



RESEARCH COLLABORATION AGREEMENT

between

UNIVERSITI MALAYSIA TERENGGANU

and

UNIVERSITI KEBANGSAAN MALAYSIA

and

RIVERS STATE UNIVERSITY

and

AISSMS COLLEGE OF ENGINEERING PUNE





KERAJAAN MALAYSIA

IBU PEJABAT
LEMBAGA HASIL DALAM NEGERI MALAYSIA
MENARA HASIL
PERSIARAN RIMBA PERMAI
CYBER 8, 63000 CYBERJAYA
SELANGOR DARUL EHSAN

**RESIT RASMI SETEM**

ASAL

STAMP OFFICIAL RECEIPT

(Sila lekatkan resit rasmi setem ini ke atas surat cara sebagai bukti penyeteman)
Please attach this stamp official receipt to the instrument as evidence of stamping

Cara Bayaran *Payment Method* TUNA I
No. Adjudikasi *Adjudication No.* T015CG210360447 (SALINAN 3/3)
Jenis Surat Cara *Type Of Instrument* RESEARCH COLLABORATION AGREEMENT
Tarikh Surat Cara *Date Of Instrument* 01/07/2021
Balasan *Consideration* RM 0.00
Maklumat Pihak Pertama / Penjual / Pemberi *First Party / Vendor / Transferor / Assignor*
UNIVERSITI MALAYSIA TERENGGANU, NO SYARIKAT 000
Maklumat Pihak Kedua / Pembeli / Penerima *Second Party / Purchaser / Transferee / Assignee*
UNIVERSITI KEBANGSAAN MALAYSIA, NO SYARIKAT 000
Butiran Harta / Suratcara *Property / Instrument Description*
TIDAK BERKENAAN

LHDN
MALAYSIA

Dengan ini disahkan surat cara ini disetem dan diindors seperti maklumat di bawah:
This is to certify this instrument is stamped and indorsed as below:

No. Resit Rasmi Setem <i>Stamp Official Receipt No.</i>	T015CG210360447
Tarikh Penyseteman <i>Date Of Stamping</i>	12/07/2021
Duit Setem Dikenakan <i>Amount Of Stamp Duty</i>	RM 10.00
Penalti <i>Penalty</i>	RM 0.00
Pelarasan <i>Adjustment</i>	RM 0.00
Jumlah Dibayar <i>Total Amount Paid</i>	RM 10.00
Indorsemen <i>Indorsement (Aidit Setem, 1940)</i>	Seksyen 12

LHDN
Lembaga Hasil Dalam Negeri
MALAYSIA

LHDN
Lembaga Hasil Dalam Negeri
MALAYSIA

Pemungut Duit Setem

No. Kelulusan Perbendaharaan *Treasury Approval No.* : KK/BSKK/10/600-2/1/2(60)Tarikh Cetak *Printed Date* : 12/07/2021 11:13:30

Pengesahan ketulenan Resit Rasmi Setem ini boleh dipastikan di stamps.hasil.gov.my atau melalui aplikasi telefon pintar
The authenticity of this Stamp Official Receipt can be verified at stamps.hasil.gov.my or by mobile app
Ini adalah cetakan komputer dan tidak perlu ditandatangani
This is a computer generated printout and no signature is required



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**RESEARCH COLLABORATION AGREEMENT
BETWEEN
UNIVERSITI MALAYSIA TERENGGANU
AND
UNIVERSITI KEBANGSAAN MALAYSIA
AND
RIVERS STATE UNIVERSITY
AND
AISSMS COLLEGE OF ENGINEERING PUNE**

THIS RESEARCH COLLABORATION AGREEMENT (hereinafter referred to as the "Agreement") is made on 1st July 2021

BETWEEN

UNIVERSITI MALAYSIA TERENGGANU, a public university established in Malaysia under the Universities and University Colleges Act 1971 [Act 30], whose address is at 21030 Kuala Nerus, Terengganu, **MALAYSIA** (hereinafter referred to as "**UMT**") of the first part;

AND

UNIVERSITI KEBANGSAAN MALAYSIA, a public institution of higher learning established under the Universities and University Colleges Act 1971 and for the purpose of this Agreement is represented by its Center for Research and Instrumentation Management (CRIM) and having its address at 43600 UKM Bangi, Selangor Darul Ehsan (hereinafter referred to as "**UKM**") of the second part;

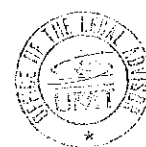
AND

THE RIVERS STATE UNIVERSITY, the first Technological University in Nigeria and the first state owned State University in the Niger University in the Niger Delta region of Nigeria, whose address is at Nkpolu – Oroworukwo, Port Harcourt, Rivers State, **NIGERIA** (hereinafter referred to as "**RSU**") of the third part;

AND

AISSMS COLLEGE OF ENGINEERING PUNE (AISSMSCOE), a private institution run by AISSMS Society, Pune is a reputed institute imparting higher education affiliated to Savitribai Phule Pune University, Pune and approved by AICTE, New Delhi India. The institute emphasizes industry academia collaboration as well as research along with regular teaching learning activities. The address of the institute is 1, Kennedy Road, Pune - 411001, Maharashtra State, **INDIA** (hereinafter referred as "**AISSMSCOE**") of the fourth and final part.

UMT, UKM, RSU and AISSMSCOE hereinafter collectively referred to as "the Parties" and individually as "the Party".



WHEREAS:

- A. UMT is a marine focused university which strives to enhance and strengthen its academic and research activities and has taken various initiatives to complement its educational excellence. UMT has entered into various collaborative arrangements with other parties to enhance its research capabilities.
- B. UKM is one of five research universities in Malaysia with a strategic direction to be the regional leader in academic and research excellence. In taking various initiatives to enhance its academic and research capabilities, UKM has established partnerships with various organizations. UKM through its faculties and institutes offers undergraduate and postgraduate courses in various fields.
- C. RSU at Port Harcourt was established in October, 1980 from the Rivers State College of Science and Technology which was itself established in 1972. It is located at Nkpolu-Oroworukwo in Port Harcourt, the capital of Rivers State, Nigeria. It is the first Technological University in Nigeria and the first state owned State University in the Niger Delta region of Nigeria. The motto of the University is "Excellence and Creativity". The University has a staff strength of 1,870 and a student population of 29,939. The University is ranked as the 16th 12th among 80 other universities in Nigeria. The language of instruction in the institution is English.
- D. The All India Shri Shivaji Memorial Society established in 1918, is a premium education society in India, and is catering instructions in General and in Engineering Education since 1992. AISSMS College of Engineering (AISSMSCOE) is one of the reputed Engineering Institute in Savitribai Phule Pune University. It offers AICTE recognised and university affiliated courses leading to the degree of Bachelor of Engineering (BE) in eight engineering streams and Master of Engineering (ME) in seven engineering streams. The college is accredited as "A+" by National Assessment and Accreditation Council (NAAC) and awarded as "Best Professional Engineering College" by Savitribai Phule Pune University in AY 2019-20. The institute emphasizes industry academia collaboration as well as research along with regular teaching learning activities.
- E. The Parties wish to collaborate in the research project entitled "**Development of Environmental Friendly Corrosion-Fouling Inhibitors for Marine Application**" (hereinafter referred to as "Project").
- F. The Parties hereto have agreed to enter into this Agreement for the purpose of recording the terms and conditions of their cooperation relating to the research collaboration and to govern their respective rights and obligations.



NOW IT IS HEREBY AGREED BY THE PARTIES as follows:

1. DEFINITIONS AND INTERPRETATIONS

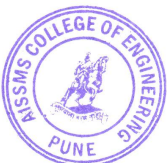
1.1. In this Agreement, unless the context otherwise requires:

“Agreement” shall mean the documents forming this Agreement together with all Schedules and/or Annexures to it, which such documents taken together shall be complementary of one another;

“Background Intellectual Property” shall mean any Intellectual Property rights owned by the Party prior to the commencement of this Agreement and which is made available by a Party or Parties to carry out the research work in relation to the Project;

“Commencement Date” 1st July 2021

“Confidential Information” shall mean all information passing from a Party (“Disclosing Party”) to the other Party (“Receiving Party”) in this Agreement relating to the Project, including, without limitation to, (i) financial information, reports or findings, studies, consultations, methodologies, proposals, systems, programs, strategies, improvements, discoveries, innovations, inventions, trade secrets, drawings, know-how, source and object codes, arrangements and agreements with third parties, formulae, concepts not reduced to material form, designs, plans and models whether given orally or in writing (ii) any derivations of any information or data which embodies, contains or describes the Confidential Information, and (iii) any other data or information designated by the Disclosing Party to be confidential or relating to the current or prospective activities or businesses of the Disclosing Party. The Confidential Information shall also include such



information or data that may be in the possession of a Party's employees or management;

"Intellectual Property"

shall mean all rights in relation to inventions (including patents), registered and unregistered trademarks (including service marks), copyright, circuit layouts, register able designs, register able plant varieties, processes, know-how, mathematical algorithm and confidential information in the industrial, scientific and artistic fields, including application or right to apply for registration of any of those rights;

"Project"

shall mean the research project entitled **"Development of Environmental Friendly Corrosion-Fouling Inhibitors for Marine Application"** as described in **ANNEX A**;

"Project Leader"

shall mean a person appointed by the Parties to conduct the collaborative research work in relation to the Project as specified in **ANNEX B**;

"Project Member"

shall mean a team member of the Project which consists of representative of each Party as listed in **ANNEX B**;

"Foreground Intellectual Property"

shall mean any Intellectual Property rights arising from or in the course of the implementation of the Project.

- 1.2. Monetary references are in Ringgit Malaysia.
- 1.3. Any word (including a word defined or given a special meaning) denoting the singular shall include the plural and vice versa.
- 1.4. Any word denoting one gender only shall include each other gender.
- 1.5. A reference to a person shall include a corporation as well as a natural person.
- 1.6. A reference to a Schedule is a reference to a schedule to this Agreement.



2. COMMENCEMENT AND TERM OF AGREEMENT

- 2.1 This Agreement shall be in force upon signing and shall remain in effect for a period of **TWO (2) YEARS** unless otherwise terminated in accordance with Clause 12 of this Agreement.
- 2.2 The term of this Agreement may be extended in writing by mutual consent of the Parties.

3. SCOPE OF AGREEMENT

- 3.1. In consideration of and subject to the terms of this Agreement and all applicable laws, the Parties shall carry out the Project in accordance with **ANNEX A**.
- 3.2. The Parties agree that the implementation of the Project shall at all times be led by the Project Leader and a team of Project Member as specified in **ANNEX B**. It is agreed that the service of the Project Leader and the Project Member shall not be terminated, replaced or substituted without prior consultation and agreement in writing by the Parties.
- 3.3. The Secretariat for each Party to this Agreement is represented by the following:
- (a) **UMT**: Centre for Research and Innovation Management;
 - (b) **UKM**: Centre for Research and Instrumentation Management;
 - (c) **RSU**: Academic Planning Unit; and
 - (d) **AISSMSCOE**: Research Centre for Mechanical Engineering.

4. JOINT RESPONSIBILITIES OF THE PARTIES

- 4.1. In consideration of and subject to the terms of this Agreement and all applicable laws, the Parties shall jointly provide funding for the Project either through internal or external grants or in-kind contribution as set out in **ANNEX C**.
- 4.2. The Parties shall use all reasonable endeavours to perform and enable the other Party to perform in time the tasks assigned to each Party in the implementation of the Project in accordance to the descriptions and objectives as specified in **ANNEX A**.
- 4.3. The Parties shall perform the task assigned to each Party in proper manner and in accordance with good management practice and shall comply with the present laws and statutes.
- 4.4. The Parties shall assist and cooperate with each other in the performance of the Project. Such assistance and cooperation shall include the provision of



materials, facilities, data and information as may be reasonably required to satisfactorily perform the Project.

4.5. The Parties shall furnish the other Parties written reports of the progress of works carried out for the Project from time to time.

4.6. The Parties shall respond promptly to any queries from the other Parties from time to time in respect of the progress of the works in relation to the Project and any other matters in relation thereto by such means as are agreed from time to time by the Parties hereto.

5. FORCE MAJEURE

Neither Party shall be liable for any loss, damage, delay or failure of performance resulting directly or indirectly from any cause which is beyond its reasonable control, including but not limited to acts of God, epidemics, pandemics, riots, civil disturbances, wars, states of belligerency or acts of the public enemy, strikes, work stoppages, or the laws, regulations, acts or failure to act of any governmental authority ("Force Majeure Event"). In the event that performance under this Agreement is prevented for a continuous period of two (2) months or longer by any Force Majeure Event, either Party shall have the right to terminate this Agreement forthwith by written notice to the other Party.

6. PUBLIC STATEMENT

The Parties agree that no public statement shall be made on the Project or in relation to any products, processes or inventions developed as a result of the Project unless unanimously approved by the Parties.

7. AMENDMENT AND WAIVER

7.1. No variation of this Agreement shall be effective unless it is made in writing, refers specifically to this agreement and is signed by the duly authorized representative of the Parties.

7.2. No waiver of any term, provision or condition of this Agreement shall be effective except to the extent made in writing and signed by the duly authorized representative of the Parties.

7.3. No omission or delay on the part of either Party in exercising any right, power or privilege under this agreement shall operate as a waiver by it of any right to exercise it in future or any other of its rights under this Agreement.

8. PROGRESS REPORTS

8.1. Each Party shall furnish the other Parties written reports of the progress of works carried out for the Project from time to time.



- 8.2. Each Party shall respond promptly to any queries from the other Parties from time to time in respect of the progress of the works in relation to the Project and any other matters in relation thereto by such means as are agreed from time to time by the Parties hereto.

9. INTELLECTUAL PROPERTY

- 9.1. For the avoidance of doubt all Background Intellectual Property used in connection with the Project shall remain the property of the Party introducing the same. No Party will make any representation or do any act which may be taken to indicate that it has any right, title or interest in or to the ownership or use of any of the Background Intellectual Property of the other parties except under the terms of this Agreement.
- 9.2. Each Party acknowledges and confirms that nothing contained in this Agreement shall give it any right, title or interest in or to the Background Intellectual Property of the other Parties save as granted by this Agreement. The Parties agree that any improvements or modifications to a Party's Background Intellectual Property arising from the Project which are not severable from that Background Intellectual Property will be deemed to form part of that Party's Background Intellectual Property.
- 9.3. Each Party grants the others a royalty-free, non-exclusive licence for the duration of the Project to use its Background Intellectual Property for the sole purpose of carrying out the Project. No Party may grant any sub-licence over or in respect of the other's Background Intellectual Property.
- 9.4. Each Party shall own the Foreground Intellectual Property generated by its employees, students and/or agents under the Project and shall ensure that it secures ownership of such Foreground Intellectual Property from its employees, students and agents. Subject to the terms of the Agreement, the Party owning any Foreground Intellectual Property shall be entitled to use and exploit such Foreground Intellectual Property as that Party sees fit, and subject always to Clauses 9.5 and 9.6.
- 9.5. Where any Foreground Intellectual Property is created or generated by the Parties jointly and it is impossible to segregate each Party's intellectual contribution to the creation of the Foreground Intellectual Property, the Foreground Intellectual Property shall be jointly owned by those Parties in equal shares. The owners may take such steps as they may decide from time to time, to register and maintain any protection for that Foreground Intellectual Property, including filing and prosecuting patent applications for any Foreground Intellectual Property, and taking any action in respect of any alleged or actual infringement of that Foreground Intellectual Property. If one or more of the owners does not wish to take any such step or action, the other owner(s) may do so at their expense, and the owner not wishing to take such



steps or action will provide, at the expense of the owner making the request, any assistance that is reasonably requested of it.

- 9.6. Any joint owner of any of the Foreground Intellectual Property may commercially exploit the Foreground Intellectual Property upon consultation and agreement with the other Party which shall not be unreasonably withheld or delayed and which will be on fair and reasonable conditions.

10. CONFIDENTIALITY

- 10.1. Upon being informed by any of their researchers of any inventions first actually reduced to practice in the performance of the Project, the Parties shall promptly disclose to the other Party and shall hold such disclosure on a confidential basis and will not disclose the information to any third party without the written consent of the other Party.
- 10.2. All information communicated between the Parties in connection with either this Agreement or work and/or services carried out or to be carried out pursuant to this Agreement shall be treated by all Parties as confidential and such information shall not be made known to any person other than a person who is necessarily either associated with this Agreement or with work or services carried out or to be carried out pursuant to this Agreement unless with the prior written consent of the Parties hereto.
- 10.3. This obligation to keep matters confidential shall apply during the subsistence of this Agreement and shall survive the termination of this Agreement.
- 10.4. Neither Party shall enter into any Agreement or other obligations, commitments or liabilities of any kind on behalf of the other or attempt to do so or hold itself out as representing the other unless previously authorized by the other to do so.
- 10.5. The Parties will procure that at all times keep confidential and will not disclose to any third parties, persons or individual any confidential information acquired by UMT, UKM, RSU and AISSMSCOE in connection with this Agreement unless otherwise authorized in advance in writing by either Party. The Parties retain all rights and interests and copyright in their materials that are provided under this Agreement.

11. PUBLICATION

- 11.1. Any publication by any Party of the outcome of the Project; or any data or information provided or contributed by the other Parties to the Project, or acquired by the other Parties by reason of the Project shall be with the consent of the other Parties to this Agreement.



- 11.2. For the purpose of obtaining consent for publication under Clause 11.1:
- (a) the Party wishing to publish shall furnish the other Parties a copy of the proposed publication; and
 - (b) the other Parties shall review the proposed publication within twenty-one (21) days or any extended period which have been mutually agreed to from the date the proposed publication is furnished.
- 11.3. Where the Parties deem it reasonably necessary to protect the interests of the Parties in the Project, proposed publication containing details of an invention etc. may be withhold until a patent application is filed or other appropriate steps to protect such interests are taken and completed.

12. TERMINATION

- 12.1. Either Party shall have the right to terminate this Agreement if the other fails to comply with or observe any condition of the Agreement and within 21 days of written notification of a breach fails to remedy the aforesaid breach. The aggrieved Party may reserve the right to suspend such termination where, in its sole opinion, steps have been taken to remedy the breach but may remove such suspension should remedial action not have been completed.
- 12.2. In the event of the termination of this Agreement, the Parties shall have no obligation to each other except for payments still outstanding and payable by the Parties for activities already undertaken prior to the date of termination.

13. ASSIGNMENT

The rights and obligations of each Party under this Agreement cannot be assigned, transferred, charged or dealt with in any other similar manner, and neither Party shall purport to do any of the same, nor subcontract any or all of its obligations under this agreement without prior written consent of the other Party.

14. INDEMNITY

- 14.1. The Parties shall indemnify and hold each other harmless from any and all loss or liability for any and all claims, causes of action, suits, proceedings, losses, damages, demands, fees, expenses, fines, penalties and costs, including without limitation reasonable attorney's fees, costs and disbursements arising from any personal injury, death or damages of any third party caused by the performance of the Research under this Agreement.
- 14.2. Neither of the Parties shall be liable to the other for any indirect, incidental, special or consequential loss or damages (including but not limited to loss of profits, revenue or business) resulting from or in any way related to this Agreement, or the termination of this Agreement.



15. SUCCESSORS BOUND

This Agreement shall be binding on the successors in title, executors and permitted assigns of the Parties hereto.

16. INDEPENDENT CONTRACTOR RELATIONSHIP

This Agreement does not constitute a partnership between the Parties. Each Party shall at all times be acting as an independent contractor in the ordinary course of business. Except where expressly authorized by this Agreement or any other agreement between the Parties, neither Party may undertake without the prior consent of the other Party any obligations on behalf of this Agreement.

17. RECONSTRUCTION OF THE PARTIES

The liabilities and or obligations created by this Agreement shall continue to be valid and binding for all purposes whatsoever notwithstanding any change by amalgamation reconstruction or otherwise which may be made in the constitution of the Parties or of any body by which the business of the Parties may for the time being be carried on and shall be available to the body carrying on that business for the time being.

18. TIME

Time whenever mentioned herein shall be deemed to be of the essence of this Agreement.

19. APPLICABLE LAWS AND NECESSARY CONSENTS

19.1. The proper law governing this Agreement shall be Malaysian Law. Any dispute which may arise between the Parties concerning this Agreement shall be determined by the Malaysian Court, the Parties hereby submit to the exclusive jurisdiction of the Malaysian Court and Indonesian Court for such purpose.

19.2. The Parties will use their best endeavour to comply with all applicable laws, statutes, by-laws and regulations of a governmental nature relating to the operation of the Project.

19.3. The Parties will use their best endeavour to obtain all necessary approvals, consents and permissions required from the relevant authority in connection with the operation of the Project.

20. NON-WAIVER

No failure or delay on the part of any Party hereto in exercising any power or right hereunder shall operate as a waiver thereof, nor shall any single or partial exercise of such right or power preclude any other or further exercise thereof or the exercise of any other right or power herein.



21. SEVERABILITY

Each clause hereof shall be deemed to be independent and the invalidity of any such clause which may be unenforceable as being contrary to the principles of law shall not affect the validity of any other clause of this Agreement.

22. ENTIRE AGREEMENT

This Agreement represents the understanding between the Parties with respect to its subject matter and supersedes any prior and/or contemporaneous discussions, representations or agreements, whether written or oral of the Parties regarding this subject matter. Purported amendments or changes shall be of no force or effect unless they are in writing and signed by duly authorized representatives of the Parties.

23. VARIATION

Subject to the rights of the Parties to amend course materials and other related documents as specified in this Agreement and after consultation with any of the Parties, no variation of this Agreement (including its Appendices) shall be binding, unless it is in writing and signed by authorized representatives of the Parties.

24. NOTICES

Any notice to be given hereunder by either Party to the other may be sent by facsimile transmission or by first class recorded delivery prepaid post addressed to the address of the other Party as set out below, or such other address as may be notified in writing as an address for service and any such notice shall be deemed to have been received for service by facsimile, on the day sent, and in the case of service by post, fourteen (14) working days after the date of posting.

- (a) For **UMT**
- Address : 21030, Kuala Nerus,
Terengganu, MALAYSIA
- Attn. To : Director
Centre for Research and Innovation Management
- E-mail : pengarah-ppp@umt.edu.my
- Tel. No. : +609-6684455
- Fax No. : +609-6684944
- (b) For **UKM**
- Address : Universiti Kebangsaan Malaysia
43600 UKM Bangi
Selangor Darul Ehsan
- Attn. To : Director
Centre for Research and Instrumentation Management
- E-mail : drmc@ukm.edu.my



Tel. No. : +603 - 8925 3184
Fax No. : +603 - 8925 4550

(c) For **RSU**

Address : Nkpolu - Oroworukwo P.M.B. 5080
Port Harcourt, Rivers State Nigeria
Attn. To : The Vice Chancellor,
Email : nlerum.okogbule@ust.edu.ng
Tel. No.: +234 906 203 3338
Fax No. : +234 906 203 3339

(d) For **AISSMSCOE**

Address : 1, Kennedy Road, Pune – 411001, Maharashtra State,
India
Attn. To : The Principal
Email : principal@aiissmscoe.com
Tel. No. : +91-20 2605 7660 / 2605 8587,
Fax No. : +91-20 2605 8943

The above address may be altered by prior written notice given by either Party pursuant to this Clause.

[end of clauses]



A handwritten signature in blue ink, consisting of several loops and a long horizontal stroke.

IN WITNESS WHEREOF the Parties hereto have set their hands/seals the day and year first written.

Signed by
for and on behalf of
UNIVERSITI MALAYSIA TERENGGANU

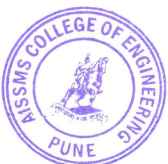


.....
PROF. DR. MAZLAN ABD. GHAFAR
VICE CHANCELLOR (RESEARCH & INNOVATION)

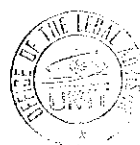
In the presence of:



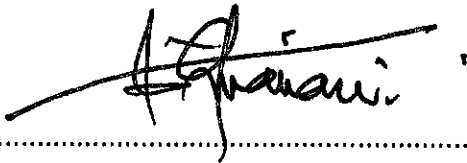
.....
PROF. MADYA CHM. DR. KHAIRUL ANUAR BIN MAT AMIN
EXERCISING THE FUNCTION OF DIRECTOR
CENTRE OF RESEARCH AND INNOVATION MANAGEMENT
UNIVERSITI MALAYSIA TERENGGANU



15
13



Signed by
for and on behalf of
UNIVERSITI KEBANGSAAN MALAYSIA



.....
PROF. DATO' TS. DR. MOHD EKHWAN HJ. TORIMAN
VICE CHANCELLOR

In the presence of:



.....
PROF. DR. ISMANIZAN ISMAIL
DIRECTOR
CENTRE FOR RESEARCH AND INSTRUMENTATION MANAGEMENT

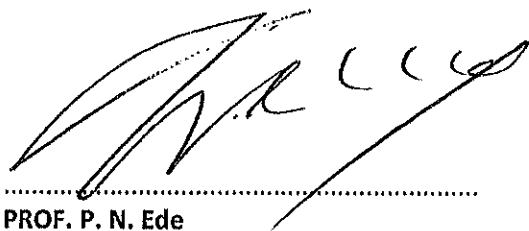


Signed by
for and on behalf of
RSU

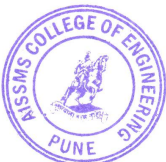
 14/5/21

PROF. Nlerum Sunday Okogbule
VICE CHANCELLOR

In the presence of:



PROF. P. N. Ede
DIRECTOR OF ACADEMIC PLANNING




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Signed by
for and on behalf of
AISSMS COE, PUNE



.....
DR D S BORMANE
Principal

In the presence of:



.....
PROF. (Dr) C S CHOUDHARI
Coordinator, Internal Quality Assurance Cell
AISSMS COE Pune



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ANNEX A
THE PROJECT

(Shall be formed as part of parcel of the Agreement)

DETAILS OF THE PROJECT

1. PROJECT BACKGROUND

Corrosion-fouling is common phenomena for ship hull and offshore structure. These problems pose billions of dollars to maritime industry. The annual cost of corrosion-fouling worldwide was estimated exceeding US\$ 2.5 trillion in 2016, which translates to 3 to 4% of the Gross Domestic Product of industrialized countries. Recently, natural extracts and natural compounds derived from plants have been identified as an environmentally acceptable, readily available and renewable source for wide range of inhibitors. Effective formulations of corrosion-fouling will be developed by incorporating other additives. Corrosion-fouling inhibition will be evaluated by weight loss method, electrochemical measurements, surface analysis, and compare them with commercially available inhibitors. In addition to validate the obtained experimental results, computational studies will be carried out. Fundamental mechanism interaction of the compounds and physical interaction with epoxy metal will be investigated by means XRD, FTIR, SEM, TEM, EIS and morphological analysis. The corrosion and fouling progress will be monitored in seawater and acidic environments. Effect of temperature will also be studied. The proposed study is expected to introduce corrosion-fouling inhibitors which will be environment friendly and of low cost. This study offers an area for new knowledge and inventions addressing various aspects such as corrosion treatment and biological active components which may provide valuable innovation in maritime field. This study will be led by Universiti Malaysia Terengganu with the involvement of four other main parties namely Universiti Kebangsaan Malaysia (UKM), Rivers State University (RSU) and AISSMS College of Engineering, Pune, India (AISSMSCOE).

2. PROJECT DESCRIPTION

Agency 1:

Development of Corrosion-fouling Coating for Mild Steel and Aluminium (UMT).

Agency 2:

Charaterisations and Laser Testing of Coatings for Pipeline Anticorrosion-fouling Activities (UKM).

Agency 3:

Development of Corrosion Inhibitors and Descaling Agents from for Mild Steel and Aluminium (RSU).

Agency 4:

Computational Fluid dynamics analysis (AISSMSCOE).



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3. PROJECT OBJECTIVES

- a) To formulate anti fouling-corrosion coating for the protection of aluminum and mild steel (UMT).
- b) To determine the effect of inhibitors when applied to plasma sprayed micro groves and pipes (UKM).
- c) To formulate corrosion inhibitors and descaling agent from plant extracts (RSU).
- d) To perform computational fluid dynamics studies (AISSMSCOE).

3. PROJECT DELIVERABLES

- (a) Publications in reputable journals.
- (b) Publications in proceedings.
- (c) Book publication.
- (d) Master student or Research scholar.



ANNEX B

PROJECT TEAM

(Shall be formed as part and parcel of the Agreement)

NO	RESEARCHERS	FIELD	FACULTY/ SCHOOL/ CENTRE/ UNIT
1.	Prof Dr Wan Mohd Norsani bin Wan Nik IC:660731115439 (Project Leader)	Mechanical Engineering, Corrosion	Faculty of Ocean Engineering Technology and Informatics, UMT.
2.	Ts. Chm. Dr Nabilah Ismail IC:871009075230	Analytical Chemistry, Green Chemistry	Faculty of Science and Marine Environment, University Malaysia Terengganu
3.	Dr. Mohammad Fakhratul Ridwan bin Zulkifli IC:870705025603	Maritime Technology, Fouling	Faculty of Ocean Engineering Technology and Informatics, UMT.
4.	Assoc. Prof. Ts. Dr. Mohd Sabri bin Mohd Ghazali IC:850518-06-5505	Materials, Nano Physics	Faculty of Science and Marine Environment, University Malaysia Terengganu
5.	Prof Dr Maryam Jameelah Binti Ghazali IC:750316086182	Mechanical Engineering, Material	Faculty of Built Environment, Dept of Mechanical Engineering & Material Engineering, UKM
6.	Engr. Dr. Izionworu Vincent Onuegbu Passport: A10070980	Chemical/Petrochemical Engineering	Faculty of Engineering, Rivers State University (RSU).
7.	Dr Dinesh Y Dhande Passport No:K6832480 (Project Leader)	Mechanical Engineering, Material, CFD	Department of Mechanical Engineering, AISSMS College of Engineering Pune
8.	Dr. Paramanand N Dange Passport No: U4224185	Chemical Engineering, CFD, Synthesis and Characterization	Department of Chemical Engineering, AISSMS College of Engineering Pune
9.	Dr D V Nighot Passport No: J7821294	Material Science, Synthesis and Characterization	Department of Chemical Engineering, AISSMS College of Engineering Pune



ANNEX C

FUNDING OF THE PROJECT

Parties	Value of Contribution
UMT	RM 20,000.00
UKM	RM 20,000.00
RSU	USD10,000 (± RM41,000.00)
AISSMSCOE	USD10,000 (± RM41,000.00)
Total	RM122,000.00 (± USD29,415.00)

