

# Dr. Sudhan Raj Jegan Mohan

Assistant Professor

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## ACADEMIC DEGREES

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- 12/2019**      **Ph.D. in Mechanical Engineering**  
Title of Dissertation: *Experimental Investigation on the tribological properties of non-asbestos organic brake friction material*  
Department of Mechanical Engineering, Karunya Institute of Technology and Sciences, Coimbatore, India
- 05/2011**      **Master of Engineering in Mechanical Engineering Design**  
Title of thesis: *Design and analysis of spiral to vertical wall suspension for a super critical steam generator*  
Faculty of Mechanical Engineering, Anna University, Coimbatore, India
- 04/2006**      **Bachelor of Engineering in Mechanical Engineering**  
Title of thesis: *Design and analysis of piping systems for pressure vessels*  
Department of Mechanical Engineering, Anna University, Chennai, India

## WORKPLACES

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- 2020 –**              **Assistant Professor**  
Faculty of Informatics, Eötvös Loránd University  
Savaria Institute of Technology, Szombathely, Hungary
- 2013 – 2019**      **Research Fellow**  
Department of Mechanical Engineering,  
Karunya Institute of Technology and Sciences, Coimbatore, India
- 2011 – 2013**      **Design Engineer**  
Engineering Design Division  
Wipro Technologies, Chennai, India

## RESEARCH INTERESTS

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- **Tribology:** Tribo-surfaces, bio-tribology, surface engineering and materials, contact mechanics, nano-tribology, lubricants and hydrodynamic lubrication. The properties of surfaces and interfaces in relative motion, including friction, lubrication, wear, adhesion, failure and contact phenomena.
- **Engineering Materials and Design:** Manufacturing, design, validation, characterization/testing, performance, application and sustainability of composite materials and also bio-based composites. the studies of structure and properties of inorganic and organic materials, advances in synthesis, processing, characterization and testing, design of materials and engineering systems, and applications in technology.

## **TEACHING ACTIVITY**

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### **Teaching**

- Course (BSc): Machine Elements, Technical Drawing, Descriptive Geometry
- Course (MSc/PhD): Advanced Machine Design

### **Supervisor / reviewer**

- Co-supervisor, 1 PhD and 2 MSc students
- Thesis reviewer, 2 PhD theses
- Doctoral exams: Composite materials, Industrial Tribology, Vibration and Damping systems.

## **LANGUAGES**

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- English: writing, reading, speaking (fluent)
- Tamil: writing, reading, speaking (native)

## **SOFTWARES**

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- Programming language: Cobol and C Programming
- ERP Software: SAP Business one
- Simulations: Matlab and Fluent
- Finite element software: Ansys
- CAD software: AutoCAD (Autodesk Inventor)

## **ACTIVITIES IN SCIENTIFIC ORGANIZATIONS**

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### **Journals – Scientific reviewer**

- Journal of International Measurement
- Polymer composites
- Ceramic International
- Journal of Engineering Science and Technology
- Material Research Express
- Friction
- Industrial Lubrication and Tribology

### **Professional Memberships**

- Member ISTE (Indian Society for Technical Education)
- Member TSI (Tribology Society of India)

## **PUBLICATIONS**

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### **Journal papers with impact factor:**

1. **Sudhan. J**, Darius. S and Christy. T.V, (2018) "Effect of two different rubbers as secondary binders on the friction and wear characteristics of non-asbestos organic (NAO) brake friction materials", Tribology-Mat. Surf and Inter, 12, 71-84. DOI:10.1080/17515831.2018.1449349. (IF:1.5)
2. **Sudhan. J**, Christy. T.V, Darius. S and Banu S. (2019) "Influence of calcium sulfate whiskers on the tribological characteristics of automotive brake friction materials", Engineering Science and Technology, an International Journal, 23, 445-451. <https://doi.org/10.1016/j.jestch.2019.06.007>. (IF: 2.432)

3. **Sudhan. J** and Banu S. (2019) "Usage of Powder Pinus Brutia Cone and Colemanite Combination in Brake Friction Composites as Friction Modifier", *Materials Today- Proceedings* (Article in Press) (IF: 0.694)
4. Sai Krishnan G, L Ganesh Babu, Kumaran P, Yoganjaneyulu and **Jeganmohan Sudhanraj**. (2020) "Investigation of Caryota urens fibers on physical, chemical, mechanical and tribological properties for brake pad applications", *Mater. Res. Express*, 7, DOI: 10.1088/2053-1591/ab5d5b (IF: 1.449)
5. **Sudhan. J**, Banu S and Mukesh K (2019) " Experimental Investigation on the Friction and Wear Characteristics of Palm Seed Powder Reinforced Brake Pad Friction Composites", *Journal of The Institution of Engineers (India): Series D* (Article in Press) (IF: 1.743)

#### **Conference Proceedings:**

1. **Sudhan. J**, Darius. S and Christy. T.V, (2017) "Effect of calcium sulfate whiskers on the friction and wear characteristics of non- asbestos organic (NAO) brake friction materials", *Proceedings of the National Conference of Surface Science and Technology at VIT- Chennai*, 10th November 2017, pp.25-26.
2. **Sudhan. J** and Darius. S, (2015) "A review of raw materials in automobile brake friction materials" *Proceedings of the International Conference on Advances in Materials and Materials Processing at Karunya University- Coimbatore*, 22nd January 2015, pp.292-314.
3. Banu Sugoza and **Sudhan J**, (2019) "The Fabrication, characterization and friction assessment of powder palm seed added composites", *Proceedings of the international Mediterranean science and engineering congress at Turkey*, 25 April 2019, pp. 221-224.
4. **Sudhan J** (2019) "Experimental investigation on the tribological characteristics of synthetic hydrated calcium silicate reinforced non-asbestos organic copper free brake pad friction composites", *Proceedings of Malaysia-Singapore Research Symposium at NUS, Singapore*, 05 November 2019.
5. **Sudhan. J** and Banu S. (2019) "Usage of Powder Pinus Brutia Cone and Colemanite Combination in Brake Friction Composites as Friction Modifier", *Proceedings of International conference on materials and manufacturing methods at NITT, India*, 5<sup>th</sup> July 2019.

#### **Ph.D work details**

Solid lubricants, especially graphite plays an important role in lubricating the frictional interface at elevated temperatures to stabilize the friction level. Lubricity of graphite is known to depend on the absorbed moisture, at high temperatures it loses its lubricity and turns in to a mild abrasive. Hence the influence of graphene on the fade and recovery performances are studied and compared it with graphite-based friction materials (BFM).

In this research work, four BFM formulations were developed by varying the proportion of graphene (0, 5, 10 and 15 wt.%). The parent compositions of these four BFM contained all the class of ingredients viz fibers, fillers, friction modifiers and binders. The 66 wt. % of ingredients in the composition were kept fixed and only the balance 24 wt.% of graphene and barites were varied. The effect of fade and recovery for the developed composites are investigated.

Overall, the friction composites with graphene content above 5 % exhibits good thermal stability. SEM images confirms the presence of few primary plateaus, less back transfer of polymeric materials and fine debris, which avoids frictional undulations and behaves counter friendly to the rotor surface.