanical Department and is responsible for engineering support & critical reviews, resource allocation and quality assurance across projects, developing engineering & design resources by training & mentoring, standardizing the designs, systems studies, layouts and is responsible for staff appraisals etc. Under project execution role, i have overall responsibility of leading a team of discipline and interdisciplinary team of engineers for timely delivery, interdisciplinary interfaces, customer interface etc. as Project Manager (engineering).

Prior to joining L&T-S&L, worked as a lecturer in Mechanical Engineering Department of Faculty of Technology & Engineering, M.S. University of Baroda, Vadodara and was teaching the subjects of Thermal & Power Plants Engineering to Undergraduates.

Experience:

I have total 25 years of experience in the field of power plant engineering including 2 years of Post-Graduation in Thermal Engineering with Power Plant Specialization. At L&T-S&L,I am now head of Mechanical Department. I was previously working in proposal engineering process center, mechanical systems engineering center. Involved in carrying out conceptual engineering, proposals engineering, detailed engineering & layouts for various Power

Projects, Feasibility studies, Preparation of EPC Bid documents, Contract documents etc., for both Thermal Power Plants (Conventional, Coal) and Combined Cycle Power Plants.

Also, worked as Project Engineer for engineering execution & co-ordination for an Oil and gas Offshore Platform Project, for Qatar Petroleum.

1) L&T-Sargent and Lundy Ltd. (Since November 1995)

Detailed Engineering:

Detailed systems and layout engineering for the following power projects:

a) Project Manager, 2 x 150 MW PACO Power Project in Panama
b) Project Manager of Boiler Island for 2 x 660 MW supercritical coal based Jaypee Nigrie Thermal Power Project.
c) Project Manager for STG Island for 2 x 660 MW Supercritical coal based Jaypee Nigrie Thermal Power Project.
d) Lead Main Plant System Engineer for 1x700 MW coal based supercritical power projects in Thailand
e) System Engineering review support to Turbine Island Project for 2x800 MW supercritical coal based TPS for APPDCL, Andhra Pradesh, India.
f) Lead Engineer (Mechanical), 370 MW Amman East Power Project, Amman Jordan. This comprised of two (2) Ansaldo V94.2 Gas Turbines, two (2) HRSG & a Steam turbine, Air Cooled Condenser.
g) Project Manager, Simple cycle power projects at 3 sites in Nigeria totaling 1467 MW having 13 nos. GE 9E gas turbines.
h) Lead Engineer (Mechanical), 445 MW Konaseema CCPP, India. This comprised of two (2) Siemens V94.2 (now SGT 5 2000E) Gas Turbines, two (2) HRSG & a Steam turbine.
i) Project Engineer, PS2/PS3 Living Quarters & Power Upgrade Project for Qatar Petroleum's Offshore Platform at Doha, Qatar.
j) Deputy Lead engineer, 200 MW, Salalah Power System Privatization Project, Oman. This comprised of 6 GE's frame-6 Gas turbines, relocation of LM2500 existing gas turbine and integration of one (1) existing frame-6 gas turbine with the New Power Station.
k) Sr. Mechanical Engineer, 500 MW CCPP for Dresden Energy Facility, USA. This comprised of one (1) GE-7FA Gas turbine, one (1) HRSG & a Steam turbine.
l) Sr. Mechanical Engineer, 500 MW CCPP, Possum Point, USA. This comprised of one (1) GE-7FA Gas turbine, one (1) HRSG & a Steam turbine.
m) Mechanical Engineer, 500 MW CCPP, Poletti Combined Cycle Power Plant for New York Power Authority, New York, USA. This comprised of one (1) GE-7FA Gas turbine, one (1) HRSG & a Steam turbine.
n) Mechanical Engineer, 500 MW CCPP, Santee Cooper Combined Cycle Power Plant, South Carolina, USA. This comprised of one (1) GE-7FA Gas turbine, one (1) HRSG & a Steam turbine.

Proposals Engineering:

Proposal Manager and / or Lead Engineer for Cycle optimization, Performance guarantee data, Systems engineering, overall interdisciplinary co-ordination for the following EPC proposals:-

a) Proposal Manager for many 660 MW and 800 MW Projects for National Thermal Power Corporation (NTPC)
b) Proposal Manager, 2 x 660 MW Safi IPP, Morocco
c) Proposal Manager, 2 x 660 MW NTPC Tanda Power Project
d) Proposal Manager, 2 x 660 MW Chettinad Power Project
e) Proposal Manager for NTPC Bulk Tendering STG Island (9 x 800 MW) package.
f) 194 MW Cogen Power Project for IOCL, Panipat India. This comprises 5 No. Hitachi made GTGs of 30 MW each, 3 No. extraction condensing STGs, 3 No. Utility boilers and drive turbines for BFPs and FO Pumps.
   L&T –EPC group won this Job as an EPC contractor and we were retained as engineering consultant for detailed engineering of the job.
g) 800 MW Konaseema Stage –II combined cycle power project. This comprised of two streams each with 1 no. Siemens V94.3A (now SGT 5 4000F) and 1 no. of STG
h) Bharat Forge -57 MW CCPP, India. This comprised of one (1) LM- 6000PC Gas Turbine, one (1) HRSG & a Steam turbine combined to a Blast Furnace fired Boiler.
i) Bidadi - 200 MW CCPP , India. This comprised of one (1) GE-9321EC Gas turbine, one (1) HRSG & a Steam turbine.
j) Aban Loyd - 100 MW CCPP, India. This comprised of two (2) GE -6561B Gas turbines, two (2) HRSG & a Steam turbine
k) Kovilkallapal - 30MW CCPP, India. This comprised of one (1) GE-PG-5371PA Gas turbines, one (1) HRSG & a Steam turbine
l) Gautami Power- 360 MW, India. This comprised of one(1) GE-PG-9351FA Gas turbine, one (1) HRSG & a Steam turbine
m) ISPAT, Vemagiri - 500 MW CCPP, India. One (1) GE - 9351FA gas turbine, one (1) HRSG & a Steam turbine.
n) Perumgulam - 30MW CCPP, India. This comprised of one (1) GE-PG-5371PA Gas turbine, one (1) HRSG & a Steam turbine

. and many more.

Detailed Project Reports:

Project Manager for making the DPRs for the following projects:

a) 200 MW +/- 20% IPP for Gujarat Alkalies and Chemicals Ltd.
b) 5 MW DPR for Bharuch Eco Aqua Infrastructure Ltd. (BEAIL).
c) 210 MW TPS for Gandhinagar, India- Unit-5
d) 100 MW CCPP for TNEB-Kovilkalappal, India
e) 210 MW TPS for Wanakbori TPS Unit-7, India

2) Faculty of Technology & Engineering, M.S.University of Baroda

Teaching the subjects of Thermodynamics, Gas Turbine Power Plants, Steam Turbine Power Plants and Gas dynamics to Undergraduates.

Professional Membership:

- Life Member, Institution of Engineers India, 2010
- Member ASME, 2014

Invited Lectures:

- Lectures held at Nirma University and M.S. University

Educational Qualification:

Qualification	Discipline	Year	Board / Institution
Post Graduate Program	General Management Program for Executives	2015	IIM Lucknow
ME	Thermal Engineering with Power Plant Engineering	1993	Faculty of Technology & Engineering, Maharaja Sayajirao University of Baroda, Vadodara
BE	Mechanical	1989	Govt. Engineering College. Kota, University of Rajasthan

Other Certificates:

- Qualified Project Management Professional, Level-D, IPMA (Switzerland)
- P4 (Power Projects Professionals Program) an Initiative by L&T-Power to develop Project Directors – EPC execution.
- 1 week Management Programs each from (IIM Calcutta) and (IIM Bangalore)

Computer Proficiency:

- GATE CYCLE software for Heat and Mass Balance Diagram (HBD)
- ACAD, Microsoft office (Microsoft Excel, word, power plant)

Personal Details:

- DOB: 15/11/1966
- Languages Known: English, Hindi

Publications:

- Selecting Flue Gas Desulfurization Technology for Existing Coal-Fired Power Plants, NTPC GETS, 2015 (Co-Authored with S&L)
- Conventional Flue Gas Desulfurization Technology as Multi-Pollutant Reduction Technology (SOx, Hg, and PM), NTPC GETS, 2015 (Co-Authored with S&L)
- Challenges on Feed Water System Design for Supercritical Power Projects, Published in Power Gen Asia, held in New Delhi India, 2014
- Parametric Study of a Dual-Pressure Gas-Steam Combined Cycle power plant in a National Seminar on recent trends in design engineering, at Allahabad, India

Mr. Somnath Kundu
L&T-Sargent & Lundy Ltd.
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Vadodara – 390019 Gujarat
Email ID:Somnath.kundu@lntsnl.com
Office No. : +91-265-2456019
Mobile No. : +91-989423212

Professional Experience:

L&T-Sargent & Lundy Ltd, Vadodara – Jt. General Manager, Head of Engineering

Proficiencies:

- Organization engineering delivery and quality management
- Project engineering, co-ordination and project management.
- System Engineering of power (nuclear & thermal), petrochemical, chemical projects.
- Piping Engineering for power, petrochemical and chemical projects.
- Procurement Engineering.
- System commissioning assistance and operation manuals.
- Procedure and document standardization.

Responsibilities:

Responsible for organization engineering delivery and quality management, also responsible for conceptual and detail engineering of various power and other projects.

Prior to L&T-S&L, Mr. Somnath Kundu worked as freelance consultant in the field mechanical systems and piping; worked with PT. Truba Jurong Engineering, Indonesia; Development Consultant Limited, India; Kuljian Corporation, USA; MHI, Japan. Was responsible for design, project co-ordination, monitoring erection supervision and commissioning of various projects.

Presently he also holds the position of head of engineering.

Experience:

He has more than thirty five (35) years of working experience in project management, design of mechanical systems, equipment and piping from concept to final implementation for various projects & following fields.

- Engineering Management
- Plant process and system design
- Procurement engineering
- Plant layout piping design
- System optimization.
- Preparation of feasibility reports.
- Project quality Management
- Project co-ordination, monitoring & control
- Pipe stress analysis & System Transient analysis
- Commissioning procedure & operation manual
- Testing and commissioning supervision.

1) L&T-Sargent and Lundy Ltd. (Since April 1999)

- Head of Engineering
- Head of Mechanical Engineering Dept.
- Project Director for Architect Engineering of
  - 375MW Dhuvaran III CCPP at Dhuvaran, Gujarat, India.
  - 1080 MW PPN CCPP at PPN, Tamilnadu, India.
- Project Manager for Architect Engineering of
  - 2 X 384MW Vemagiri Phase-2 CCPP at Rajahmundry, Andhra Pradesh, India.
  - 380MW Amman East CCPP at Jordan. Client Doosan Heavy Industries
  - 230 MW Co-generation Plant for IOCL Naphtha Cracker Project at Panipat, India.
  - Owner's Engineering for Coal based 2X500 MW Malwa Plant of MPPGCL, MP
  - FEED for 2X26 MW Co-Generation Project of Oman Refinery at Ruwi, Oman.
  - R&M Engineering for 2X70 MW Kutch Lignite Power plant at Kutch, Gujarat, India
  - GE 500MW CCPP for NYPA, New York, USA.
- Architect Engineering (Mechanical) for GE 500MW CCPP for Santee Cooper, South Carolina, USA.
- Piping design of GCW - 100 MW captive CCPP, Pipavav project, Gujarat, India.

2) Freelance Consultant. (From June 1998. to March 1999)

Worked as freelance consultant for mechanical system, piping design and piping stress analysis. Some of the major assignments taken-up during that period are:

- Analysis of Primary Coolant Piping for 500 MW Reactors, India. Complying requirements of ASME section 3. Involved as consultant to the group entrusted with the job by Nuclear Energy Commission of Government of India.
- Piping Analysis of the coolant piping for steel plant furnace, Jamshedpur, India.
- Stress Analysis of ducts for sulphuric acid plant, Ghatshilia, India.

3) PT. Truba Jurong Engineering. (From April 1994. to March 1998)

Lead Mechanical Engineer in the Design Engineering Division of Pt. Truba Jurong Engineering (TJE), Jakarta, Indonesia. One of the largest construction based engineering company of Indonesia, involved in construction of power and industrial plants. It is an ISO 9001 Company. Worked in the following projects:

- AAI Tripolyta Acrylic Acid Plant, Indonesia. Chemical Storage Tank farm including 31 storage tanks as per API650 (20 stainless steel tanks).
- Paiton Steam Power Plant, Indonesia. Operator Housing Complex comprising 200 dwelling units, recreation unit, swimming pool, water treatment & supply for potable water, service water, firefighting and swimming pool.
- Tanjung Pinang Diesel Power Plant, Indonesia. Piping works.
- Polisindo Eka Prakasa, Polyester Fiber Plant, Indonesia. Piping works. Stress analysis.
- Semarang Steam Power Plant, Indonesia. Retrofitting and augmentation of feed water system, stress analysis.

- Grati Combined Cycle Power Plant, Indonesia. Fire water system and fuel oil and other tank farm including 4X20,000 cu.m storage tanks and tanks with internal floating deck

4) Development Consultant Limited, Calcutta, India. (From Sept.1980 to March 1994)

Involved in system studies, transient analysis, development process & system design, procurement engineering, plant & piping layout, stress analysis, feasibility study, system operation manual preparation etc. of various systems and packages of many projects:

- Fuel Oil Marketing Depots, Nepal Oil Corporation. Nepal. 3 nos. various Oil Depots including storage tanks, loading/unloading, pumping and metering piping etc.
- Crude Oil Tanks, Indian Oil Corporation, Amlekhghanj, India. Design for large diameter (79m & 30m) double deck floating roof crude oil storage tanks.
- Reliance Naphtha/LNG Cracker plant, Hazira, India. Design and detail engineering of complete OSBL piping.
- Raja Bazaar Gas Holder Station, Kolkata, India. Design of coal gas receiving and distribution station with large scale wet gas storage holders.
- Nagarjuna Fertiliser Plant, Kakinada, India. Offsite design of the natural gas based fertilizer plant including storage and handing facility for large scale refrigerated anhydrous liquid ammonia, emergency safety flare system for both process plant and storage area, piping design, stress analysis etc.
- Machinery Test Center, Vizag, India. Design of a large machinery and equipment testing facility including test beds for turbines, pumps, pressure vessels, heat exchangers etc. for Government of India.
- Spent Fuel Storage Facility, Tarapur Atomic Power Plant, India. Design of Away From Reactor (AFR) Spent Enriched Uranium Fuel Bundle Storage Facility (Liquid cooled type).
- Di-Ammonium Phosphate plant, Hindusthan Liver, Haldia, India. Design of Offsite and Utility Systems for the fertiliser plant including anhydrous liquid ammonia, concentrated phosphoric and sulphuric acid receipt, storage and handling facility, plant piping, 5 Km long cross country refrigerated anhydrous liquid ammonia pipe line with occasional two-phase flow, preparation of system commissioning manuals etc.
- Narora Atomic Power Plant, Narora, India.. ASME section -III, Class 2 and 3 Piping design and static and dynamic (for seismic) Analysis for 2X232 Mw Heavy Water reactor Nuclear Power Plant. Analysis done complying ANSI/ASME Section-3.
- Madras Atomic Power Plant, India. Static Stress Analysis for the Class 2 and 3 piping for 2X232 Mw PHWR Nuclear Power Plant. complying ANSI/ASME Section-III.
- Fast Breeder Test Reactor Facility, Madras, India. Stress analysis for the primary liquid sodium coolant lines for the test reactor facility.
- Heavy water project, Kota, India. Piping design and stress analysis, including 400mm dia. 9 Km long steam supply line from Rajasthan Atomic Power plant.

Deputed from DCL

1) MHI, Japan.
(From Dec. 1991 to March 1992)
Worked in Qurayah Power Station, Saudi Arabia. site office for testing and commissioning of 3rd unit of 4 X 600 MW gas based thermal power plant

2) **Kuljian Corporation, USA**
(From Sept. 1991. to Dec. 1991)
Worked in Qurayah Power Station, Saudi Arabia. site office for testing and commissioning of 3rd unit of 4 X 600 MW gas based thermal power plant

Educational Qualification:

Qualification	Discipline	Year	Board / Institution
M.E	Project Engineering	1983	Birla Institute of Technology, Pilani, India
B.E	Mechanical Engineering	1980	Jadavpur University, Kolkata, India

Professional Membership:

-

Invited Lectures:

- Regular Faculty for Various Power plant engineering courses for Power training institute, L&T since 2003. Topics delivered:
  - Power plant System design
  - Piping Engineering
  - Power project engineering management

Computer Proficiency:

- Proficient Power user of MS Office suite
- Vector graphic software Micostation and Autocad
- Thermal power plant HMBD simulation using GATE Cycle software
- Computer programming language Visual Basic & Fortran

Personal Details:

DOB: 4th March,1960
Blood group: AB+
Languages Known: Bengali, English, Hindi and Indonesian

Publications:

- Somnath Kundu, Rontidev Sinha, “Positioning Engineering to Meet Power Sector Challenge” at CII National Seminar on Capabilities,Opportunities and Challenges in Boiler,Turbine and Generator (BTG) Industry-25 September 2013, Silver Oak,India Habitat Centre,New Delhi
- Somnath Kundu, “Coal in Combined Cycle – A New Frontier for Power Generation” at Clean Coal Technologies, Power Gen, New Delhi – 20 April, 2012

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Mobile No: +91-9898873257
Email ID: ramsingh.kushwaha@lntpower.com

Professional Experience:

1) L&T Power, Vadodara – Deputy General Manager, Thermal Power R&D: Since Feb, 2015

- Leading Analytical Group within Thermal Power R&D and responsible to complete various specialised engineering analysis assignments including CFD (Computational Fluid Dynamics), FEM (Finite Element Method) and Surge Analysis in area of troubleshooting, design verification and design optimization of equipment and system in L&T Power Projects.
- Reviewed and provided guidance to achieve optimum design by carrying out engineering analyses for various system including flow distribution in Circulating Water pump intake sump, Raw Water intake well, HRSG transition duct, ESP inlet, Boiler Back-end duct and structural weight optimisation of ESP hoppers.

2) L&T Hydrocarbon Engineering, Vadodara – Deputy General Manager, Front End Engineering & Design/ Technology Innovation Centre -: July, 1996 to Jan, 2015

- As Area Manager for Hot Oil Heater Package in one of L&T Project, ensured technical compliance of project requirement during detailed engineering phase and facilitated resolution of technical queries through interfacing with detail engineering centre, vendor and client. Carried out Thermal design verification, Design verification through CFD modelling and provided technical support in smooth integration of Heater & Incinerator equipment.
- Executed various Fired Heater Design enquiries comprising of Cylindrical & Box Heater for L&T Projects & proposals. Provided guidance to team, prepared schedule, monitored/reviewed work and interfacing with departments & external customers. Carried out Thermal design and API datasheet generation of Fired Heater. Risk identification and mitigation of thermal & hydraulic guarantees of Fired Heaters.
- Executed CFD assignments on troubleshooting, design verification, design optimisation. Responsibility includes understanding client requirements and developing suitable analysis approach, developing analysis schedule, monitoring, and review of work & Interfacing with the client. The CFD area of work includes following.
    - Developed CFD procedure to study flow, combustion & heat transfer in furnace section of Fired Heaters & HRSGs.

- Implemented CFD technique to predict surface, submerged vortices & swirl angle at pump throat of Circulating Water pump sump system.
- Effectively utilised CFD technique to estimate airflow distribution in combustion air duct of Reformer, Fired Heater & Fired HRSG burners. Design of flow correcting devices to reduce flow mal-distribution.
- Applied CFD technique to estimate heat transfer through Plate Type Heat Exchanger, Natural convection around Reaction Furnace and Hot air recirculation in Air fin coolers.
- Estimation of Gas Turbine Exhaust gas distribution at inlet sections of tube bundles of HRSG.
- Prediction of Thermal radiation from Stack flue gases/ Flare.
- Verification of flue gas draught calculation in Fired heater stack systems.

- Attended inquiries on troubleshooting, design verification, design optimisation using FEA (Finite Element Analysis) technique. Responsibility includes understanding client requirements and developing suitable analysis approach, developing analysis schedule, monitoring, and review of work & Interfacing with the client. Effectively utilised FEA technique to troubleshoot thermal stresses / mechanical design issues surfaced during design, detailed engineering, erection and commissioning of Shell & Tube Heat Exchangers, Fire tube heater in Reboiler, Reactor Column beam, Mounded storage vessels and Fired Heater Tube support etc.
- Developed thermal design capability on various fired & unfired equipment. Thermal design capability includes following.
    - Developed calculation procedure to design/size stack system of Fired Heaters for Natural, Forced & Balanced draught systems.
    - Developed thermo-hydraulic design of horizontal & vertical HRSGs involving unfired and supplementary fired designs.
    - Developed Thermal design capability of Air cooled heat exchangers/condensers using HTFS-ACOL software.
    - Developed calculation procedure for thermal check rating of ABFB (Atmospheric Bubbling Fluidised Bed Boilers) for furnace & convection sections.
    - Carried out optimisation/simulation of Combined Cycle Power Plants using GATE Cycle software.
    - Carried out simulation of Heat & Mass Balance for Integrated Gasification Combined Cycle (IGCC) Plants using HYSYS software.

3) LPSC (ISRO), Mahendragiri – Scientist/Engineer 'SC', Cryogenic System Facility -: May, 1993 to Jun, 1996

- Thermal stratification calculation in cryogenic storage tank.
- Transient heat transfer analysis of combustion section wall of ramjet engine.

- Design of Hydrogen cooled regenerative cooling passage of combustion chamber wall of ramjet engine.
- Estimation of chill down mass required in cryogenic pipelines.

Professional Membership:

- Indian Society for Heat & Mass Transfer (ISHMT): Life Member

Invited Lectures:

- Short Term Training Program on "Application of Computational Fluid Dynamics in Mechanical Engineering" organised by Mechanical Engineering Department of Parul Institute of Engineering & Technology, Vadodara on 10th May, 2010.
- AICTE sponsored Short Term Training Program on "Computational Fluid Dynamics for Engineers" at SVNIT, Surat on 4th Feb, 2010.

Educational Qualification:

QUALIFICATION	DISCIPLINE	YEAR	BOARD/INSTITUTION	CGPA/%
M.Tech.	Thermal & Fluids Engg.	1993	IIT Powai, Mumbai	8.68
B.E.	Mechanical Engg.	1991	MNNIT Allahabad	83.16%

Computer Proficiency:

- Thermal design software FRNC -5PC for Fired Heaters
- Thermal design software ACOL for Air Cooled Heat Exchangers/Condensers.
- Exposure to ANSYS CFX & Fluent for CFD and ANSYS Mechanical for FEA.
- Thermal power plant simulation using GATE Cycle software
- Computer programming languages Visual C++ & Fortran

Personal Details:

DOB: 16/06/1968

Blood group: A+

Languages Known: English, Hindi

Publications:

- *R. S. Kushwaha*, Ajay Pudi, S M Pillai, "CFD analysis to study the hot flue gas mixing and stack draught profile in the Integrated Incinerator-Fired Heater system", 22nd National and 11th International ISHMT-ASME Conference, 2013.

- *R. S. Kushwaha*, S. Pawar, "Modeling of Hot Air Recirculation around Cluster of Air Coolers Using CFD Technique- Case Study", 21st National and 10th International ISHMT-ASME Conference, 2011.
- *R. S. Kushwaha*, S. Pillai & S. Krishnan, "Design of Combustion Air Duct Manifold of Fired Heater", Chemical Industry Digest, August 2011.
- *R. S. Kushwaha* and S. Pawar, T. Shah & S. Krishnan, "Heat Transfer Modeling and CFD Simulation of Plate Type Heat Exchangers," 20th National and 9th International ISHMT-ASME, Mumbai, Jan 2010.
- *R. S. Kushwaha* and Sachin Pawar, "Improvement of APH Inlet Flow Profile Using Flow Correcting Devices with Help of CFD Technique", Chemcon 2009.
- *R. S. Kushwaha*, Jasmin Chhadia & S Krishnan, "Industrial Applications of CFD Technique, National conference - AFFTS 2008", SVNIT Surat, May 2008.
- Jasmin Chhadia & *R. S. Kushwaha*, "Heat Flow Analysis of a Multi-layer Refractory Lined Reaction Furnace with Natural Convection Cooling through Air Gap", 19th National 8th ISHMT-ASME Heat & Mass Conference at Hyderabad, Jan 2008.
- *S Maharudrayya*, R Sen and R. S. Kushwaha, "CFD Modeling of Fired Process Heaters used in Petroleum and Petrochemical Industries", 19th National 8th ISHMT-ASME Heat & Mass Conference at Hyderabad, Jan 2008.
- R. Sen, Jasmin Chhadia & *R. S. Kushwaha*, "CFD Simulation of Pump Intake Sumps", Petrotech - 07, Delhi, Jan 2007.
- S Maharudrayya and *R. S. Kushwaha*, "Modeling of Flow Distribution and Pressure Drop in Combustion air Duct Manifold used in the Process Heaters", Chemcon 2006.
- Maharudrayya Swamy, Jasmin Chhadia & *R. S. Kushwaha*, "Flow over three in-line arranged cylinders: Detached Eddy Simulations", Indian Chemical Engineering Congress 2005, Dec 2005.
- Jasmin Chhadia & *R. S. Kushwaha*, "CFD analysis of rotating flow through screw compressor motor", ANSYS User Conference 2005, Nov 2005.
- R. Sen, Jasmin Chhadia & *R. S. Kushwaha*, "Modelling of Combustion, Radiation & Heat Transfer in a Process Heater using CFX-5", ANSYS User Conference 2004, Dec 2004.
- K. A. Reddy, *R. S. Kushwaha*, A. Saxena & K. S. Agrawal, "Co-production of Ammonia through Refinery Residue Gasification - A System Analysis", FAI – 2001, Dec 2001.
- K. A. Reddy & *R. S. Kushwaha*, "Utilising Refinery Residues through Gasification", Hydrocarbon Asia, Nov/Dec 2001.
- K. A. Reddy & *R. S. Kushwaha*, "An Integrated Approach for Utilisation of Refinery Residues for Co-production of Methanol-Acetic Acid-Power through Gasification", WPC Asia Regional Meeting Shanghai, Sept 2001.
- S.K. Bhave, V.P. Khare, *R. S. Kushwaha* & R. Saravanan, "Refinery residue based IGCC: Critical aspects in synthesis of cycle configuration", Petrotech - 99, Delhi, Jan 1999.

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PARUL UNIVERSITY									
Sr No	Name	Designation	no of days in a week	Total days required for completion (2 years)	Gross Salary/ month	With Increments for 2 years	per day remuneration	Total in INR	Total
1	DrP G K murthy	Dean	0.5	52	85000	110500	4420	229840	2298.4
2	Dr. S. F. Xavier	Director (R&D)	0.5	52	43000	55900	2236	116272	1162.72
3	Sanjoy Paul	Asst. Professor	2	104	50338	65439.4	2617.576	272227.904	2722.279
4	Jitendra Kumar Chauhan	Asst. Professor	2	104	50338	65439.4	2617.576	272227.904	2722.279
5	P Pranith Kumar Reddy	Asst. Professor	2	104	48940	63622	2544.88	264667.52	2646.675
6	Sohail M. Siddiqui	H.O.D	0.5	52	65679	85382.7	3415.308	177596.016	1775.96
7	Seema A.Nihalani	H.O.D	0.5	52	60,000	78000	3120	162240	1622.4
8	Suhasini Kulkarni	Asst. Professor	0.5	52	54000	70200	2808	146016	1460.16
9	Falguni Bhavsar	H.O.D	0.5	52	67098	87227.4	3489.096	181432.992	1814.33
10	Deepa Karvat	Asst. Professor	0.5	52	57196	74354.8	2974.192	154657.984	1546.58
11	lab technician		2	208	12000	15600	624	129792	1297.92
							total salaries	2106970	21069.7
	Stay Fcailities for a Researcher		24 months	Rs.5000 per month				120000	1200
	Sustenance	Months	24	10000				240000	2400
	Travel Out station in India			60	10000			600000	6000
	Travel to UK 4	90000	75000					660000	6600
	Miscellaneous							100000	1000
							Total at PU	3826970	38269.7

CONSUMABLES INCLUDING SOFTWARES TO BEBOPUGHT						
s. no.	equipment name/softwares	specification	quantity	unit price	tal cost in IN	POUNDS
1	ANSYS 15.0	complete research version	3	70000	210000	2100
2	STAADPro	individual license	1	150000	150000	1500
3	MATLAB 13.0	individual license	5	110000	550000	5500
				total	910000	9100

Budget for visit of experts from University of Surrey						
	No of Experts	No of day	No Expert Da	Daily Budget per Expert day	Total IN INR	POUND STRELINGS
Provision of two experts , lab facilities etc					1500000	15000
Stay, Local Travel and Hospitality	2	20	40	10000	400000	4000
Travel	2	4 visits	90000 per round visit		720000	7200
Miscellaneous					50000	500
					1170000	11700

WORKSHOPS , SEMINARS ETC								
no of workshops	no of days	no of participants	no of speakers	proceedings	food	miscellaneous	INR	POUNDS
18	18	720	36	720	720	720		
per participants				150	100	25		
Per speaker Honorarium plus Book and Local			10500					
total			378000	108000	72000	18000		
total							576000	5760

EXPENDITURE ON THE PART OF LNT						
SR.NO	HEAD	No OF Professional Hours	Per Head Cost per Hour	Total Cost	POUNDS	
1	Salary Supportt Costs	1200	1500	1,800,000	18,000	
2	Travel			200,000	2,000	
3	Subsistence			100,000	1,000	
				2,100,000	21,000	

SUMMARY OF BUDGET		
	INR	UK POUND STERLING
Parul University	3826970	38269.7032
LNT Ltd	2,100,000	21000
University of Surrey	1500000	15000
Consumables Etc	910000	9100
Travel and Stay Expenditutre of Experts from UK	1170000	11700
Workshops , Seminars Etc.,	576000	5760
		0
Total	10082970	100829.7032
		0
Means of Funding		0
		0
Royal Academy of Engineering	5000000	50000
		0
LNT , PU and University of Surrey	5082970	50830

UNIVERSITY OF SURREY

5 January 2016

Faculty of
Engineering & Physical Sciences
University of Surrey
Guildford, Surrey, GU2 7XH, UK

Professor Jonathan Seville
FREng FIChemE
Executive Dean of Faculty

T: +44 (0)1483 686660

j.p.k.seville@surrey.ac.uk
www.surrey.ac.uk

Dear Shaarad Sharma,

Re: Newton–Bhabha fund for Higher Education partnership

I write to confirm that the Faculty of Engineering and Physical Sciences supports participation in the RAEng delivered Newton–Bhabha fund for Higher Education partnership.

We are motivated to engage in this programme for the opportunity to work and develop sustained relationships with our Indian partners and to find new applications for our science as applied technology. It is especially interesting to us that the application is in the broad area of energy and water management, because we are keen that our science is applied to mitigate environmental harm. It provides an opportunity to continue to grow the international outreach and engagement that is an essential element of our institutional strategy.

The Advanced Technology Institute (ATI) has a very wide range of equipment and expertise in the development of nanomaterial coatings. An area of particular expertise is engineered carbon materials. The ATI has especial expertise in variants of Diamond-Like Carbon that can be optimised for applications. These have, to date included low-k dielectric materials, extremely high-performance barriers to moisture ingress, and containment coatings. Development work has taken place for sectors including: semiconductor manufacturing, medical and aerospace.

We are delighted to offer support and advice on coatings technology appropriate to reduction in water use in steam condensers. There are many possibilities to modify surfaces to control the nucleation of droplets and the surface tension. The ATI has also developed novel magnetic graphene structures that have significant potential and interest as very high surface area functional materials that are readily steered within systems and scavenged from outflows using simple magnets.

Support to the activity will be primarily through contributing the time of Professor Ravi Silva and Mr Tony Corless. Professor Silva is the Director of the ATI and has a proven track record of expertise in the delivery of scientific programmes, with especial emphasis on nano-scale carbon materials and surface coatings. He has close to 13,000 citations for his 500 papers, with a Google H-factor of 56. Mr Corless is the Laboratories and Business Manager at the ATI. He has over 30 years of experience mainly as a Staff Scientist at EMI's corporate research centre, working under ISO9000 Quality System control. He has been involved in the writing and filing of over 30 patents that range from train-ticketing to micro-technology in pharmaceutical research. Both will offer guidance and support on

the range of coating technologies, the assessment of coating performance, and on technology risk management.

The ATI will be delighted to welcome visiting researchers and will make time available both to train them on equipment and techniques and to allow them access to the equipment.

If the anticipated support were accounted under our usual rules then it would have a value of £15k p.a.

Yours faithfully,

Professor Jonathan Seville
Executive Dean of Faculty

Established & Incorporated Under Gujarat Private Universities
(Second Amendment) Act, 2015 (Guj. Act No. 7 of 2015)

Parul University

R/MISC -01/2015-16

Jan 8, 2016

To
Royal Academy of Engineering ,
United Kingdom

Parul Arogya Seva Mandal was registered under Bombay Public Charitable Trusts Act in 1993 . Parul Institute of Engineering and Technology (PIET) was established in year 2003. PIET has been affiliated to Gujarat Technological University and has been approved by AICTE . PIET has been accredited by NAAC and NBA . PIET was rated as Best Engineering College in Western India in one of leading surveys . PIET also bagged Pedagogical Innovation Awards from Gujarat Technological University . PIET offers BE , ME and Ph D Programs . PIET has become part of Parul University from Academic Year 2015-16 . Parul University has come into existence under Gujarat Private University Act – 2009 in 2015. The university's mission reads as "To become a World Class University producing globally competent human capital;(a) equipped with skill and competence to meet technical, social, industrial, medical and environmental needs (b) capable of disseminating and creating new knowledge (c) offering innovative, scientific and productive solutions that contribute to the developmental challenges of the society and (d) honouring human lives and environment.". Becoming a partner in this programme is perceived to be part of our mission to be a world class university as our faculty members and students will be exposed to industry professionals in India and in UK and also to faculty members of University of Surrey , UK .

Dr.p G K Murthy , the applicant and nine co-applicants – details there of are furnished in schedule – are employed currently and will continue to be employed by the University for the duration of the award i.e from March 2016 to March 2018 .

The applicant and co-applicants will be given full access to the facilities, equipment, personnel and funding as required by the application.

P.O. Limda, Tal. Waghodia, Dist. Vadodara - 391760, Gujarat State, India.
Tel.: + 91-2668-260300/307, Tel. Fax: +91-2668-260201, E-mail :info@paruluniversity.ac.in, Web : www.paruluniversity.ac.in

The costs submitted in the application are correct and sufficient to complete the award as envisaged. Any shortfall in funding will be met by the university.

The university will ensure that the proposed programme of work has been agreed between all institutions involved namely Larsen & Toubro Ltd and University of Surrey in the exchange and that all necessary contracts, visas, IPR agreements, financial processes and other necessary arrangements are in place before the start of the exchange.

The university is satisfied that language will not be a barrier in regard to a successful collaboration and, if necessary, sufficient language support and training will be obtained in advance of the exchange visits.

Dr.H.S.Vijaya Kumar
Registrar
Parul University

Date : 8 Jan, 2016
Place : Vill. Limda : Tq.Waghodia
Dist . Vadodara : Gujarat
INDIA

SCHEDULE OF PROFESSORS FROM PARUL UNIVERSITY

SR.NO	NAME	ORGNISATION	DESIGNATION	EMAIL ID
1	Dr.P G K Murthy	Parul Univeristy	Dean (Doctoral Studies) , Faculty of Management	GOPALAKRISHNAMURTHY.PAIDIPATI@paruluniversity.ac.in
2	Dr.Francis xavier	Parul Univeristy	Director R&D	Rnd@paruluniversity.ac.in
3	Mr.S.M.Siddiqui	Parul Univeristy	HOD, Mechanical Department , PIET	pietmechanicalhod@paruluniversity.ac.in
4	Mr.Sanjoy Paul	Parul Univeristy	Asst Professor , Mechanical Engineering ,PIET	sanjaoy.paul@Paruluniversity.ac.in
5	Mr. Jitendra Chauhan	Parul Univeristy	Asst Professor , Mechanical Engineering ,PIET	jitendra.chauhan@paruluniversity.ac.in
6	Mr.Pranith Kumar Reddy	Parul Univeristy	Asst Professor , Mechanical Engineering ,PIET	p.pranith.reddy@paruluniversity.ac.in
7	Ms.Seema Nihalani	Parul Univeristy	HOD, Civil Engineering , PIET	seema.nihalani@paruluniversity.ac.in
8	Ms.Suhasini Kulkarni	Parul Univeristy	Asst Professor , Structural Engineering ,Civil Engineering ,PIET	suhasini.kulkarni@paruluniversity.ac.in
9	Mrs. FALGUNI BHAVSAR	Parul Univeristy	HOD, Electrical Department , PIET	falguni.bhavsar@paruluniversity.ac.in
10	Ms.Deepa Karvat	Parul Univeristy	Asst Professor, Electrical Department , PIET	bhaskerdeepa@yahoo.co.in

REGISTRAR
PARUL UNIVERSITY

Curriculum Vitae of Professor S. Ravi P. Silva
BA MA PhD (Cantab) CEng CPhys FIEE FInstP FRSA

Current Status: Director, Advanced Technology Institute,
Professor of Solid State Electronics, and
Director, Nano-Electronics Centre,
University of Surrey

Nationality: British

Business address: Advanced Technology Institute,
University of Surrey,
Guildford, Surrey GU2 7XH
T. +44 (0)1483 689825
E. s.silva@surrey.ac.uk

EDUCATION

1987–1990 BA (Hons) Electrical and Information Sciences Tripos (EIST), Cambridge University
1990–1993 PhD Solid State Electronics, Cambridge University

PRIZES AND AWARDS

1990–1991 Menz Fund Bursary, Engineering Department, Cambridge University
1990–1993 Clare College, Cambridge University, Bursary
1990–1993 Cambridge Commonwealth Trust (CCT) Bursary (Elected Fellow 1991)
1990–1993 Overseas Research Studentship (ORS), Bursary
1991–1993 Runner up, John Winbolt Prize, Civil/Materials Engineering, Cambridge University
1999 Outstanding Young Researcher Award, IUMRS, China (June 1999). (Over 2000 delegates.)
2002 Vernon-Charles Boys Medal and Prize for 2002 for Outstanding Contribution to Experimental Physics, awarded by the Institute of Physics, United Kingdom.
2002 Awarded prestigious Monbusho-Gakusin Senior Fellowship from the Ministry of Education, Japan and Special Visiting Professorship, Gifu University.
2002 Awarded one of eight Portfolio Partnership Awards in 'Integrated Electronics' for all Engineering and Physical Sciences in the UK to the value of £6.7M.
2003 Institute of Electrical Engineers (IEE) 'Achievement Award and Medal for 2003'.
2003 UNESCO biannual Albert Einstein Silver Medal and Javed Husain Young Scientist Award for contributions to 'Electronic devices and Materials on a national and international scale'.
2002 Lead investigator of HEFCE-SRIF2 team awarded £4.0M by the UK research councils to set up a Nano-Electronics Centre at the University of Surrey.
2004 BAE Systems Innovation Bronze Award jointly with Dr. Sajad Haq (BAE Systems).
2005 Finalist, Emerging Technologies Category, Innovation in Engineering Award for Nanoelectronics, IEE 2005 Awards.
2007 Runner up (Highly commended), Times Higher Education Young Scientist of the Year.
2008 Elected to the Fellowship, Royal Academy of Engineering (FREng).
2009 Royal Society Kan Tong Po Public lecture and Visiting Professorship to Hong Kong.
2009 Elected to a Fellowship, National Academy of Sciences of Sri Lanka.
2009 Runner-up, ACES Academic Enterprise Awards in Europe for 'Materials Enterprise'.
2011 Royal Society Clifford Paterson Lecture for outstanding contributions to Nanoscience.
2013 Finalist, Elektra Awards in Renewable Energy Design for 4G (4th Generation) hybrid solar cell research.
2013 Elektra Awards, "Best Electronics Engineering Department" to Surrey University.
2014 Distinguished visiting Professor, Chongbuk National University, South Korea.

Best paper awards with PhD students at International Conferences include: IEEE Sensors13 (Ramli), Malay12 (Yahya), MinMaT13 (Gopee), ATI12 (Gompers), EMRS11 (Beliatis), ICSE10 (Yahya), Merck09 (Opoku), EMRS09 (Beliatis), INNANO08 (Heister), Merck08 (Opoku), ICMAT07 (Tan), EW Muller Award 06 (Biennial) Field Emission Society (Tsang)

PROFESSIONAL EXPERIENCE

EXTERNAL APPOINTMENTS

2001–present	Peer review college, Engineering & Physical Sciences Research Council (EPSRC), UK
2003–2007	Advisor, Commonwealth Association for Scholarships, London, UK
2004–2011	Founder Director, Quantum Filament Technologies Ltd.
2005–2008	Scientific Advisor, Imprimatur Capital Ltd (London).
2005–2006	Member, Regenerative and Nanomedicine research panel, NIHR, Canada
2005–2013	Chair and Advisor to the Sri Lanka National Science Foundation on Nanotechnology
2006–2009	Member, Research Assessment Exercise (RAE) Panel on Electronic Engineering, UK
2006–present	Founder Director, Surrey NanoSystems Ltd
2006–2008	Member, UK Nanotechnology Strategic Review Panel, EPSRC
2007–2010	Member, Technical Opportunities Panel (TOP), EPSRC, UK
2007–2010	Science Advisor, Hon. Minister of Science and Technology, Sri Lanka
2008–2013	Member, Brian Mercer Panel, Royal Society
2009–2013	Chair, Proactive International Fellowship Group, Royal Academy of Engineering
2010–present	Science Advisor, Senior Minister in Charge of Scientific Affairs, Sri Lanka
2011–2012	Chair, International Materials Review Committee, Zhejiang University, China
2013–present	Member, Council on Science, Technology and Innovation (COSTI), Sri Lanka

UNIVERSITY ROLES

Over the years at the University my career has developed from an initial post as Lecturer in Large Area Electronics to the current post as Director of the Advanced Technology Institute and Head of the associated Nano-Electronics research group. Other significant responsibilities have included:

2011–present	Member, Management Committee of Electronic Engineering
2009–present	Member, Faculty Policy and Strategy Group
2009–present	Member, Faculty Research Committee
2005–2011	Chair, University of Surrey's Vice Chancellor's 'Think Tank' on future strategy

Over the last fifteen years I have raised £30m in research funding. Over £15m has been as PI from UK research councils. Jointly with colleagues I won £2m in Oct 2014 to establish Microwave Multiphysics Modelling and Measurement, and £0.5m in Oct 2015 for aligned electro-spinning of CNTs. I am the Founder Director of two spin-out companies that have been developed from the Nano-Electronics research group. These start-up companies have raised a further £15m in support funding, with Surrey NanoSystems Ltd. winning the spin-out company of the year in 2007 from the Engineer Magazine.

TEACHING

As a member of the Academic staff I have contributed consistently the teaching of our undergraduate and post-graduate community. We are proud that the University is highly rated by its students, and that the Electronic Engineering Department is justifiably ranked among the best in the country.

Inter alia, I have developed and taught undergraduate courses in Nanoelectronics and Nanotechnology, Semiconductor device physics, Microwave and Photonic Devices, Electronics and photonic devices, Advanced semiconductor devices & technology, MEMS, Large area electronics (includes amorphous materials), Electromagnetism, Solar energy harvesting. I have also lectured in the Engineering and Professional Studies (EPS) programme and Leadership courses. I have demonstrated first / second year practical's and have supervised on average 5 final year undergraduate and masters projects per year for the last ten years.

I was the module co-ordinator for the module on 'Microwave and Photonic Devices' which is part of the MSc in Microwave Engineering (2004-2006). I taught and ran a laboratory on this module.

I have helped setup a new MSc course in Nanotechnology and Nanoelectronics at the Department of Electronic Engineering, which began in Sept. 2006 and have been the module convenor of the 'Frontiers in Nanotechnology' module since its inception (2006-present).

I am at present setting up a module for Renewable Energy Technologies for Masters Level students, which will also include discussions on policy and energy scavenging techniques.

I was the module convenor for the Ion Implantation module for the IGDS (Integrated Graduate Development Scheme) programme in Advanced Semiconductor Processing co-ordinated by Surrey (2001-2006).

RESEARCH

I have successfully supervised 50 PhD students and 60 postdoctoral researchers (RAs) as their direct line manager. I am the currently direct line manager of 20 academics. I lead one of the largest research activities/groups in the UK on Carbon Based Electronics. In 2003, the success of the group was acknowledged by EPSRC in being awarded a Portfolio Partnership Awards in 'Integrated Electronics'. I am the inventor of 25 patents, four of which are being exploited in spin-out companies (raised venture capital in excess of £15m). I have published close to 500 papers (See: http://scholar.google.co.uk/citations?hl=en&user=EmiQCOMAAAAJ&view_op=list_works). I have approaching 13,000 citations to my research and a Google H-factor of 56.

I have published in multi-disciplinary journals: Nature, Science, Nature Materials, and in materials-oriented journals: Advanced Materials, Advanced Functional Materials, Small, NanoLetters, ASC Nano, Nanoscale, NanoResearch. I have published in specialist journals: IEEE Transactions, Applied Physics Letters, Physical Review Letters, Physical Review, Langmuir, J Materials Chemistry, Nanotechnology at regular intervals. I have made over 90 keynote, plenary or invited talks at international conferences.

I contributed the section on Amorphous Carbon for the Handbook of Thin Films, a five-volume edition published by Academic Press in 2002. In 2003, I edited the 29th EMIS (Electronic Materials Information Service) series book published by the IEE INSPEC series, on 'Properties of Amorphous Carbon', the first publication of its kind in the then emerging field.

UNESCO's biennial award of the Albert Einstein Silver Medal and Javed Husain Prize for Young Scientist was awarded in 2003 for contributions to device applications and materials science. In 2003 I was awarded the IEE Silver Medal for Achievements in the Electronic Engineering Community.

In 2005, I initiated a strategic collaboration on quantum metrology with the National Physical Laboratory (NPL), where as part of the programme NPL seconded a senior researcher to the ATI to conduct joint research. This has developed to a partnership in which the University and NPL jointly hold a Knowledge Transfer Account to exploit fundamental research in Nanotechnology, Photonics, Advanced Materials and Communication.

The research conducted at the ATI has been of the highest quality with the institute winning 4 highly sought after Royal Academy of Engineering research Fellowships in the last 5 years. Hatton, Mashonovich, Tsakmakidis, and Sporea were successful here, with Mashonovich winning also a Royal Society Research Fellowship. The ATI has also won two RCUK (Stolojan, Henley), NPL (Cox, Allam), Leverhulme (Shiozawa) fellowships in the last 5 years. We also won an ERC Advanced Investigator Award (Homewood), as well as a Royal Society Wolfson Merit Award (Murdin). Further Royal Society Medal for the Kan Tong Po Lectureship (Silva) and Clifford Patterson Medal and Lecture (Silva) have been won by members of the ATI team.

My own publication include many world firsts including:

* Band gap modulated superlattices using a single homogeneous system (hydrogenated amorphous carbon, a-C:H) (the variation achieved by changing the sp^1:sp^2:sp^3 ratio of C-H and C-C bonds). Quantum size effects were observed at room temperature in these structures.
* Electronic doping of hydrogenated amorphous carbon films.
* Electron field emission from hydrogenated amorphous carbon films. This area of research is now being exploited by multinationals such as Motorola and Samsung in a multi-billion dollar industry.
* Electron field emission from hydrogenated amorphous silicon films. The University and Philips have a world-wide patent on this invention (Inventors: SRP Silva and JM Shannon)
* Ion Beam Synthesis (IBS) of amorphous gallium nitride. The University has a UK patent in this invention (Inventors: SRP Silva, SA Almeida and BJ Sealy).
* Synthesis and observation of fullerenes and carbon nanotubes by PECVD at room temperature.
* Delocalised conduction in amorphous carbon thin films. As a result barrier controlled conduction is now possible in these films. This work has been further extended to the Source Gated Transistor concept now being exploited as part of a Royal Academy of Engineering Fellowship (Dr. Radu Sporea).
* Electron field emission from laser crystallised thin films. A joint UK and PCT patent with Dundee now exists, and commercialisation routes are being pursued (Inventors: SRP Silva, JM Shannon and MJ Rose).
* High density recording media for data storage (patent pending).
* Nd:YAG crystallisation of polycrystalline films with multiple pulses for super sequential lateral growth.
* First, comprehensive simulation of field emission from flat amorphous cathodes. Patent submitted on Hot Electron emission process.
* Growth of carbon nanofibres and carbon nanoropes using novel techniques at room temperature. UK

and worldwide patents and advanced stages of commercialisation. (Inventors: Silva, Boskovic and Haq).
* First work on nano-assembly of carbon nanotubes using a proprietary technique for which a patent application has been deposited. (Inventors: DC Cox, RD Forrest and SRP Silva).
* New concept in proposing the use of triple junctions for the efficient dissociation of excitons in hybrid organic-carbon nanotube solution processable solar cells.
* Use of carbon nanotube-organic hybrid materials for charge injection in OLED devices. Work has been patented and spin-out set up. (Inventors: RA Hatton, SRP Silva)
* Invented a novel low-*k* dielectric material for CMOS compatible ULSI device interlayer dielectrics. Patent applied for and being licensed. (Inventors: SRP Silva, GY Chan and BP Jensen)
* Novel low temperature growth system developed for nano-carbon materials. This photo-thermal system is now licenced to a spin-out of the university.
* New technique for the preparation of nano-composite materials for large area high efficiency solar cells using the inorganics-in-organics concept developed and patented for 4G solar cells.
* New route to produce 3D connected CFRP developed for large aerospace company. Related work includes moisture barrier smart coatings for space applications. Prototype devices fabricated and patents applied for by multinational for exploitation of the technology.
* Growth technique for large area CVD graphene using a protected catalyst system developed and patented. Third party companies are in discussions on its exploitation.

In December 2013, won joint funding from EPSRC, Industry (Tata, Tetreon, NPL, BAE Systems, Intel, Thomas Swan) to establish a 'UK Graphene Growth Facility', to provide the UK academic and industry with high quality large area electronic grade CVD graphene. This is a strategically key programme that is already leading to new collaborations with UK industry and opportunities across Europe.

EXTERNAL AND OUTREACH

I have a long track record of outreach to diverse audiences from school-age groups to facilitating a cross-bench, parliamentary Nanotechnology Task Force in Westminster. A few examples are:

2002	Guest lecturer on the Sterling Lecture Tour of Singapore and Malaysia. Presentations to Schools, Polytechnics, Universities and Professional bodies were made on the merits of Engineering, especially within the UK. Over 2500 school kids were spoken to and enthused.
2006–present	Advisor to the Government of Sri Lanka on the National Nanotechnology Initiative via the Minister of Science and Technology. I helped establish two companies to develop resources in Sri Lanka to benefit the national economy. During my sabbatical year in Sri Lanka, I helped raise the funding from the private and public sector to a 50 acre science park near Colombo. This park was inaugurated by His Excellency the President of Sri Lanka in Sept 2013 as the first Nanotechnology Science park and Centre of Excellence. The Centre of Excellence has over 250 research scientists in some of the best equipped laboratories in Asia.
2011	Member of the 50 strong UK delegation to visit India under the leadership of David Cameron PM. I was part of the Energy and Climate Change group, led by the Hon. Greg Barker.
2013	Led the Royal Academy of Engineering party to Hyderabad, India to help celebrate the Silver Jubilee of the Indian National Academy of Engineering (INAE).
1999–	I continue to be a member of the EPSRC peer Review College
1998–2002	Member of the Advisory Board for the Network of Excellence in Silicon Microelectronics (NESM) in the UK
1997–2006	Co-organiser of the first, second, third, fourth and fifth international Specialist Meeting in Amorphous Carbon (SMAC) in Cambridge -July 1997, Singapore -July 1999, Torino (Italy) in 2000, Barcelona (Spain) in 2002, Trento (Italy) in 2004 and Crete in 2006. I also co-edited the proceedings (editors: SRP Silva, J Robertson, GAJ Amaratunga, WI Milne et al.),
2002	Member of EPSRC review panel of the IT and Computer Sciences
2007–2010	Member of the Technical Opportunities Panel (TOP)
2015	Member of Newton-Bhabha Funding Committee, Royal Academy of Engineering

I have been on International Advisory Expert Panels in Japan, Korea, Sri Lanka, Saudi Arabia, China, Canada, Brazil, Singapore and for UNESCO.

C V

1. Name: Suhasini M Kulkarni

2. Date of Birth: 26-08-1974

3. Address: E/28, Thirthak Tenaments, Waghodia-Daboi Ring Road, Vadodara, GUJARAT

4. Designation: Assistant Professor

5. Department: Civil Engg **6. College:** Parul Institute of Engineering and Technology

7. E-Mail: suhasini.kulkarni@paruluniversity.ac.in **8. Mobile:9898879519**

9. Qualifications:

	Year:	Institute:	University:
Ph.D:Structural Engineering	**Pursuing**		
M.E:Structural Engineering	**2009**	**Faculty of Technlogy**	**M S University**
B.E:Civil Engg	1997	BVB College of Engg & Tech	Karnatak University

10. Experience:

Organization	Responsibilities	Period of work
ProCon Infosys, Hubli, Karnataka	• Faculty • Teach Computer Softwares like • C,C++,AutoCAD,Oracle,D2K,MS Office .,	1 Year(1-04-1998 to 30-04-1999)
DataPro, Hubli,Karnataka	• Faculty • Teach Computer Softwares like • C,C++,AutoCAD,Oracle,D2K,MS Office .,	1Year(1-01-1999 to 30-11-1999)
CMC Computers, Hubli, Karnataka	• Faculty • Teach Computer Softwares like • C,C++,AutoCAD,Oracle,D2K,MS Office	1Year(1-06-2000 to 30-11-2000)
The Oxford Polytechnic, Bangaluru	• Civil Engg Subjects Advanced Construction Tech, AutoCAD, Town Planning	1 Academic year(01.08.2001 to 31.03.2002)
Parul Institute Of Engineering & Technology.Degree 1st Shift, Limda Vadodara	• Structural Analysis I,II,III • Structural Design I,II **ME Structural Engg (Sem I,II,III,IV)** • Basic Concepts of Structural Behavior • Prestressed Concrete • Computer Lab for Analysis • Structural Design Project • Design of Earthquake Resistant Structures	10/07/2006 till date

Publications (List):
Published / Communicated in International / National Journals

Name of National Journal	Title of the Paper	Authors	Year of Publication / ISSN No
Journal of Information, Knowledge and Research in Civil Engineering	A State-of-Art Review on Reinforced Concrete Beam-Column Joints	S.M.Kulkarni, Y. D. Patil	ISSN: 0975 – 6744 ,Nov 11 to Oct 12 ,Vol 2, Issue 1, Page 94(Impact Factor: GIF: 00.9487 – SIF: 03.495
Indian Journal of Technical Education	Behavior of Exterior RC Beam-Column Joint Subjected to Monotonic Loading	S.M.Kulkarni, Y. D. Patil	ISSN 0971-3034, pp.129-136.

Name of International Journal	Title of the Paper	Authors	Year of Publication / ISSN No
Elsevier, Procedia Engineering 2013	A Novel Reinforcement Pattern for Exterior Reinforced Concrete Beam-Column Joint	S.M.Kulkarni, Y. D. Patil	ISSN 1877-7058(2013) pp. 184-193,vol 51C, 184–193(IMF 0.629)
International Journal of Scientific & Engineering Research 2014	Evaluation of Advanced Reinforcement Pattern in Exterior RC Beam-Column Joint	S.M.Kulkarni, Y. D. Patil	ISSN 2229-5518,Vol 5,Issue 3, pp 624-629.(IMF 3.2)
International Organization of Scientific Research 2014	Cyclic Behavior of Exterior Reinforced Beam-Column Joint with Cross Inclined Column Bars	S.M.Kulkarni, Y. D. Patil	e-ISSN: 2278-1684,p-ISSN: 2320-334X, Volume 11, Issue 4 Ver. III (Jul-Aug. 2014), PP 09-17(IMF 1.753)

Details of Work shop-Training school/ FDP Attended:

Organization	Topic Name	Date	Attended/ Conducted
Charotar University of Science and Technology	One Day National Seminar on Soil Dynamics and Machine Foundations	February 8,2014	Attended
SVNIT	Advances in Geotechnical Engineering	25th June to 4th July 2014	Attended
SVNIT	Recent Advances in Civil Engineering	30,1 & 2 October 2014	Attended

Inventors	Title of Patent/Copyrights	Application No/ Date
Patents:		
Kulkarni Suhasini, Purohit Shonk	Process has been developed- Process for preparation of high strength concrete using glass fibers.	3355/MUM/2013 24/10/2013
Kulkarni Suhasini, Soni Deval	Process has been developed- Process for preparation of high performance concrete incorporating Alccofine and Fly ash.	3345/MUM/2013 24/10/2013
Kulkarni Suhasini, Kamdar Bhoomi,Gandhi Pranali,Mathias Denzil,Shah Dhwani,Thakkar Komal	Process has been developed- Process for preparation of high compressive strength and low cost concrete using Hypo-Sludge.	3349/MUM/2013 24/10/2013
Copyright:		
Pruthvi N Patel,Vishva K Shastri,Nirali S Patel,Kruti J Tamboli,Suhasini Kulkarni,Yogesh Griglani	Process has been developed- Analysis of flexible supports against fixed supports of a fixed steel tank roof using Staad pro.	10466/2013-Co/SW 29/10/2013
Mayank I.Patel,Suhasini M. Kulkarni	Process has been developed- Optimal cable profile of post tensioning Prestressed concrete member by using adapt software.	10467/2013-Co/SW 29/10/2013

ME DISSERTATIONS GUIDED

M E Structural Engineering Dissertation Titles- 2014-15(2013 Batch)			
Sr No	**Name of Student**	**Title of Thesis**	**Internal supervisor Name**
1	Sanjaykumar Satyaprakash Gond	Experimental study on different embedment length and bond behavior of headed reinforcement bar in concrete	Prof. Suhasini Kulkarni
2	Vijay Natvarlal Rathod	Sensitivity analysis based dynamic assessment & vibration testing of ductile frame with innovative infill	Prof. Suhasini Kulkarni
3	Deep Parekh	Automation of Staad file generation	Prof. Suhasini Kulkarni
M E Structural Engineering Dissertation Titles- 2015-16(2014 Batch)			
Sr No	**Name of Student**	**Title of Thesis**	**Internal supervisor Name**
1	PANKTI PATEL	BLAST RESISTANT DESIGN OF STRUCTURE	Suhasini Kulkarni
2	KOMAL VAIDHYA	BUCKLING OF CYLINDRICAL SHELL	Suhasini Kulkarni

Name	**Title**	**National/International Journal**	**ISSN No**
Vicky Patel, S M Kulkarni	Literature Review on Self-Compacting Concrete with Fibres and Fly ash	National Conference on Emerging Vistas of Technology in 21st Century	10th & 11th May 2013
Hiren Panchal, S M Kulkarni	Literature Review on Analytical Study of steel Beam-Column Bolted Joint using Ansys	National Conference on Emerging Vistas of Technology in 21st Century	10th & 11th May 2013
Bhargav Patel, S M Kulkarni	State-of Art Review on Pushover Analysis of RC frame building	National Conference on Emerging Vistas of Technology in 21st Century	10th & 11th May 2013
S M Kulkarni, Purohit Shonk	Strengthening of Concrete using Glass Fibres	National Conference on Emerging Vistas of Technology in 21st Century	10th & 11th May 2013
Jatin Patel, S M Kulkarni	Parametric Study of Composite Slab using Ansys	National Conference on Recent Advances in Civil & Structural Engineering (RACSE-14),ADIT,BVM	25th-26th April 2014

C.V.

1. Name: Ms.Nihalani Seema Anand

2. Date of Birth: 22/05/1979

3. Address: C-13/1, Sharda Society, Warasia. Vadodara-390006

4. Designation: Head & Assistant Professor,

5. Department: Civil Engineering **6. College: PIET**

7. E-Mail: seema.nihalani@paruluniveristy.ac.in **8. Mobile**: +919687691388

9. Qualifications:

	Year:	Institute:	University:
M.E:	2001	Faculty of Engg & Tech.	M.S.University of Baroda
B.E:	2000	Faculty of Engg & Tech.	M.S.University of Baroda

10. Experience:

- **Total Experience = 10 years and 07 months**
- **Teaching Experience = 07 years and 06 months**

Sr. No.	Designation	Name of employer	Period of employment
1	Head and Assistant Professor	Parul Institute of Engineering & Technology, Vaghodia, Limda PO, Vadodara	Feb'2015 Till Date
2.	Assistant Professor	Parul Institute of Engineering & Technology, Vaghodia, Limda PO, Vadodara	Sep'2009 Till Dec'2011
3.	Lecturer	Civil Engg. Dept, Institute Of Technology, Nirma University, Ahmedabad.	Nov'2005 Till Jan'2007
4.	Lecturer	Parul Institute of Engineering & Technology, Vaghodia, Limda PO, Vadodara	Jul'2005 To Oct'2005
5.	Temporary Lecturer	Civil Engg. Dept. Faculty Of Tech. & Engg. M.S.University	Sept'2002 To Jun'2005
6.	Teaching Assistant	WREMI, Faculty Of Tech. & Engg. M.S.University	Aug'2001 To Jan'2002.

Professional Experience = 03 years 01 month

Sr. No.	Designation	Name Of Employer	Period Of Employment
1.	Sr. Manager - EMS	Green Circle Inc., Vadodara	May' 2008 till Aug' 2009
2.	Environmental Engineer	UPL, Environmental Engineers Ltd.	Feb'2007 to Apr'2008
3	Project Associate	International Council For Local Environmental Initiatives (ICLEI) In Collaboration With Vadodara Municipal Corporation (VMC)	Feb'2002 To Aug' 2002.

11. Publications (List):

Published / Communicated in International/National Journals /: 13 – National, 04 International, Few are listed below

Sr. No	Title of the Paper	Name of the Journal/ Conference	Year, Month (Vol., No., pp)	ISSN No.
1.	Performance Evaluation Of Effluent Treatment Plant – A Case Study	27th National Convention of Environmental Engineers, Mangalore organised by The Institution Of Engineers (India)	24th-25th Jan' 2012	Published
2.	Treatability Study Methodology & Application	1st International Science Congress (ISC-2011) Organised by Maharaja Ranjit Singh College of Professional Sciences Indore, MP, India –	24th - 25th Dec'2011	**ISSN-2249-9261**
3.	Energy from Waste	International Conference on Renewable Energy Technologies (iCORET 2011) organised by PSG College Of Technology: Coimbatore	15th - 17th Dec 2011	Published
4.	Environmental Impact Assessment Study For Thermal Power Plants	National Conference on Sustainable Development of Water Resources and Environment Management SDWEM2011at Sri Balaji College of Engineering and Technology, Jaipur	25th -26th Feb 2011	Published
5.	Performance Evaluation of ETP for Pharmaceutical Industry	National Conference on Emerging Tends in Engineering, Technology and Architecture by D.Y.Patil College of Engg , Kolhapur –	28th -29th Jan'2011	**ISBN – 978-81-920561-0-4**
6.	C-Tech -A Novel Wastewater Treatment Technology	International Conference NuIcone'2010 at Nirma University	11th -12th Dec'2010	Published

Sr. No	Title of the Paper	Name of the Journal/ Conference	Year, Month (Vol., No., pp)	ISSN No.
7.	Bio-Energy Recovery from Municipal Wastewater/ Sewage	National Conference on "Current Trends in Technology" (NUCONE 06) at Nirma University**. ISBN- 81-8424-140-2**	30th Nov - 2nd Dec 2006	Presented & Published
8.	An Efficient Method of Treating Water & Wastewater by using Polyelectrolytes in combination with Alum for Coagulation & Flocculation Processes	National Journal of IAEM (Indian Association For Environmental Management) **ISSN – 0970-8480**	Oct'2004	Published in National Journal

12. Attended National / International Workshops / Seminars / Conferences etc:

Sr. No.	Topic	Duration	Organised by
1.	High Impact Teaching Skills-Mission 10X	12th - 16th Jan-2012	PIET in collaboration with Wipro Technologies
2.	High Impact Teaching Skills Mission 10x - a 5 day workshop	**12th Sep- 16th Sep'2011.**	PIET in collaboration with Wipro Technologies
3.	Recent Trends in Statistics and Probabilities for Research in Engineering	**18th – 20th Jul-2011**	PIET
4.	Workshop on Modern Methods of Structural Analysis and Design	11th & 12th of September, 2010	PIET
5.	One week Training Programme on Fuzzy Logic.	08th - 13th Jan'2007	SVNIT, Surat
6.	Two weeks Short Term Training Program on Teaching Methodology for Construction Technology & Structures	19th – 31st Dec'2005	CEPT University Ahmedabad
7.	One Week Faculty Induction Training Programme	07th - 12th Nov'2005	Nirma University
8.	Advanced Water & Wastewater Treatment & Modelling Techniques	Nov 29 – Dec 03, 2004	IIT Powai.

Sr. No.	Topic	Duration	Organised by
9.	Integrated Water Resources Management using Numerical Methods, Remote Sensing & GIS	Nov 22 – 26, 2004	IIT Powai.

13. Membership of Professional Bodies / Association:

Sr.No.	Name of the Professional Body / Association	Category of Membership	Year
1	Institution Of Engineers India – (AM -125240-5)	Life Member	
2	Indian Society For Technical Education – (LM-48722)	Life Member	
3	Indian Water Works Association – (LM-008274)	Life Member	
4	M. S. University Civil Engineering Alumni Association	Life Member	
5	Society For Clean Environment	Life Member	

16. Any Other Details of Relevance:

1. Worked Co-ordinator and Member of Schedule – I Environmental Audit Team of Nirma University, Ahmedabad.
2. Worked as Evaluator, Govt of Gujarat for Various Schemes like National Rural Development, Hariyali, Desert Development Programme, Watershed Management etc.

(SEEMA NIHALANI)

C.V

1. Name: Prof. Bhavsar Falguni Mohanlal

2. Date of Birth: 29 / 06 / 1980

3. Address: B-12, Vishranti Bunglows, Near Rukamni Party Plot, Dabhoi Wagodia Ring Road, Vadodara - 390025

4. Designation: Asst. Professor

5. Department: Electrical **6. College:** Parul Institute of Engineering and Technology

7. E-Mail: falguni.bhavsar@parluniversity.ac.in **8. Mobile:** 9427840090

9. Qualifications:

Ph.D: N.A

M.E: Electrical Power Engineering Year: 2006 Institute: Faculty of Technology University : The M. S. University, Vadodara

B.E: Electrical Year: 2004 Institute: Faculty of Technology University : The M. S. University, Vadodara

10. Experience:

Teaching: No. of Years: 10 **Institute:** Parul Institute of Engineering and Technology, Vadodara **University:** Gujarat Technological University

Industry: NA **No. of Years:** NA **Industry:** NA

11. Publications (List):

Published / Communicated in International / National Journals /:

Sr. No.	Title of the Paper	Name of the Journal / Conference	Year, Month (Vol., No., pp)	ISSN No.
1	Novel Control Strategy For Grid-Connected PV System With Reactive Power Compensation And MPPT Control	International Journal Of Innovative Research In Electrical, Electronics, Instrumentation And Control Engineering,	2014, May (Vol. 2, Issue 5)	ISSN (Online) 2321– 2004, ISSN (Print) 2321 – 5526
2	Analysis of Contingencies leading	International Journal of Scientific Engineering &	2014, March (Vol.03, Issue.03,	ISSN 2319-8885

Sr. No.	Title of the Paper	Name of the Journal/ Conference	Year, Month (Vol., No., pp)	ISSN No.
	to Transient stability assessment in Power System Network	Technology Research, SG: IJSETRV03ISO3P742-3 presented at SEMAR GROUPS, at Hyderabad, AP_INDIA	Pages:0518-0523)	
3	Transient stability Analysis of Typical Power System scheme for offshore platform.	International Journal of Engineering Development and Research,	2013, September, (Volume 1 Issue 2, Paper ID:IJDER1302014)	ISSN NO. 2321-9939
4	Control Strategy for Islanded Single DER unit with Load Compensating Feed Forward	6th National conference on "Emerging Vistas of Technology in 21s century", in Electrical Engineering on Upcoming Issues & Challanges	2015, April (p.p. 8-15)	ISSN NO. 978-93-84869-43-4
5	MATLAB based Simulation for transmission line fault Detection at	6th National conference on "Emerging Vistas of Technology in 21s century" in Electrical Engineering on Upcoming Issues & Challanges	2015, April (p.p. 20-23)	ISSN NO. 978-93-84869-43-4
6	Novel Control Strategy for grid Connected PV system with Reactive Power compensation	5th National Conference on "Emerging Vistas of Technology in 21st century" in Electrical Engineering on Power System, Power Electronics, Intelligent Control & Renewable Energy System	2014, April (p.p. 135-139)	ISSN: 978-93-83842-30-8
7	Power System State Estimation – Challenges and Methodology	4th National Conference on "Emerging Vistas of Technology in 21st century" in Electrical Engineering on Futuristic Trends in Electrical Engineering	2013, May (p.p. 17-21)	ISBN: 978-93-82880-34-9
8	Application of advance genetic algorithm operators for economic & environmental load dispatch	3rd National Conference on "Emerging Vistas of Technology in 21st century" in Electrical Engineering Advances in Power Electronics & Power system in Technical sponsored with AICTE, at GTU	2012, April (p.p. 133-137)	ISSN: 0971-3034

12. Attended National / International Workshops / Seminars / Conferences etc:

Sr. No.	Title of the Conference	National / International	Name of Organizing Institute	Year, Month
1	6th National conference on "Emerging Vistas of Technology in 21s century" in Electrical Engineering on Upcoming Issues & Challanges	National Conference	PIET	2014, April
2	5th National Conference on "Emerging Vistas of Technology in 21st century" in Electrical Engineering on Power System, Power Electronics, Intelligent Control & Renewable Energy System	National Conference	PIET	2014, April
3	4th National Conference on "Emerging Vistas of Technology in 21st century" in Electrical Engineering on Futuristic Trends in Electrical Engineering	National Conference	PIET	2013, May
4	3rd National Conference on "Emerging Vistas of Technology in 21st century" in Electrical Engineering Advances in Power Electronics & Power system in Technical sponsored with AICTE, at GTU	National Conference	AICTE, GTU & PIET	2012, April
5	NCEVT-10 Advances in Power Electronics & Power System	National Conference	PASM	2010, December

13. Participation as an Invited Speaker:

Sr. No.	Title of the Topic	Name of the Institution	Year, Month
NIL			

14. Details of Guidance of M.E. / B.E. Dissertations (List):

Sr. No.	Title of the Dissertation	Course: ME/BE (Branch)	Name of the Student	Academic Year, Month
1	Simulation for Identify Fault Location In Transmission line.	ME (Electrical)	Yuvraj Bharathaniya	June 2015
2	Design of Control Startegy for Islanded Micro-grid	ME (Electrical)	Vrutik Patel	June 2015
3	Novel Control Strategy for Grid Connected PV System with reactive power compensation and MPPT Control	ME (Electrical)	Avdhoota Trivedi	June 2014
4	Simulation of Cascade Tripping and Grid Islanding	ME (Electrical)	Supriya Rakshit	June 2014

15. Membership of Professional Bodies / Association:

Sr. No.	Name of the Professional Body / Association	Category of Membership	Year
1	Indian Society for Technical Education	Life	Since 2010

16. Awards / Scholarships Obtained:

Sr.No.	Title of Award/Scholarship	Sponsoring Institution/Organization	Year
	NIL		

C.V.

1. **Name**: Sanjoy Paul

2. **Date of Birth**: 18th December 1987

3. **Address:** RN: 207, Mechanical Dept.,

   Parul University, Limda, Vadodara (GJ)

4. Designation: Assistant Professor

5. Department: Mechanical Engineering

6. College: Parul Institute of Engineering & Technology, Parul University

7. E-Mail: sanjoy.paul@paruluniversity.ac.in **8. Mobile:** 8866088361

9. Qualifications:

Degree	Year	Institute	University
M. Tech	2014	National Institute of Technology Silchar	National Institute of Technology Silchar
B.E.	2011	S.J.M.I.T	V.T.U, Belgaum

10. Experience:

Teaching: Assistant Professor in Department of Mechanical Engineering

No. of Years: 1 year 4 months

Institute: Parul Institute of Engineering & Technology

University: Parul University, Vadodara (GUJ, India)

11. Publications (List):

Published / Communicated in International/National Journals /:

Sr. No	Title of the Paper	Name of the Journal/ Conference	Year, Month (Vol., No., pp)	ISSN No.
1.	CFD analysis of hydrodynamic condition of designed spiral column photo bioreactors for cultivation of microalgae	International Conference on Contemporary challenges in Management, Technology & Social Sciences,	April 5-6, 2014; pp. 166-174	ISBN: 978-81-928926-3-4.
2	Simulation of Hydrodynamic Conditions of a Photo bioreactor for Microalgae Cultivation	Journal of Applied Mechanics and Materials	June 2014; Vols. 592-594 pp. 2427-2431.	AMM 592-594.2427

12. Awards / Scholarships Obtained:

Sr. No.	Title of Award/Scholarship	Sponsoring Institution/Organization	Year
1.	M. Tech scholarship	Ministry of Human Resource Department (MHRD)	2012-2014
2	The best paper in International Conference on Contemporary challenges in Management, Technology & Social Sciences	SEMS, held at MGIMT Lucknow	during April 5-6, 2014

13. KEY SKILLS

MATLAB, ANSYS.

C.V.

1. **Name**: P Pranith Kumar Reddy

2. **Date of Birth**: 10th May 1990

3. **Address:** RN: 207, Mechanical Dept.,

Parul University, Limda, Vadodara (GJ)

4. Designation: Assistant Professor

5. Department: Mechanical Engineering

6. College: Parul Institute of Engineering & Technology, Parul University

7. E-Mail: ppranith.reddy@paruluniversity.ac.in **8. Mobile:** 9998809151

9. Qualifications:

Degree	Year	Institute	University
M. Tech	2014	National Institute of Technology Karnataka Surathkal	National Institute of Technology Karnataka Surathkal
B.E.	2011	Government Engineering College Modasa	Hemchandracharya North Gujarat University, Patan (GUJ)

10. Experience:

Teaching: Assistant Professor in Department of Mechanical Engineering

No. of Years: 1 year 4 months

Institute: Parul Institute of Engineering & Technology

University: Parul University, Vadodara (GUJ, India)

11. Publications (List):

Published / Communicated in International / National Journals /:

Sr. No	Title of the Paper	Name of the Journal / Conference	Year, Month (Vol., No., pp)	ISSN No.
1.	Thermomechanical and Metallurgical Analysis of SMA and GTA Welded Low Carbon Steel Butt Joints	International journal of Chemical, Molecular, Nuclear, Materials & Metallurgical Engineering	2015,Nov(Vol:9)	10002950

12. Membership of Professional Bodies / Association:

Sr. No.	Name of the Professional Body / Association	Category of Membership	Year
1.	Society of Automotive Engineers, India (SAE)	Student	2010-2011

13. Awards / Scholarships Obtained:

Sr. No.	Title of Award/Scholarship	Sponsoring Institution/Organization	Year
1.	M. Tech scholarship	Ministry of Human Resource Department (MHRD)	2012-2014

14. KEY SKILLS

MATLAB, ANSYS (MECHANICAL APDL), AutoCAD (2D, 3D).

I. Dr. SODAGUDI FRANCIS XAVIER

Professor, Director (R & D), (Since 2011),
Parul Innovation Center, Parul University,
Waghodia, Vadodara-391760, Gujarat,
Tel: 02668-260349, Mob: 09099926579, Fax: 02668-260201,
E- mail: RnD@paruluniversity.ac.in , dr.sfxavier@gmail.com,

II. Education:

Ph.D., Materials Science & Technology, Indian Institute of Technology (IIT), New Delhi, (May 1979).

M.Sc., 1st Class, (Physics), Andhra University, Visakhapatnam, *August 1972*.

B.Sc., 1st Class, (Maths, Physics, Chemistry), Andhra University, Andhra Loyola College, Vijayawada, *July 1970*.

III. Experience:

Experience: Post-Doctoral Fellow / Research Associate: Indian Institute of Technology, Delhi, 1979 to 1982.

- Joined R & D Center, IPCL (/ RIL) in October, 1982, as Research Officer.
- Last Position Held at RIL, March, 2009: HEAD, Information & Knowledge Management Group & (General Manager), *Polymer & Materials Science Group, Reliance Technology Group, Reliance Industries Ltd.,Vadodara Manufacturing Division.*

Experience Abroad: UNIDO FELLOW, ***Visiting Scientist***: Department of Chemical Engineering, Center for Composite Materials, University of Delaware, U.S.A. (1985).

Visiting Scientist at Polymer and Composites Group, Technische Universitat Hamburg-Harburg, Germany (1985).

IV. Awards & Technological Achievements:

- Received **'Pedagogical Innovation Award-2013',** from Hon.V.C, GTU, **Prof. Akshai Aggarwal,** Padmashree **Dr. Vijay Bhatkar**, Architect PARAM series of Supercomputers, **Mr. David Hamilton**, Consulate General, Canada and **Swami Sarvasthananda,** RKM.
- Reviewed the Final Year Projects of BE and ME students at Parul Institute of Engineering and Technology and filed **32 IPRs** (12 Patents and 20 Copyrights) in 2012.
- This had placed PARUL at **7th place** among '**Top 10 Indian Applicants from Institutes and Universities**'.
- The Hon. Vice Chancellor, GTU, has given him a **Special Memento** for his efforts towards IPRs.
- He also received another **Memento** from Registrar of GTU for his IPR activities.
- Reviewed the Final Year Projects of BE and ME students at Parul Institute of Engineering and Technology (PIET), Parul Institute of Pharmacy (PIP) and Parul Institute of Pharmacy & Research (PIPR) filed **45 IPRs (17 Patents and 28 Copyrights) in 2013**.

- Reviewed the Final Year Projects of BE and ME students at PIET, PIP and PIPR and filed **35 IPRs (24 Patents and 11 Copyrights) in 2014**.
- **Parul University has today 124 Patents and Copyrights filed.**
- Received an award "**INVENTOR-2006**" from MarkPatent.Org, a well known Intellectual Property Knowledge Hub during their Annual Seminar at Ahmedabad, 25-26th November, 2006, for the work on 'High Performance Polyolefin Compounds for Industrial Pallets…'
- **Reviewer**, since 2007, for Research Papers in International Journal, **POLYMER**, published by **Elsevier**, U.K.
- Developed High Impact Polyolefin Blend that is accepted for use by M/s. Maruti Udyog Ltd. in their cars. (**US Patent: 6,710,131 B2**)
- Developed Epoxy-Carbon fiber Prepreg on a commercial level along with NAL.
- Developed PC/ABS blend comparable to Cycoloy 2800 of M/s. GE (Plastics).
- Developed PVC/ABS alloy comparable to Cycovin of M/s. Borg Warner.

V. Patents Granted / Applied:

A. U.S.Patents Granted:

1. Melt Processible Thermoplastic Polyolefin Blends for Car Bumpers and Other Articles and a Process for the Preparation Thereof
   S.F.Xavier and P.V.N.Sastry; **US Patent No. 6,710,131 B2**
2. High Performance Polyolefin Blends for Industrial Pallets Other Articles and a Process for the Preparation Thereof
   S.F.Xavier, P.V.N.Sastry and R.Bhaskeran; **US Patent No. 6,987,148 B2**
3. Thermoplastic Polyolefin Alloys and Process for Their Preparation
   S.F.Xavier and P.V.N.Sastry; **US Patent Appl. No.** ***20080262140***

B. PCT International:

1. A Process for Preparation of Thermoplastic Polyolefin Alloys having Improved (Notched) Impact Strength
   S.F.Xavier and V.N.S.Pendyala
   PCT International Application No. **PCT / IN 04 / 00011**
2. Flame Retardant Polyolefin Blends and a Process for the Preparation Thereof
   S.Banerji, A.K.Kulshreshtha, M.S.Choudhary and S.F.Xavier
   PCT International Application No. **PCT / IN 03 / 00365**

C. Indian Patents:

1. A Process for the Preparation of High Performance Composites of Carbon Fibers and Nylon-6; S.F.Xavier, **Indian Patent No. 207866**.
2. A Melt-Extrusion Process for Making Advanced Composites of Polybutylene Terephthalate Reinforced with Carbon Fibers; S.F.Xavier, **Indian Patent No. 206659**.
3. Thermoplastic Polyolefin Blends
   S.F.Xavier, P.V.N.Sastry, and R.Bhaskeran, **Indian Patent No. 204619**.
4. Melt Processable Thermoplastic Polyolefin Blends and a Process for Preparation Thereof. S.F.Xavier and P.V.N.Sastry, **Indian Patent No. 204816.**

VI. Book Chapters Published:

1. **Chapter in "Polymer Blends Handbook"** ***, Second Edition,***
   Properties and Performance of Polymer Blends

S.F.Xavier, Chapter 10, Vol. 2 of 3, p.1031-1201, 2014; **Series Editors: Leszek A. Utracki and Charles A. Wilkie, Springer Reference, New York**

2. Chapter in an **International Monograph**:
   Development of Fine Morphology in Polypropylene Composites
   S.F.Xavier, Chapter 14, in **Two-Phase Polymer Systems**, Progress in Polymer Processing, Series Ed.: L.A. Utracki, Hanser Publishers, Munich, 1991.
3. Chapter in an **Encyclopedia**: **IPCL Bumper Compound**
   S.F.Xavier, V.N.S. Pendyala, I.S.Bhardwaj.
   Encyclopedic Dictionary of Commercial Polymer Blends (EDCPB*);*
   Ed.: L.A. Utracki, Chem Tec Publishers, Toronto, p.167, 1994.
4. Chapter in **Handbook**: **Properties and Performance of Polymer Blends**
   S.F.Xavier
   Chapter 12, Vol. 2, p.861-950, in **Polymer Blends Handbook (PBH);** Vol. Ed. L.A.Utracki, Chapter Ed.: S.F.Xavier., Kluwer Academic Publishers, London, 2002.
5. Chapter in a Book: **Polymer Blending Processes**
   S.F.Xavier, Chapter in **Polymer Blends and Alloys-An Overview**,
   Eds: R.P.Singh, C.K.Das and S.K.Mustafi, Asian Books Private Ltd., New Delhi,
   p. 54, 2002.

VII. Some Papers Published / Presented (List is not complete):

1. Performance Properties of Short & Long Carbon Fiber Reinforced Nylon-6 Composites
   S.F.Xavier, Invited Lecture, International Conference PPS-25, Goa, India, March 1–5, 2009.
2. Processing, Structure and Properties of Polypropylene Composites with Wood Fiber. S.F.Xavier, Invited Lecture, Proceedings, International Conference on Natural Polymers, Fibers, Blends & Composites, School of Chemical Sciences, Mahatma Gandhi University, Kottayam, November, 2007.
3. Processing, Microstructure and Property Relations in Carbon Fiber Reinforced Nylon-6 Composites, S.F.Xavier, An invited lecture delivered at Indian Physics Association- Inter Chapter Meeting,
   Physics Department, M.S.University, Baroda, 20th April 2002.
4. Structure-Property Relations in Carbon Fiber Reinforced Polypropylene Composites.
   S.F.Xavier, V.N.S.Pendyala and R.C.Jain
   Paper presented in POLYMERS '99, an International Symposium, Polymers Beyond AD 2000, p.465, Ed., A.K.Ghosh, I.I.T., New Delhi, January 1999.
5. Influence of Compatibilizers on the Mechanical Properties of Polypropylene Copolymer and Polycarbonate Blends.
   V.N.S.Pendyala and S.F.Xavier
   Paper presented in National Seminar on Polymer Research in Academy, Industry and R&D Organizations, organized by I.I.T., Kharagpur & Tezpur University, June 1998.
6. Structure-Property Relations in Toughening of Polypropylene Copolymer.
   S.F.Xavier, V.N.S.Pendyala and I.S.Bhardwaj
   Proceedings of ACS, Division of 'Polymeric Materials: Science and Engineering', Washington DC, 1994.
7. Fracture Propagation in Particulate-Filled Polypropylene Composites.
   Part I: Influence of Filler Nature.
   S.F.Xavier, J.M.Schultz and K.Friedrich; J.Mater.Sci., **25**, 2411(1990).

8. Fracture Propagation in Particulate-Filled Polypropylene Composites.
Part II: Influence of Mica Concentration.
S.F.Xavier, J.M.Schultz and K.Friedrich; J.Mater.Sci., **25**, 2421 (1990).

9. Fracture Propagation in Particulate-Filled Polypropylene Composites.
Part III: Influence of Mica Surface Treatments.
S.F.Xavier, J.M.Schultz and K.Friedrich; J.Mater.Sci., **25**, 2428 (1990).

10. Transcrystallinity in Injection Molded Polypropylene-Glass Fiber Composites.
A.Mishra, B.L.Deopura, S.F.Xavier, F.D.Hartley and R.H.Peters
Die Angew. Makromol. Chem., **113**, 113(1983).

11. Mechanical Properties and Morphology of Glass Reinforced Polypropylene.
S.F.Xavier, D.Tyagi and A.Misra; Proceedings of IUPAC 28th Macromolecular Symposium, Amherst, USA, p.616 (1982).

VIII. Guidance to Ph.D. Students:

i) Ph.D.Thesis: "Synthesis and Characterization of Antioxidants for Polypropylene Copolymer", Jigar Desai, Department of Chemistry, M.S.University, Baroda, 2002.

ii) Ph.D.Thesis: "Influence of Compatibilizers on the Structure-Property Correlations in PBT Blends with Polyolefins"; P.Vashi, Department of Applied Physics, M.S.University, Baroda, 2000.

iii) Ph.D.Thesis: "Studies on Antioxidants"; A.Raja, Department of Organic Chemisty, M.S.Univeristy, Baroda, 1994.

iv) Ph.D. Thesis: "Studies on PVC and Epoxidized PVC Blends with PBR"
T.O.Verghese, Department of Organic Chemistry, M.S.University, Baroda, 1994.

IX. Guidance to PG / M.Tech Projects: 19 Projects for Students of different IITs.

X. General:

- **Chaired a Session** in National Seminar on Polymers, Surfactants & Gels, M.S.University of Baroda, 11-13 March 2005.
- **Ph.D.Examiner** for Mr.Rajkumar Patel from **National Chemical Laboratory**, Pune, submitted to University of Pune, September 2005.
- **Ph.D. Examiner** for Dr.P.Pradeep, Dept. of Physics, University of Rajasthan, Jaipur, Jan. 1997.
- **External Expert** for the project funded by Aeronautical Development Agency (**ADA**): **"Development of Composite Wind Shield for LCA**", Defense Materials & Stores Research and Development Establishment, (Ministry of Defense), Kanpur, 1998.
- Gave an invited lecture at **National Aerospace Laboratories**, 1987.
- Member of the Editorial Committee for reviewing the papers presented in "Polymers-94", Polymer Science: Recent Advances, Symposium conducted by Research Center, IPCL, Baroda, Feb. 1994.
- Delivered an invited lecture in **"Advanced Plastics and Rubber Composites"**, 6th Annual General Meeting of **Materials Research Society of India**, Calcutta Chapter, I.I.T., Kharagpur, Feb. 1995.
- Gave an invited lecture on "**Innovation and Intellectual Property Rights**" for students and faculty members at ITM, Vadodara.
- Attended as Member, Research Advisory Committee meetings of ERDA (Electrical Research and Development Agency), Baroda, 2002-2005.
- Life Member of Indian Physics Association.
- Member of Thermal Analysis Society of India.

L&T Power

Larsen & Toubro Limited
Power
Radhadaya Complex
Old Padra Road,
Vadodara 390015
Gujarat, India
Tel: +91 265 2456606
Fax: +91 265 245 4350
www.lntpower.com

To.

Royal Academy of Engineering, UK

Subject: Letter of Support to Parul University for the Industry Oriented Research Project "To Reduce Water Consumption and Optimize Efficiency of Thermal Power Plant by Using Air Cool Condensers (ACC)" under Higher Education Partnership Program - India through FICCI-NKFH under Newton - Bhabha Fund

Larsen & Toubro limited (L&T) is an Indian multinational having turnover of around USD 15 Bn. and operates in many sectors of the economy. It includes Infrastructure, Power, InfoTech, Finance and Technology Services.

L&T Power is the power group that executes turnkey projects to set up large gas and coal based power projects for national and international clients. L&T Power is head quartered in Vadodara, Gujarat, India.

L&T is deeply committed to Industry-Academia collaboration and its success. This project related to Air Cooled Condenser (ACC) is strategically very important in Indian context due to depleting water resources. Water cooled steam condensers consume huge quantum of water in a coal based thermal power plant. Thus, ACC is going to be a solution for the future.

Our team of senior engineers will be working with faculty and PG students of Parul University to explore and evaluate various options to find an optimum solution. We will jointly prepare the road map, schedule and periodically review the work done by Parul University team. We will also give them specific inputs to define the problem statement. We will share the required process parameters based on our experience of working on many coal based super-critical thermal power projects.

We will allow the students to use our technical resources like library, codes & standards as well as provide technical supervision and guidance to the team. We will allow them use of our facilities like meeting room, video conferencing etc. for the purpose of this project. We will also allow them to use our software and work stations as required to work on this project. Our experienced engineers will give their quality time to drive this project as per the schedule. We will interact with the U.K. based partner University as required to find the appropriate approaches & solutions.

We sincerely believe that this project will help us to offer better environment friendly solutions to our customers and will help to preserve precious national / global resource like water. This project fits in very well with the objective of our company – To provide Power Plants using sustainable technologies to our customers.

B K Basu
Vice President and Head - Corporate center & Technology

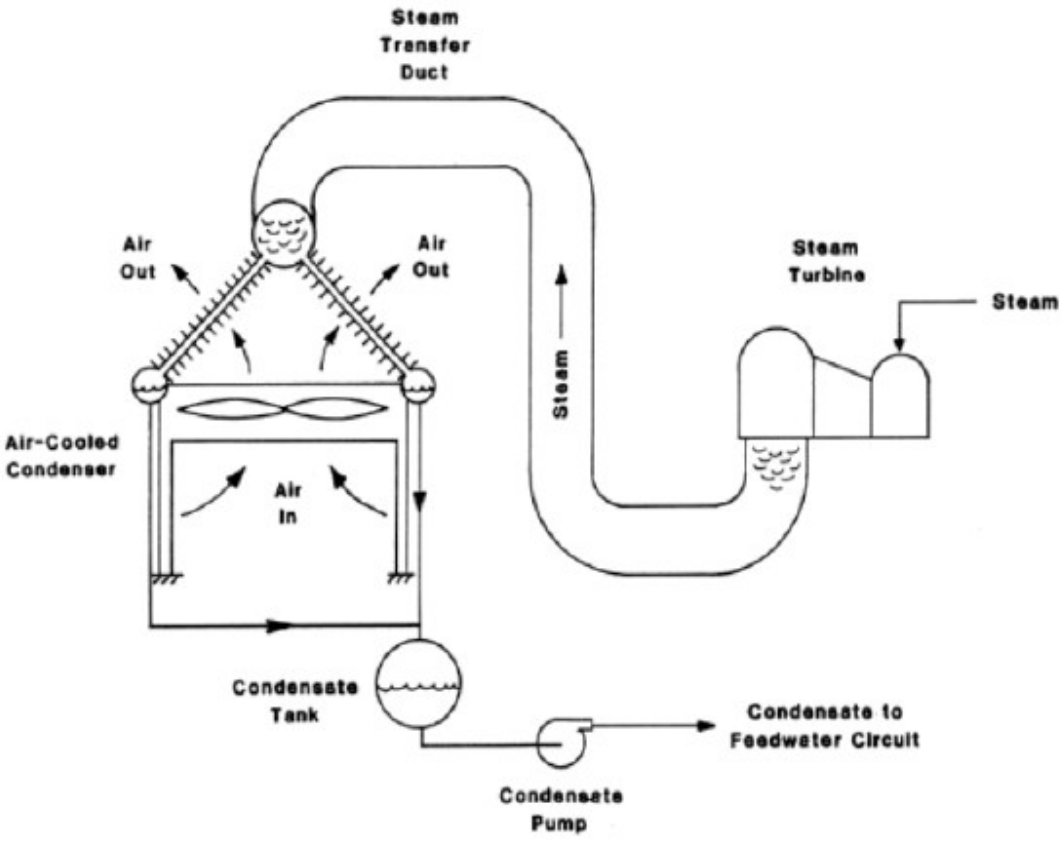

Fig 1 Direct Dry Cooling Systems

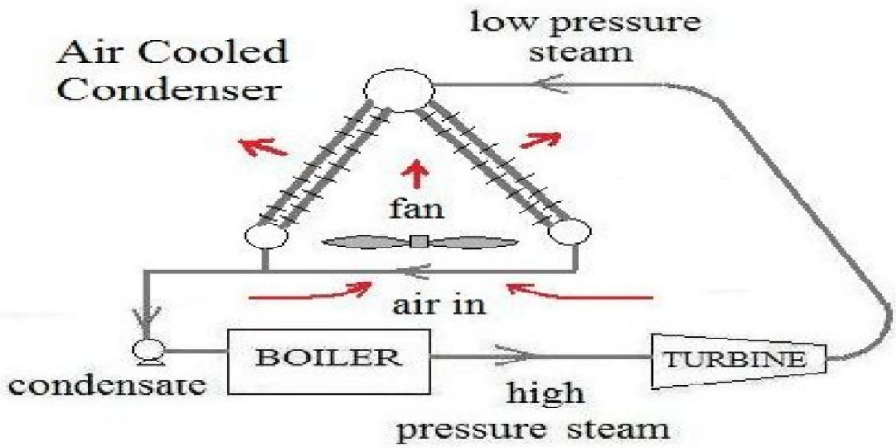

Fig2: steam power plant Rankine cycle with air cooled condenser

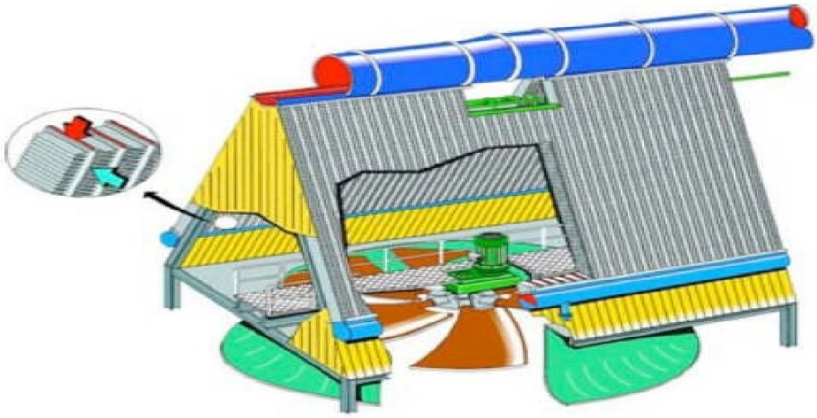

Fig 3:A Frame Mechanical Draught ACSC

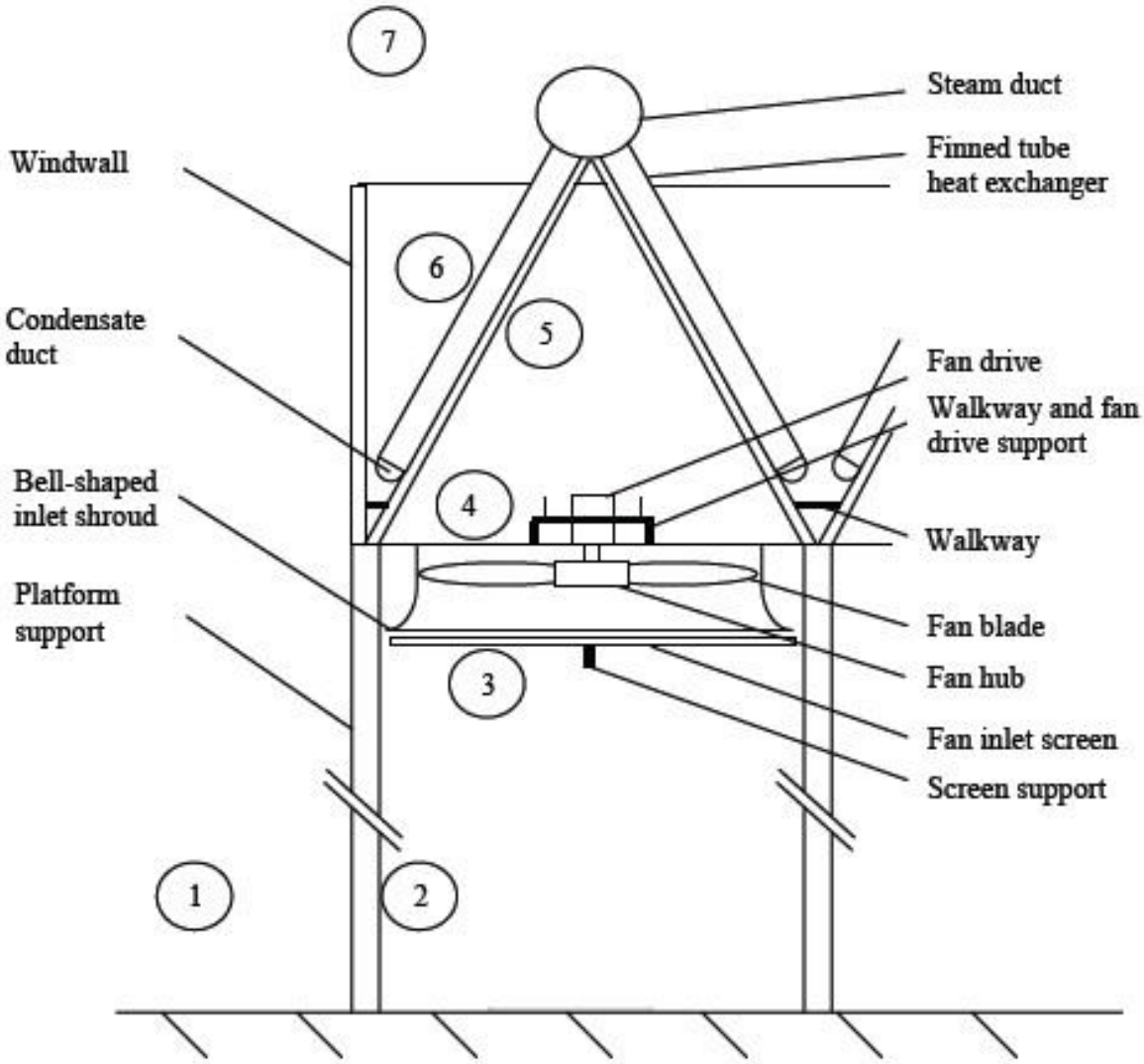

Figure4: cross sectional view of air cooled condenser

Annex C

Monitoring Schedule

The Recipient shall ensure that the following Reports are submitted to the Academy by the dates shown below:

Report	Date
Initiation Report	21 March 2016
Progress Report	01 June 2016
Progress Report	01 September 2016
Progress Report	01 December 2016
Progress Report	01 March 2017
Progress Report	01 June 2017
Progress Report	01 September 2017
Progress Report	01 December 2017
Progress Report	28 March 2018

Annex D

Schedule of Payments

Subject to the prior submission of the necessary Reports as detailed in Annex C, the Academy shall ensure that payments are made to the Recipient for the following amounts on the dates shown:

Action	Date	Value	Pre-requisite Report
Initial Payment - HEPI\1516\38	25 March 2016	£35,000.00	Initiation report
Final Payment - HEPI\1516\38	27 April 2018	£15,000.00	All progress reports submitted and approved
Total	£50,000.00		

NB. VAT is not payable on this Award

Invoices are not required and payment will be made against the banking details provided by the Recipient. It is the Recipient's duty to inform the Academy immediately if the banking details change during the Award.

Annex E

BANKING INFORMATION FORM

This form must be signed by an appropriate senior member from the central administration of the Recipient. Please return this form together with the signed contract to which this form is attached as an Annex. As an anti-fraud measure, you must also return one of the following to confirm the bank account details: a void cheque, a paying in slip, a copy bank statement.

Summary

The Recipient's internal reference for the award (maximum 25 characters in length):	
Royal Academy of Engineering reference:	HEPI\1516\38
Principal Contact:	Dr Gopala Krishna Murthy Paidipati
Start date of award:	
Total Award value:	£50,000.00

Key Finance Administrative Contact for this award:

Name (full):	DR. PARUL PATEL
Position:	MANAGING TRUSTEE
Organisation:	PARUL UNIVERSITY
Contact email address:	

Please type or print legibly the Recipient's bank information to avoid delay in payment processing.

Bank Information

Organisation Name	PARUL UNIVERSITY
Organisation Address	PARUL CAMPUS, VILL. LIMDA. TQ. WAGHODIA City BARODA County INDIA Postal Code 391760 Country INDIA
Bank Name	DSB BANK LTD
Bank Address	VADODARA BRANCH City VADODARA County INDIA Postal Code 390007 Country INDIA
Beneficiary Name	PARUL UNIVERSITY
Bank Account Number	1 0 0 2 2 4 1 1 0 0 0 0 4 2
Bank Account Currency	Please specify ~~Transfer~~ ~~GBP~~ INR
Sort Code	6 0 9 1 0 4
BIC or SWIFT code	SCBLGB2L
IBAN	GB12SCBL60910412701014

Payment Notification Details:

Email Address*	pimr.parul@gmail.com.

*An email notification will be sent as confirmation of payment which includes the amount, date of payment and invoice number(s)

Authorised Signatories

Name DR. PARUL PATEL	Name DR DEVANSHU PATEL
Job Title MANAGING TRUSTEE	Job Title VICE PRESIDENT
Signature	Signature
Date 18/03/2016	Date 18/03/2016.

Note: **TWO** Authorised Signatures on behalf of the Finance Department are required.

I hereby authorise the Royal Academy of Engineering to process payment to the above bank account and I confirm that the above information is correct. This

account will remain in effect until written authorisation to stop and/or change the instructions is received by the Royal Academy of Engineering.

I have authority to sign this Form on behalf of the organisation.

I have included a VOID CHEQUE or PAYING IN SLIP or a COPY BANK STATEMENT as evidence of the bank account details.

Signed:	
Date:	18/03/2016
Name (full):	DR. PARUL PATEL
Position:	MANAGING TRUSTEE
Organisation:	PARUL UNIVERSITY
Contact email address:	drparul@paruluniversity.ac.in

Managing Trustee
Parul Arogya Seva Mandal

STATEMENT OF ACCOUNT

DCB BANK

DCB BANK

Vadodara

Statement Period: FROM 01-02-2016 TO 17-03-2016

Account Number: 10022411000042 - INR (CAA DCB ELITE CURRENT ACCOUNT)

Account Name: PARUL UNIVERSITY

Joint Name: --

Address: PARUL AROGYA SEVA MANDAL TRUST , B/H APOLO TYRES PO LIMDA TAL WAGHODIA , VADODARA , Pin:-391760

Date	Transaction Particulars	Instrument Details	Withdrawal	Deposit	Balance
	Opening Balance				**2399728.64**
01-02-2016	By Cash			1175050.00	3574778.64
02-02-2016	TRF			100000000.00	103574778.64
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02-02-2016	By Cash			453000.00	104102778.64
02-02-2016	TRF TO TD A/C		100000000.00		4102778.64
03-02-2016	By Cash			292200.00	4394978.64
04-02-2016	By Cash			272100.00	4667078.64
05-02-2016	By Cash			42000.00	4709078.64
05-02-2016	By Cash			390100.00	5099178.64
06-02-2016	24/BOB/MANDVI (MAIN) (MDV)			10000.00	5109178.64
06-02-2016	By Cash			525000.00	5634178.64
08-02-2016	TRF		4000000.00		1634178.64
08-02-2016	By Cash			27600.00	1661778.64
08-02-2016	By Cash			106100.00	1767878.64
09-02-2016	By Cash			25000.00	1792878.64
09-02-2016	By Cash			80800.00	1873678.64
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12-02-2016	PIT TO CASH			2250.00	749528.64
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15-02-2016	By Cash			1750.00	856378.64
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15-02-2016	73437/CBI/PANIGATE (MAIN) (PNG)		20000.00	883628.64
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29-02-2016	By Cash		64550.00	384948.64
01-03-2016	By Cash		93000.00	477948.64

Contents of this statement will be considered correct if no error is reported within 30 days of receipt of statement.
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STATEMENT OF ACCOUNT

DCB BANK

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Vadodara

02-03-2016	By Cash		87300.00	565248.64
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	Closing Balance			**12748.64**
	Total No. of Transactions	**7**	**77**	
	Turnover	**108601000.00**	**106214020.00**	

****END OF STATEMENT****

DCB 24-Hour Customer Care: Call: 3281 1322 | Email: customercare@dcbbank.com | Visit: www.dcbbank.com

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