

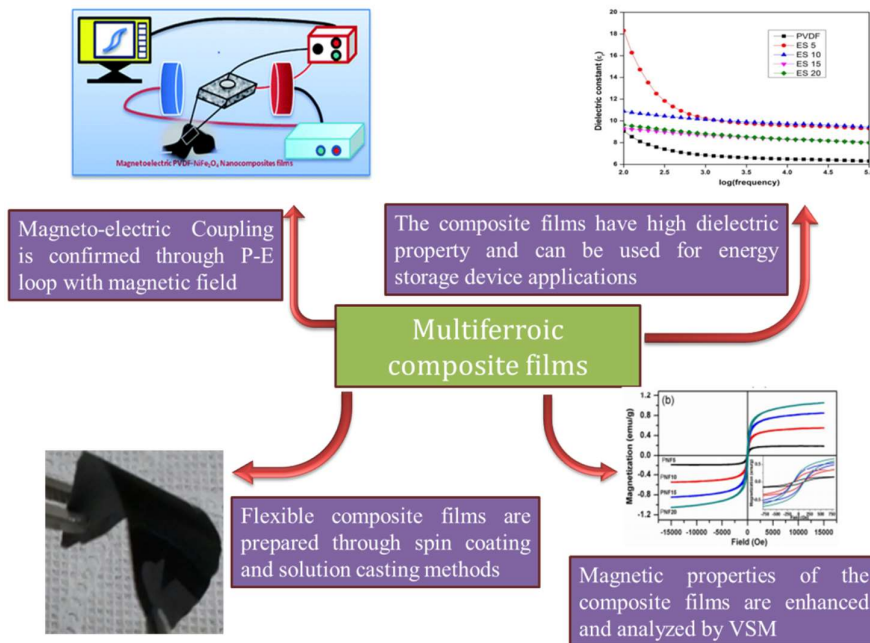
## Research interest

Magnetic materials, Multiferroic materials, Polymer nanocomposites, multifunctional polymer structures, Nanofluids/Ferrofluids, Ultrasonics etc

## Current research

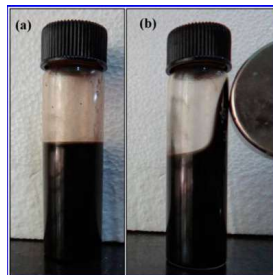
### Polymer Nanocomposites

Polymer-based magnetolectric nanocomposite films and electrospun polymer composite fiber mats are fabricated through dispersion of magnetic nano structured fillers in the electro-active polymers to achieve high magneto-resistance, towards the applications of magnetic field sensor, spintronics, memory devices.

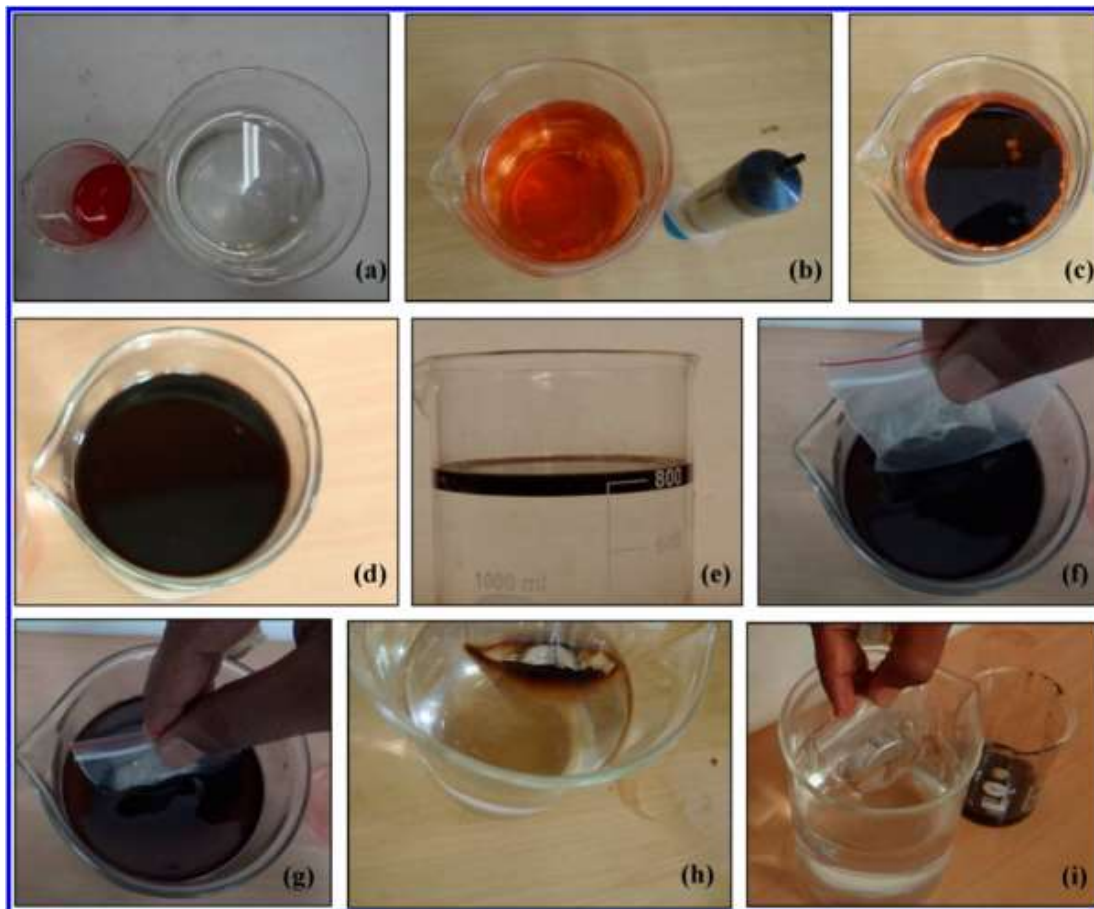


### Magnetic Nanofluids

Magnetic nanoparticles dispersed in base fluid highly influence the heat transfer property of the nanofluid. Similarly, some of the other physical parameters like electrical conductivity, rheological and density also influence the heat transfer of the nanofluid and targeted towards the application of coolants, heat moderators, fuel cells etc.



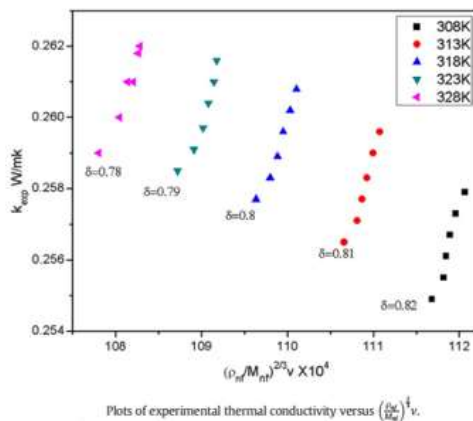
Magnetite - coconut oil nanofluids in the (a) absence and (b) presence of a magnet



**Figure** Optical images describing the removal of motor oil dispersed on the water surface, using coconut oil based magnetic nanofluid and a high field magnet: (a) Motor oil and pure water, (b) the contaminant dispersed on the water surface and magnetic nanofluid in a syringe, (c) after dropping the magnetic nanofluid onto the contaminated water, (d, e) oil and water mixture after agitation, top view and side view, (f, g) magnet dipped into the magnetized oil contaminant, (h) magnetized oil contaminant attaching to the magnet, and (i) cleaned water and collected contaminant.

Equation for finding the thermal conductivity of nanofluids through ultrasonic velocity

$$k_{bnf} = 3 \left( \frac{\rho_{nf} N_A}{M_{nf}} \right)^{2/3} k_B v$$



**Doctoral students working on multiferroic polymer nanocomposites**



*Ms Divya S*



*Mr. Durga Prasad P*



*Mr. Prathipkumar S*



*Mr. Sandeep kumar Yadav*



*Mr. Nirmal Kumar R*

**Doctoral students working on magnetic nanofluids**



*Ms. Anu K*



*Ms. Kirithiga R*



## Alumni

### Doctorates

#### Dr. T. Prabhakaran

Research area: Synthesis and Characterization of Poly (vinylidene Fluoride) Based Magnetolectric Polymer Nanocomposite Films

Awarded Year: 2013



#### Dr. M. Nabeel Rashin

Research area: Rheological, Thermal and Ultrasonic Studies on Magnetic and Non-Magnetic Nanofluids

Awarded Year: 2014



## **Masters students**

### **M.Phil:**

**Dr. T. Prabhakaran** (A. V. V. M. Sri pushpam college, Poondi-2008)

Dissertation: The size effect on magnetoelectric multiferroic bismuth ferrite nanoparticles

Awarded Year: 2008

### **M.Tech Projects: May session**

**Mr. Sachin B** (213116011-2018)

Dissertation: Sweep Frequency Approach for the Estimation of Wall Thickness in Ferromagnetic Tubes

**Mr. Suresh D** (213115019-2017)

Dissertation: Probability of detection studies of multi-NDE techniques for detection of flaws in small diameter tubes

**Mr. Mohd Farhan** (213115026-2017)

Dissertation: Defects sizing and material characterization of nylon 6 by non-destructive testing techniques

**Mr. Ravi kumar vatturi** (213114026-2016)

Dissertation: Inspection of Reformer tubes using higher order mode cluster guided wave Testing

**Mr. Peter felix** (213113019-2015)

Dissertation: Artificial neural networks an aid to automatic defect classification of Advanced ultrasonic NDE

**Mr. Muhammed thanseer P** (213113005-2015)

Dissertation: Assessment of Fatigue damage by noncollinear nonlinear ultrasonic technique

**Mr. Surla Ramesh** (213112003-2014)

Dissertation: Determination of strength and fracture Toughness of Nimonic-263 super alloy through Non-destructive method

**Mr. Robin Thomas** (213112013-2014)

Dissertation: Ultrasonic phased array examination of pressure tube and fuel tube using daisy probe

**Mr. Bineesh A.C** (213111001-2013)

Dissertation: Modeling and simulation of Phased array ultrasonic inspection of austenitic stainless-steel weld by CIVA code

**Mr. Akhil Chandra** (21311006-2013)

Dissertation: Development of phased array and TOFD ultrasonic techniques for characterization of defects in weld joints of nuclear pressure vessels

**Mr. C. Mascovani** (213210009-2012)

Dissertation: Investigations on the synthesis and properties of Pure and Dy-Modified YMnO<sub>3</sub> system dissertation

**Mr. Sai Krishna Y. N. M** (213109024-2011)

Dissertation: Estimation of Wall Thinning in Corroded Pipes Using Digital X-Ray Radiography

**Mr. Jagarollu Pradeep** (213108017-2010)

Dissertation: Performance Evaluation of An Image Plate

**Mr. N. V. V. Narasimha Murthy** (213107006-2009)

Dissertation: Tofd-An Alternative to Radiography for Thick Weld Stainless Steels

**Mr. Dharmveer Singh** (213107001-2009)

Dissertation: Theory, Modeling, Simulation, Derivation and Experimentation of Defect Detection Using Frequency Modulated Thermal Wave Imaging(Fmtwi)

**Mr. Sathish Murugan A** (PHB0612-2008)

Dissertation: Damage Assesment And Lideprediction Of Control Plug Mock-Ups Using Different NDE Techniques

**Mr. Suresh M. K** (PHB0504-2007)

Dissertation: Studies on Advanced Ultrasonic Testing-Tofd

**Mr. Larence P** (PHB0503-2007)

Dissertation: Investigation of Guided Wave Saft of Defect Signals in Plates Using Ultrasonic Phased Array

### **M.Tech Projects: December session**

**Mr. Suresh D** (213115019-2016)

Dissertation: Probability of detection studies of Multi-NDE Techniques for detection of flaws in ferromagnetic tubes

**Mr. Mohd Farhan** (213115026-2016)

Dissertation: Identification and analysis of welding defects of submerged arc welding to enhance the quality of welds in wind turbine tower steels

**Mr. Ravi kumar vatturi** (213114026-2015)

Dissertation: Inspection of Reformer tubes using higher order mode cluster guided wave Testing

**Mr. Peter Felix** (213113019-2014)

Dissertation: Shielding integrity inspection using radiometry and gammatography

**Mr. Muhammed thanseer P** (213113005-2014)

Dissertation: Assessment of Fatigue damage by noncollinear nonlinear ultrasonic technique

**Mr. Surla Ramesh** (213112003-2013)

Dissertation: Characterization of precipitation behavior in nimonic-263 by potential drop technique

**Mr. Robin Thomas** (213112013-2013)

Dissertation: Ultrasonic phased array examination of pressure tube and fuel tube using daisy probe

**Mr. Akhil Chandra** (21311006-2012)

Dissertation: Development of phased array and TOFD ultrasonic techniques for characterization of defects in weld joints of nuclear pressure vessels

**Mr. Aneesh mohan A N** (213110010-2011)

Dissertation: Development of embedded sensor for ultrasonic guided wave generation using nanostructured magnetorstrictive materials

**Mr. Sai krishna Y. N. M** (213109024-2010)

Dissertation: Assessment of wall thickness loss in corroded pipelines using digital x-ray radiography

**Mr. Snvs narayana munnaluri** (213109021-2010)

Dissertation: Nondestructive evaluation of porosity and its effects on CFRP composites: experimental approach

**Mr. Durga rao palada** (213108019-2009)

Dissertation: Thermal images and modeling of the composite structure in frequency modulated thermal wave imaging

**Mr. J. Pradeep** (213108017-2009)

Dissertation: Characterization of micro coating using lock-in thermography

**Mr. N. V. V. Narasimha Murthy** (213107006-2008)

Dissertation: Digital radiography and conventional radiography for different application

**Mr. M.Abdul Habibullah** (PHB0610-2007)

Dissertation: Defect detectability in computed radiography

**Mr. Sathish Murugan A** (PHB0612-2007)

Dissertation: Damage assesment and life prediction of control plug mock-ups using different nde techniques

**Mr. Suresh M. K** (PHB0504-2006)

Dissertation: Studies on ultrasonic testing and advantages of tofd

**Mr. P Larence** (PHB0503-2006)

Dissertation: Phased array focusing guided wave in plate

### **M.Sc. Projects:**

**Ms. Lalitha G Krishnan** (213217021- May 2019)

Dissertation: Synthesis and Characterization of CuO-EG nanofluids with enhanced Electrical Conductivity for Supercapacitor Applications.

**Ms. Manju P S** (213217002- May 2019)

Dissertation: Synthesis and characterization of PMMA/Ag nanofiber films for transparent conducting electrode applications

**Mr. Sriganapathy Raghav RV** (213216009- May 2018)

Dissertation: The effect of magnetic field on the viscosity of water

**Ms. Srimathi G** (213216018- May 2018)

Dissertation: Synthesis and characterization of TiO<sub>2</sub> nanoparticles for photo catalytic applications

**Ms. Lavanya rathi P** (213215022- May 2017)

Dissertation: Synthesis and Characterization of PANI-CoFe<sub>2</sub>O<sub>4</sub> Nano composite and its Gas sensing application

**Mr. Vignesh R** (213215013- May 2017)

Dissertation: Synthesis of Strontium carbonate nanorods for water purification and gas sensing application

**Ms. Rini cheriyan** (213214019-May 2016)

Dissertation: Synthesis and characterization of ZnO nanofiber/PVA nano composite films for Device application

**Mr. Thomas tom** (213214001- May 2016)

Dissertation: Hybrid magnetic nanofluids for anti-corrosive coating in metallic tubes

**Ms. G Sai Priya** (213213011- May 2015)



Dissertation: Preparation and characterization of PVP-PVA-ZnO blend polymer composite films

**Ms. R. Priyanka** (213213007-May 2015)

Dissertation: Synthesis and characterization of electro-spun films of PEO-CuO nanocomposite fibers

**Ms. S. Leelashree** (213212013- May 2014)

Dissertation: Ultrasonic and thermal conductivity studies on Cu-Water nanofluids

**Mr. Thirupara sakthi B** (213212019-May 2014)

Dissertation: Ferroelectric investigations on Poly (vinylidene fluoride-co-hexafluoro propylene) films

**Mr. Haldane Paul** (213211015- May 2013)

Dissertation: Synthesis and characterization of PANI-Cobalt ferrite nanocomposites

**Mr. Govindan kutty R** (213211011- June 2013)

Dissertation: A Comparative study on the removal of Oil contaminants from water using Oil based ferrofluids

**Ms. Hasina A** (213210004- May 2012)

Dissertation: Synthesis and characterization of PMMA-ZrO<sub>2</sub> polymer nanocomposite film for optical applications

**Ms. A.V Ramya** (213209003- May 2011)

Dissertation: Magneto electric studies on nano composites of barium titanate and nickel ferrite

**Ms. Sanitha K.H** (213208009- May 2010)

Dissertation: Fabrication of magnetic polymer nano composite structure of PVP

**Ms. Renjini P** (PHA 0609 -May 2008)

Dissertation: Design of analog section for a Digital mixer

**Ms. M S Gayathri** (PHA 0508 -June 2007)

Dissertation: Analysis of single line defect 2-D photonic crystal waveguide

### **B.Tech. Project:**

**Mr. Deepak Krishna M and Mr. Sai Karthick** (112111014, 112111044- May 2015)

Dissertation: Synthesis of Polyaniline-Zinc oxide Nano composite film for Hydrogen Storage

**Summer projects:**

**Ms. Amutha soosai** (M.Sc. project- Holy Cross College, Tiruchirappalli, 2018)

Dissertation: Synthesis and characterization of superparamagnetic nanosized Magnesium ferrite ( $\text{MgFe}_2\text{O}_4$ ) particles

**Mr. R Nirmal Kumar**, Assistant professor (Summer project- Srimad Andavan Arts and Science College, Tiruchirappalli, 2016), sponsored by Indian Academy of Sciences

Dissertation: Structural and functional analysis of Titania based nanostructures for efficient photocatalytic application.