

## Faculty Profile

<b>Name of Faculty</b>	Dr. N. Raghavendra
<b>Department</b>	Mechanical Engineering
<b>Qualification</b>	BE, M Tech, Ph.D.
<b>Designation</b>	Associate Professor
<b>Area of specialization</b>	Metal Matrix Composites, Tribology, Artificial Neural Networks
<b>Date of Joining BNMIT</b>	22.07.2013
<b>Nature of Association (Regular/Contractual/Adjunct)</b>	Regular
<b>e-mail</b>	<a href="mailto:raghavendran@bnmit.in">raghavendran@bnmit.in</a> , <a href="mailto:ragu1676@gmail.com">ragu1676@gmail.com</a>
<b>No. of years of Experience</b>	Teaching:18.5 years



### Academic Qualifications

- **Ph.D.**(2018), Department of Mechanical Engineering, Visvesvaraya Technological University, Belagavi, India.
- **M.Tech. Machine Design** (2004), Department of Mechanical Engineering, B.M.S.C.E, Bangalore, (Visvesvaraya Technological University) Belagavi, India., India (F C D).
- **B.E. Mechanical Engineering** (1997), S. S. I. T, Tumkur (Bangalore University) (F C D).

### Working Experience Details

- **Associate Professor**, Department of Mechanical Engineering, B N M Institute of Technology, Bangalore, from 22-07-2013 to till date.
- **Assistant Professor**, Department of Mechanical Engineering, Vemana Institute of Technology, Bangalore, from 2008 to 2013.
- **Senior Lecturer**, Department of Mechanical Engineering, Vemana Institute of Technology, Bangalore, from 2005 to 2008.
- **Lecturer**, Department of Mechanical Engineering, Vemana Institute of Technology, Bangalore, from 1999 to 2005.
- **Lecturer**, Department of Mechanical Engineering, Bangalore College of Engineering & Technology, Bangalore, from 1997 to 1999. (2 years).

### Subjects taught

**Topics Taught:** Elements of Mechanical Engineering, Strength of Materials, Kinematics of machine, Machine Drawing, Design of machine Elements 1 &2, Mechanical Vibrations, Tribology, Computer aided Engineering Drawing, Computer Aided Machine Drawing, Composite materials, etc.

## **Research Experience Details:**

### **Ph.D:**

Developed an Aluminium based Particulate MMCs and to investigate the mechanical and wear behavior in relation to the parameters of processing route such as stirring speed, melting temperature, mechanical property and other wear test parameters such as Load, Speed, Volume fractions. Particulate MMCs was developed with Al 7075 alloy reinforced with Al<sub>2</sub>O<sub>3</sub> in 5%, 10%, 15% and 20% volume fractions by conventional Stir casting Process. Reinforcement pre heating, casting using metal mould, stirring the matrix and reinforcement melt and bottom pouring are the features used in the present development. Mechanical properties and the wear behavior of the Al 7075/Al<sub>2</sub>O<sub>3</sub> Particulate composite were carried out as per ASTM standards.

Composites are characterized by XRD analysis, Scanning Electron microscope, EDS analysis, optical microscope to establish the presence of Alumina, interface reactions, and distribution of Al<sub>2</sub>O<sub>3</sub> in the MMC. Tensile test, Hardness test, Pin on Disc wear test are performed to study the improvement in mechanical and wear property due to addition of Al<sub>2</sub>O<sub>3</sub> reinforcement. Extensive investigation on the Al 7075/Al<sub>2</sub>O<sub>3</sub> particulate composite are carried out to study the wear behavior at various sliding speed, Sliding Distance, Normal Load and Volume Fractions. Wear rate at the various speed and load are summarized in the form of wear map indicating wear mechanisms. Dominant wear mechanisms in all the wear regions were studied based on wear track, wear debris and wear rate during the test.

Artificial Neural Network based modeling was developed with 10, 30, and 50 neurons for Levenberg Marquardt algorithm and 10 neurons for Bayesian Regularization algorithm. One hidden layer with 13 input parameter and 8 output results are used in ANN architecture. The Developed ANN model can be effectively extended to predict the nonlinear behavior of wear for any particulate MMC. Large amount of time, money and materials invested for the experiments can be reduced due to development of ANN models.

## **Academic Positions and other Responsibilities (Institute Level):**

1. **Coordinator**, NBA, Mechanical Engineering (2017-18, 2018-19)
2. **Deputy Chief Superintendent** (External) at City engineering College, Bangalore from 11-06-2014 to 23-06-2014 for the conduction of June 2014 B.E. examinations of VTU, Belgaum.
3. **Deputy Chief Superintendent** (External) at Dayanand Sagar College of Engineering, Bangalore 28-05-2012 to 09-06-2012 for the conduction of June 2012 B.E. examinations of VTU, Belgaum.
4. Head of the Department from 06-10-1999 to 25-08-2005 at Vemana Institute of Technology, Established All the laboratories for the Mechanical Engineering Branch.
5. National Conference **Recent Trends in Mechanical Engineering, RTME-08**, Program Co-ordinator.
6. Laboratory **In-charge** for Material Testing & Metallurgy Lab, CAMA Lab, Fluid Mechanics Lab, Design Lab.
7. Project Co-ordinator & Technical Seminar Coordinator at Vemana Institute of Technology. 2008 to 2010
8. NBA Co – coordinator at Vemana Institute of Technology, 2012.
9. Reviewer for Journal IJMINDS.(International Journal of Ignited Minds)

### **Study Materials Developed**

- 1) Prepared Laboratory Manual for Material Testing Lab.
- 2) Prepared Laboratory Manual for CAMA Lab.
- 3) Prepared Laboratory Manual for FM Lab.
- 4) Prepared Laboratory Manual for Design Lab

### **Experimental/ Computational/ Any other Skills:**

#### **A. Material Synthesis**

- Development of Al 7075/ Al<sub>2</sub>O<sub>3</sub> Particulate Composite Material.
- Development of Al 7075/ Al<sub>2</sub>O<sub>3</sub>/ SiC hybrid Particulate Composite Material.

#### **B. Characterization Techniques**

- **Density measurements by Archimedes principle.**
- X-ray Diffraction technique (XRD).
- Optical Micrograph Analysis as per ASTM standards
- **Scanning Electron Microscope with Energy Dispersive Spectroscope.**
- Tribological Characterization of composites as per ASTM G-99 Standards.

### **Instruments Handled/Software's handled:**

- **Optical Microscope.**
- Computerized pin on disc wear testing machine.
- **Computerized universal testing machine.**
- Solid Edge ST2.
- ANSYS
- MATLAB
- FEMAP Nastran
- COSMOS Works
- ALGOR Nastran

### **Awards/ Achievements/Memberships:**

- Appreciation Letter for 100 % results in Tribology course, Vemen Institute of technology, Dec 2008.
- Merit Fellowship from Jindal Industries, India during B.E.
- Appreciation Letter for securing more than 90% in Faculty Appraisal, BNMIT in 2016.

### **Professional Memberships:**

- Member of Tribology Society Of India - LM#5638
- Member of International Association Of Engineers – 145087

### **Short Term Courses**

1. Post graduate in Computer Application – Supra Computer Academy
2. Three months certificate Course on Oracle, Visual basic and OOPs form Al-Ameen Institute of Information technology.
3. Diploma in Advance JAVA 7 web technologies from SSI limited.
4. 15 days program on CAD/CAM/CAE training form VTU,-UGS PLM Center of excellence, Belagum, 2007.

### **Workshops Attended:**

1. 3 day work shop on **Research Methodologies and Latex** –VTU & KSSEM, Feb 2014
2. Author Work Shop on **Effective Writing Journal Papers**-Springer, Feb 2014
3. 3 day work shop on **CAMD** - Reva I T, Bangalore , July 2007
4. Work shop on **Rapid Manufacturing Technologies** , IISC, March 2006
5. 1 day Workshop on research methodologies, BIT , Bangalore, March 2015
6. 3 day work shop on NBA, BNMIT, Dec 2015.

### **Faculty Development Programs attended:**

1. 5 day FDP on **High Impact teaching Skills**- Dale Carnegie Training, Wipro technologies, Aug 2011
2. 3 day FDP on **Advanced Manufacturing and Digital Manufacturing** , Cambridge I T, March 2011
3. 5 day FDP on **MISSION 10X** –Wipro Technologies, Aug 2011
4. 5 day FDP on **Introduction to Nano-Technology** – PESIT, Dec 2007.
5. 15 days FDP on **CAD CAM CAE** Training program –V T U –UGS PLM Centre of Excellence, Belgaum , Aug 2005.
6. 2 Week FDP on Advanced materials and manufacturing, MSRIT, Bangalore, Jan 2015

## **I Journal Publications:**

### **International Journals**

1. Raghavendra N, V. S. Ramamurthy, Development and dry sliding wear map for Al 7075/Al<sub>2</sub>O<sub>3</sub> Particulate Composites, IconAMMA-2017, ELSEVIER –Materials Today: Proceedings 5 (2018) 24104–24113. (Scopus indexed journal)
2. Raghavendra N, V.S. Ramamurthy, “Investigations of Microstructures and Tribological Behavior of AA7075/Al<sub>2</sub>O<sub>3</sub> Particulate Composite as a Function of Volume Fraction by Applying Artificial Neural Network”, *Fronteiras: Journal of Social, Technological and Environmental Science*, V6, n2, may –august 2017, p 362- 367. (Scopus indexed journal)
3. DOI <http://dx.doi.org/10.21664/2238-8869.2017v6i2.p372-382> • ISSN 2238-8869 372
4. Raghavendra N, V.S. Ramamurthy, “Wear Studies on Al 7075/Al<sub>2</sub>O<sub>3</sub> Particulate MMC by Artificial Neural Network”, *Fronteiras: Journal of Social, Technological and Environmental Science*, V6, n2, may –august 2017, p 372- 382. (Scopus indexed journal)
5. DOI <http://dx.doi.org/10.21664/2238-8869.2017v6i2.p372-382> • ISSN 2238-8869 362
6. Raghavendra.N, V.S.Ramamurthy, “Development and Tribological Characterization of Dual Particle and Triple Particle Reinforced Al-7075/ Al<sub>2</sub>O<sub>3</sub> Metal Matrix Composite”, *International Journal of Recent Advances in Mechanical Engineering (IJMECH)* Vol.6, No.2, Page 11-22, May 2017, DOI: 10.14810/ijmech.2017.6202
7. Raghavendra N, V.S. Ramamurthy, “Tribological Characterization of Particulate MMC Developed By Stir Casting Process, *International Journal of Recent Advances in Mechanical Engineering (IJMECH)* Vol.5, No.4, Page 35-44, November 2016, DOI: 10.14810/ijmech.2016.5403.
8. Raghavendra N, V.S. Ramamurthy, “Development And Tribological Properties Of Particulate MMC Developed By Stir Casting Process”, *IJRET: International Journal of Research in Engineering and Technology* eISSN: 2319-1163 | pISSN: 2321-7308 ,Volume: 05 Special Issue: 13 | ICRAES-2016, Sep-2016, Available @ <http://www.esatjournals.org>
9. Raghavendra N, V.S. Ramamurthy “Tribological Characterization Of Al7075/Al<sub>2</sub>O<sub>3</sub>/SiC Reinforced Hybrid Particulate Metal Matrix Composite Developed By Stir Casting Process”, *International Journal of Recent advances in Mechanical Engineering (IJMECH)* Vol.4, No.3, August 2015, DOI : 10.14810/ijmech.2015.4309.
10. Raghavendra N, V.S. Ramamurthy, “Wear Characterization of Al 7075 –Al<sub>2</sub>O<sub>3</sub> Metal Matrix Composite Fabricated by Stir Casting Process”, *International Journal of Engineering Research & Technology (IJERT)*, NCERAME-2015, March 2015, [www.ijert.org](http://www.ijert.org).
11. Raghavendra N, V S Ramamurthy “Effect of Particle Size and Weight Fraction of Alumina Reinforcement on Wear Behavior of Aluminium Metal Matrix Composites”, *International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET)*, Vol. 3, Issue 4, April 2014 , ISSN: 2319-8753.

### **National Journals:**

12. Raghavendra N, Design and Fabrication of Stir Casting Furnace with Bottom Pouring Arrangement for Development of Aluminium Particulate Metal Matrix Composite. National Conference NCAMD-2016, BMSIT, Bangalore, July 29, 2016.
13. Raghavendra N, V. S. Ramamurthy Development and Tribological Characterization of Al 7075 /Al<sub>2</sub>O<sub>3</sub>/SiC Hybrid Metal Matrix Composite Fabricated by Stir Casting Process, Proc. of 1st National Conference on Trends and Innovations in Automation, Materials and Thermal Engineering (TIAMTE-2015) ,VTU PG centre Mysore, March 2015.

## **II. In National/International Conference Proceedings**

1. Raghavendra N, V. S. Ramamurthy, Development and dry sliding wear map for Al 7075/Al2O3 Particulate Composites, International conference on Advances in Materials & manufacturing Applications - IconAMMA-2017, AMRITA Vishwa Vidyapeetam, Bangalore.
2. Raghavendra N, V.S. Ramamurthy, Wear Studies on Al 7075/Al2O3 Particulate MMC by Artificial Neural Network, International Conference on Emerging research trends in Mechanical and Civil Engineering - ICERTMTE-2017, REVA university, Bangalore.
3. Raghavendra N, V.S. Ramamurthy, “Development And Tribological Properties Of Particulate MMC Developed By Stir Casting Process”, Second International Conference on Recent Advances in Engineering Sciences ISBN : 978-1-944541-66-8, Sep 2016, Ramaiah Institute of Technology, Bangalore, Karnataka, India.
4. Raghavendra N, V.S. Ramamurthy, “Al 7075/Al2O3 Particulate Metal Matrix Composites”. Proceedings of International Conference on Advances in Materials, Manufacturing and Applications, International Conference, Amma-2015, NIT Trichy, page 683-888, April 2015. ISBN 978-93-84743-68-0 © 2015 Bonfring.

## **Papers presented in International/National Conferences**

### **International/National**

1. Raghavendra N, V.S. Ramamurthy, Wear Studies on Al 7075/Al2O3 Particulate MMC by Artificial Neural Network, International Conference on Emerging research trends in Mechanical and Civil Engineering - ICERTMTE-2017, REVA university, Bangalore.
2. Raghavendra N, V.S. Ramamurthy, “Development And Tribological Properties Of Particulate MMC Developed By Stir Casting Process”, Second International Conference on Recent Advances in Engineering Sciences ISBN : 978-1-944541-66-8, Sep 2016, Ramaiah Institute of Technology, Bangalore, Karnataka, India.
3. Raghavendra N, V.S. Ramamurthy, “Al 7075/Al2O3 Particulate Metal Matrix Composites”. Proceedings of International Conference on Advances in Materials, Manufacturing and Applications, International Conference, Amma-2015, NIT Trichy, page 683-888, April 2015. ISBN 978-93-84743-68-0 © 2015 Bonfring.

## **Participation in Training courses/Seminars/Workshops**

1. Participated in Workshop on “**New Model Curriculum for First year B.E./B. Tech. – CBCS Detailed Syllabus (2018-19) as per Outcome-Based Education (OBE) format including Course Outcomes (CO) and Bloom’s Taxonomy**” on 9<sup>th</sup> May 2018 at B.N.M Institute of Technology, Bangalore organized by VTU, Belagavi.

### **Personal Details:**

- Name: Dr. Raghavendra N.
- Address : # 40, D’souzanagar, Hosakerehalli, BSK 3<sup>rd</sup>Stage, Bangalore
- Date of Birth: 16<sup>th</sup> April 1976
- Sex : Male
- Nationality : Indian
- Languages Known: English, Hindi, Kannada, Telugu & Tamil

**16<sup>th</sup> February 2019**

**N. Raghavendra**