



**INDIAN INSTITUTE OF TECHNOLOGY PATNA
BIHTA PATNA-801106
RESEARCH & DEVELOPMENT UNIT**

ADVERTISEMENT NO: R&D/697/ARDB/246

DATED: 13/10/2022

Project No: **R&D/SP/ME/ARDB/2022-23/697**

Applications are invited in the prescribed format only for the following assignment in a purely time bound research project undertaken in this institute.

1. (a) Name of the temporary assignment : JRF with provision to register in PhD
(b) Number of Post : One (01)
(c) Duration of the Post : Initially for six months extendable up to three years or completion of project subject to satisfactory performance
2. Name of the temporary research project : “An Experimental and Numerical Study of Environmental Degradation in Adhesive Joints”.
3. Name of the sponsoring Agency : Aeronautics and Research Development Board (ARDB)
4. Fellowship/Salary : Rs. 31,000/- plus HRA as per GoI rule for first Two years followed by Rs. 35,000/- plus HRA as perGoI rule subject to satisfactory performance.
5. Qualifications & Experience :
 - a) For candidates with M.Tech./ME/MS as qualifying degree in Mechanical/Machine Design / Applied mechanics / Solid mechanics / Mechanics / Manufacturing / Production / Aerospace with first class (minimum 65% marks or 7.0 CPI) in M.Tech./ME/MS with GATE/NET qualifications and first class (minimum 60% marks or 6.5 CPI) in B.Tech./BE, 12th and 10th class. Thesis with Fracture mechanics/FEM/Mechanical testing will be preferred.
 - b) For candidates with B. Tech./BE in Mechanical/Production/Aerospace/Automobile as qualifying degree, 75% marks or 8.0 CPI in B.Tech/BE from institutes other than IITs/IISc and 7.0 CPI in B.Tech. from IITS and IISc with valid GATE score and first class (minimum 60% marks or 6.5 CPI) in 12th and 10th class.
 - c) The age should not exceed 28 years for a candidate with BE/B.Tech/M.Sc. degree as the highest qualification and 32 years for a candidate with ME/M.Tech/MS degree as the highest qualification.
 - d) Relaxations for SC/ST/OBC/women/PD will be given as per the GoI rules.

Application procedure:

1. Candidates interested in this position and satisfying the qualification criteria should write an email to the project investigator Dr. Akhilendra Singh, Department of Mechanical Engineering, IIT Patna (Email IDs: akhil@iitp.ac.in and akhilendra.singh@gmail.com).
2. The subject of the email should read as “PhD Position ARDB/697”. The last date for receiving this email is **28th October 2022**.
3. The email MUST include the scanned/pdf copy of duly filled application form (see attached word document) with applicant’s signature.
4. The email MUST include self-attested scanned pdf copy of all supporting documents (degree certificates, mark-sheets, GATE scorecard, and category certificate, if applicable).



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5. The application should additionally include a 250-word statement of purpose (SOP). This document should elaborate on your interest in this project and any relevant prior experience/skills which would help you in solving the assigned research problem.

6. The application should also include a brief Academic CV not exceeding two pages.

IIT Patna reserves the right to not shortlist any candidate in case the application email does not contain complete information backed up by supporting documents as listed above.

All candidates who apply via email by **28th October 2022** (deadline) and are shortlisted will be informed regarding the further details by **5th November 2022**.

Date of ONLINE Interview: **9th November 2022** (**10th November has been kept as the reserve day in case of large number of applications**). It is the responsibility of the applicant to ensure that they have reliable internet connectivity on the date of online interview.

About the project:

The structural design of aerospace parts using multi-materials (i.e., metal and composite) provides greater flexibility and several other benefits in terms of safety, strength, worthy fatigue life and better impact damage tolerance. Adhesive bonding technology has the potential to join all the different types of materials. It is increasingly being used in the aerospace industry due to numerous advantages over conventional fastened joints. However, the long-term durability of an adhesive joint is a major concern due to the in-service temperature and prolonged exposure to aggressive environmental conditions of aerospace components. These two main factors severely affect the strength and fracture resistance of adhesive joints. Therefore, it is important to develop comprehensive scientific methodology for understanding the effect of in-service temperature and prolonged environmental conditions especially on the fracture resistance degradation of adhesive joints.

The proposed research work aimed to develop a new insight in the modeling of degradation of adhesive joints under temperature and prolonged environmental conditions. A suitable multi-physics model based on extended finite element method (XFEM), cohesive zone modeling (CZM) and machine learning will be developed and validated with the experimental results. The developed model will be further utilized in predicting the fracture degradation of adhesive joints as a function of important parameters such as temperature, moisture, hygrothermal condition, thickness of adhesive and thickness of adherent materials. Further, machine learning will be utilized for its modeling capabilities with a range of input parameters for the desired individual output. The research conducted and the framework developed could be utilized in aeronautical industries to forecast a wide range of harsh in-service conditions or environmental conditions scenarios.

For any query contact Investigator(s) : **Dr. Akhilendra Singh, Dept. of Mechanical Engineering, IIT Patna, Emails: akhil@iitp.ac.in, akhilendra.singh@gmail.com Tel.: 0612-3028018.**

Deputy Registrar

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1. Associate Dean, R&D, IIT Patna
2. Advertisement file
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PROJECT CODE: R&D/SP/ME/ARDB/2022-23/697**ADVERTISEMENT NO: R&D/697/ARDB/246****DATED: 13/10/2022****FORMAT OF APPLICATION FOR “JUNIOR RESEARCH FELLOW”**

Name & Address Including email id and Phone no. (for Correspondence)	Category (GEN/OBC/SC/S T/PD)	DOB dd/ mm/yy	Professional Exam. (GATE/CSIR-NET, etc) & Validity
NAME IN CAPITAL Address: Phone: Email:			
Educational Qualification			
Institute/ Board	Exam Passed	Year of Passing	% of Marks/CPI
	10 th Class		
	12 th Class		
	Bachelors (B.Sc/B.Tech/B.E./BCA) or equivalent		
	Masters (M.Sc/M.Tech/M.E/MCA/ MA) or equivalent		
Qualifying degree		Degree/ major/Specialization	
(B.Sc/B.Tech/B.E./BCA)			
(M.Sc/M.Tech/M.E/MA/MCA)			
Others			

Signature of applicant

Date:
Place: