Department of Mechanical Engineering
NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL

Ref. No. 81/NITK/SERB/MECH/Su.PS/2023-24/A9 23/03/2024

Advertisement for Summer Internship

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

Title of the project:

"Enhance lubricant performance in an electrical environment to overcome electrical bearing failures in electric vehicles"

Principal Investigator:

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Co-Principal Investigators:

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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/ Electrical or other allied disciplines with a minimum of 65% aggregate score (6.5/10 CGPA).

Desired Skills:-

- Basic exposure to software such as MATLAB, ADAMS, ANSYS, Python,AI/ML 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. P S Suvin (suvin@nitk.edu.in) by 5th April, 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:

Electric vehicles (EV) are expected to have (ICE) different tribological performance requirements than internal combustion engine vehicles. All of the components involved in the power generation process must be tuned in order to improve the vehicle's performance and efficiency. As a result, the research of lubricants is critical. Those lubricants must play a vital role in electrical compatibility, thermal management, and material adaptability as e-mobility technologies evolve. The electrical characteristics of a lubricant can be optimized to reduce bearing electrical damage, which is common in electric vehicles. Electrical impedance and dielectric strength are the two qualities. It was discovered that there is a link between bearing deterioration and lubricant electric characteristics. The thermal qualities of a lubricant, such as thermal conductivity, heat capacity, and flow rate, influence the thermal efficiency of an electrical motor. Among the most important issues for EVs are the lubricant's thermal and electrical qualities, copper corrosion, and compatibility with EV elastomers/polymers (Clarke, 2014; Van Rensselar, 2019). To avoid friction and wear, seals, bearings, and gears must be adequately greased at speeds exceeding 25,000 rpm. Because batteries and motors employ advanced materials, new lubricants that are compatible with those materials will be needed (Becker, 2019). This is because lubricants would come into contact with motors and batteries. Lubricants that are incompatible with the explosive electrolytes found in batteries and motor components are potentially dangerous. Copper is used for the majority of these components due to its excellent electrical conductivity. As a result, excellent copper compatibility in the lubricant is critical. High speeds, high temperatures, increased oxidation, particle abrasion and wildly fluctuating electric and magnetic fields would expose the bearing lubricant in an electric vehicle. Lubricants should have stable dielectric properties throughout to be able to withstand these conditions They will be in direct touch with the e-motor and/or other electrical components of the vehicle, EV lubricants must have increased electrical insulation to prevent arcing. Furthermore, the lubricant comes into direct touch with various materials, which can result in component breakage, swelling, cracking, and other issues. To avoid component damage and early failure due to incorrect lubrication in a highly fluctuating charged environment, specific designed lubricants are required. Performance parameters of lubricant in EV needs to be critically analyzed with the integration of impedance analyser with a tribometer, which will serve in choosing the best lubricant with respect to EV vehicle operating conditions. The facility will benefit in avoiding bearing failures or lubricant failure in electrical environment.