Department of Mechanical Engineering
National Institute of Technology Karnataka Surathkal,
Mangalore – 575025, India

Date: June 06,2022

Advertisement for Junior Research Fellow (JRF)

Ref. No: 327/NITK/MECH/DRDO/MD/2022-23/A9

Applications are invited from the interested candidates (Indian National) for the post of Junior Research Fellow (JRF) to work on the Research and Development (R&D) project titled "**Shock response studies on 3D printed high performance fibre reinforced thermoplastic composites and sandwich panels**" funded by DMRL-DRDO, Hyderabad. The appointment will be **purely temporary** for a period of 22 months. Details are given as below:

Sl. No.	Position	Area of Specialization	Maximum duration	Consolidated salary per month	No. of positions
01	Junior Research Fellow (JRF)	3D Printing of Polymer Composites	22 months	Rs. 31,000/-	One (01)

Brief of the R&D project

Project Title	Shock response studies on 3D printed high performance fibre reinforced thermoplastic composites and sandwich panels
Funding Agency	DMRL-DRDO, Hyderabad
Principal Investigator (PI)	Dr. Mrityunjay Doddamani, Dept. of Mechanical Engg., NITK Surathkal
Co-Principal Investigator (Co-PI)	Dr. P. Jeyaraj, Dept. of Mechanical Engg., NITK Surathkal

Details of the Project

The proposed project aims to establish 3D printing based scientific methodology for developing potential blast mitigation materials. Eventually, the proposed methodology can be applied for the blast resistance predictions of the thermoplastic composites and graded cored sandwiches in the future. Thermoplastic composites possess lot of advantages like damage tolerance, better mechanical properties and lower processing cycles. With these properties they may offer better advantages in shock resistance applications. Fabrication of thermoplastic composites in tailor made complex designs using conventional techniques include many processing issues and requires lot of capital investment. This proposal deals with developing high performance thermoplastic composites using 3D printing technology. It is also planned to study their shock response behavior. A carefully designed and 3D printed core can attenuate a large amount of blast energy by scattering the shock wave. This is due to the acoustic impedance mismatch intentionally introduced through the geometrically tuned hexagonal honeycomb core design and is the focus of this proposal. A large amount of blast energy is also absorbed by the high strain crushing of the core. The mechanical properties of hexagonal honeycomb core materials used in sandwich composites vary greatly depending on their density, material composition, and internal cellular structure, which can be tailored through 3D printing. The large amount of shock wave energy absorbed by the core protects the back sheet of 3D printed unified sandwich composites. Reducing the core density increases the attenuation of the shock wave as it propagates through the core, leading to an improvement in the blast resistance of sandwich composites. The sandwich displacement decreases with the core density resulting in enhanced blast resistance. However, reducing the density also reduces the stiffness and strength and thereby lowers the resistance against compression, compaction, and cracking. Alternatively, increasing the core density improves the mechanical properties, but the attenuation efficiency is weakened. Hence, the hexagonal honeycomb core design and cell size need to be optimized in 3D printed unified sandwiches with due consideration to the skin/core thickness ratio.

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Information for the Position of JRF

Essential Qualifications:	▪ B.E/B.Tech. (Mechanical/Manufacturing/Production) and M.E/M.Tech. in Manufacturing/Production/Machine Design/Design Engineering (or any other related areas). Candidates must have at least 60% (CGPA 6.5/10) marks in aggregate from a recognized technical institute or university as a full-time program. ▪ Candidate should have qualified GATE at least once in his academic career.
Desirable Qualification	Candidate must be able to work independently and flexibly. The following will be desirable qualities. (i) Experience of conducting tests or physical model tests in lab. (ii) Development of numerical models (quasi-static) for optimizing facesheet/core ratios to be used in a 3D printed sandwich structure Good communication and writing skills.
Age Limit	32 Years preferred (Age relaxation as per GOI rule).
Last date for receipt of the application	**10th July 2022**

Application Process:

Interested candidates may apply in the prescribed format along with CV, photo copies of relevant certificates, grade/mark sheets, publications etc. They need to send the scanned copy of below mentioned documents.

(i) Cover letter
(ii) Duly filled application form in the prescribed format with passport-size photograph,
(iii) Bio-data/Resume
(iv) Educational certificates and mark sheets (class X onwards)
(v) GATE qualified certificate and
(vi) Proof for research experience, publications, special achievements and patents, if any.

Interested candidates must fill the application form attached below and should send the **soft copies of all the documents along with duly filled application form in the prescribed format must be sent to the Principal Investigator as a single PDF file by email to mrdoddamani@nitk.edu.in on or before 10th July 2022** and hard copies of all the documents should be send **on or before 10th July 2022** to the address given below:

Correspondence Address:

Dr. Mrityunjay Doddamani
Assistant Professor,
Department of Mechanical Engineering,
National Institute of Technology Karnataka (NITK), Surathkal,
P.O. Srinivasnagar, Mangalore – 575 025. Karnataka.
E-mail ID: mrdoddamani@nitk.edu.in

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Additional Information:

1. **The shortlisted candidates will be informed by email/post/phone.** Most probably it will be an online interview. The online interview is most likely to be held during July 11-15, 2022. The position will be available immediately.
2. Selection will be based on qualification, interview and relevant experience.
3. Selected candidates will be required to join immediately or as soon as possible (on mutual consent between PI and candidate).
4. Candidates before appearing for the interview shall ensure that they are eligible for the position, they intend to apply. The date of interview (online interview) will be communicated to the shortlisted candidates by email/phone/post. Please note that no TA/DA is admissible for attending the interview. No any extra payment will be provided if the interview will be conducted in online mode.
5. Candidates who are already employed should produce relieving certificate from their employers, if selected.
6. The appointment will be on a purely temporary basis co-terminus with the project. The selection committee decision will be final. The duration of the post is for 22 months or up to the termination of project, subjected to performance review time to time.
7. Merely fulfilling the eligibility requirement does not guarantee shortlisting for interview; additional criteria may be imposed for shortlisting. NITK Surathkal reserves the right toreject any or all the application without assigning any reasons thereof.
8. In future, JRF may get PhD admission in fulfilling admission criteria of NITK Surathkal.However, PhD position is not guaranteed.
9. For any further information and clarification, candidates can contact Principal Investigator on the address given for correspondence.

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APPLICATION FOR THE POST OF JUNIOR RESEARCH FELLOW (JRF)

For Office Use:	Paste your recent Passport size photo
Serial Number: ……	
Eligible for Written exam/Interview: Yes / No	
Verified the Certificates: ……..	

Post Applied for	***Junior Research Fellow (JRF)***

1. Name of the Candidate: (Block Letters)		
2(a). Father's Name:		
2(a). Mother's Name:		
3(a). Date of Birth:	**3(b). Nationality:**	
3(c). Sex: Male/Female/other	**3(d). Marital Status: Married/Single**	
3(e). Category (Open/OBC/SC/ST/PWD):		
3(f) Age on 10.07.2022 (in Years):		

4. Address for Communication:

(i) Address for communication:	
(ii) Mobile No:	
(iii) Email ID:	

5(a). Educational Qualifications (Attach self-attested copies of all certificates)

Name of Exam Passed	**Discipline /Specialization**	**Board/ University**	**Name of Institute/ College**	**Marks / CGPA**	**Year of Passing**
X					
XII					
B.E./B.Tech					
M.E/M.Tech					
PhD					
Other					

Exam	Qualified	Marks obtained/ Total marks	Rank	Year
GATE	Yes / No			

***Attach self-attested copies of all certificates.5(b). B.Tech/M.Tech Project Titles**

B. Tech Project Title	
M. Tech Project Title	

6. Work/Research Experience (if yes, describe it in 200 words in a additional sheet)

Organization	Designation	Duration (Year)	Responsibilities

7. Number of Publications (Attach a separate list of publications with full details, if required):

National	International

8. Workshop/Training programs attended (Attach a separate sheet, if required):

S. No.	Details

9. Other Achievements (Attach a separate sheet, if required):

S. No.	Details

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10. Contact Details of Two Referees:

Particulars	Referee I	Referee II
Name		
Designation :		
Organization:		
Office Address :		
Contact Number:		
Email ID:		

11.Declaration: I hereby declare that I have carefully read the instructions and particulars supplied to me and that the entries made in this application form are correct to the best of my knowledge and belief.I understand that, if the provided information is found incorrect, I may be disallowed to appear in the interview/test or terminated at any stage even after selection. If selected for the post, I promise to abide by the rules and discipline of the Institute and the funding agency. I note that the decision of the Institute is final regard to selection for the post and assignment to a particular Department and field of study. The Institute shall have the right to expel me from the Institute at any time after my admission, provided it is satisfied that I was admitted on false particulars furnished by me or my antecedents prove that my continuance in the Institute is not desirable. Further, if my performance is found not satisfactory, my service can be terminated at any stage. Moreover, my service can be terminated at any stage due to shortage of fund or any other reason(s). I agree that I shall abide by the decision of the Institute, which shall be final.

Date:
Place:

Signature of the Candidate

Note: Attach the list of enclosures along with the application.

NOTE: *The envelope containing the application should be super scribed as,*

"**Application for the position of JRF for DMRL-DRDO, Hyderabad project in the Dept. of Mechanical Engineering**"on "**Shock response studies on 3D printed high performance fibre reinforced thermoplastic composites and sandwich panels**".