Department of Mechanical Engineering
NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL

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Advertisement for Summer Internship

Applications are invited for the position of Summer Internship in a research and development project **(SERB-CRG**) with following details:

Title of the project:

"Synthesis of Intelligent Nanostructured Materials via a Plasma Source based Digital Nano-manufacturing Method and their Characterization"

Principal Investigator:

Dr. Ranjeet Kumar Sahu,
Assistant Professor (Grade-1), Department of Mechanical Engineering,
National Institute of Technology Karnataka, Surathkal, Mangalore-575025,
Ph: +91 9182679250
Email: ranjeetsahu.j@nitk.edu.in

Co-Principal Investigators:

Dr. Hemantha Kumar
Professor
Dept. of Mechanical Engg.,
National Institute of Technology Karnataka,
Surathkal, Mangalore-575025, Karnataka.
Email: hemantha@nitk.edu.in

Dr. Debashisha Jena
Professor
Dept. of Electrical & Electronics Engg.,
National Institute of Technology Karnataka,
Surathkal, Mangalore-575025, Karnataka.
Email:debashisha.jena.2409.ee@nitk.edu.in

Name of the position: Summer Internship

No. of Positions/Vacancies: One

Qualifications:
Essential Qualifications:- Candidate studying in Prefinal year or final year **B.E./B.Tech** in Mechanical or other allied disciplines with a minimum of 60% aggregate score (6.5/10 CGPA).

Desired Skills:-

- Basic exposure to software such as MATLAB, ADAMS, ANSYS, Labview.
- Ability to work in a team, good communication skills and experience in experimental research for fabrication of setup.

Age Limit: 25 years (Preferrable)

Salary:

- **Rs. 5,000/month**

Duration: 02 Months

How to apply: Interested candidates must apply with the following documents (1) Cover letter (2) Bio-data with passport-sized photograph, (3) Scanned copies of educational certificates and mark sheets, class X onwards.

The soft copies of all the above documents (pdf format) must be **emailed to the P.I., Dr. Ranjeet Kumar Sahu (ranjeetsahu.j@nitk.edu.in) by 31st March, 2024**. The email address for correspondence is given above. Only shortlisted candidates will be intimated by email and called for **Offline interview**. The position is available immediately. The appointment will be on a purely temporary basis co-terminus with the project.

About the project:

Total duration: 3 YEARS (2023-2026)

Funding Agency: Science & Engineering Research Board (SERB)

Project summary:

Intelligent Nanostructured Materials have gained significant attention in recent times and show a great promise for providing us many breakthroughs in the near future that will change the direction of technological advances in a wide range of applications. Indicatively, such applications include self-healing materials for coating application in automobiles, damping in automobiles, flexible electronics, drug delivery applications, implants and prostheses, energy generation and conservation, smart textiles, catalysis, optical fields and so on. The intelligent nanostructured materials (INMs) are the stimuli-responsive nanomaterials that can react to the varying environmental conditions like variation in temperature, mechanical loads, light, pH-value, moisture, electrical charge and magnetic fields. INMs can exhibit their own functions according to these variations. This indicates that these materials can change their excellent physical, mechanical, thermal, electrical, permeable, catalytic, optical properties, etc. in an intelligent way for adapting to the surrounding environment. A few methods have been developed for the synthesis of INMs of required size and shape. These methods include sol-gel, solution precipitation, hydration-ultrasonic dispersion, sputtering, track-etching and micro-emulsion. But, from the methods mentioned above, some of them are normally hard to control the nanostructured materials size and distribution, and their subsequent aggregation. Further, most of these methods exhibit low production rates and high cost. Therefore, there is a recognized need for, and it would be most advantageous to have a simple, compact, versatile and cost-effective method for synthesizing intelligent nanostructured materials at high yield with respect to known methods. This feature calls for a plasma source based digital nano-manufacturing (PSDNM) method for the synthesis and characterization of intelligent nanostructured materials, which has not been explored, and finally to study the application suitability of these materials in the scientific, medical and industrial society. The proposed PSDNM is a contactless material removal method which is basically, based on the plasma column formed between the two electrodes- tool and the workpiece surrounded by dielectric medium. In this method, the material is removed from both the electrodes in the form of debris at nano level through melting and evaporation by the initiation of electrical discharges.