

# Assistant Professor

## Versha Khare, Ph.D

### Professional Profile

- ✓ Ph.D in Physics (solid state physics / materials)
- ✓ Proven scientific publication track record in journal of international repute
- ✓ Several years of multi-disciplinary experience in the field of Physics, material science, materials chemistry and nanoscience
- ✓ Autonomous skills in teaching, experimental design, project management, research student supervision, grant proposal submissions, accustomed to working independently and as part of a team (assistant to the co-ordinator of a multi-European project)

### Projects and Research Funding

Agency : National Research Foundation Korea

Grant No. : Basic Science Grant-2012008196

**Title : Development of multi-scale filtering process using high-performance hybrid nanomaterials**

**PI : Khare Versha**

**Duration: 2012-05-01 ~ 2015-04-30**

Agency : National Research Foundation Korea

Grant No. : Mid-Career Researcher Grant -2012047189

**Title : A next-generation hybrid nano-materials based dye-sensitized solar cells**

**PI: Khare Versha**

**Duration: 2012-12-01 ~ 2015-11-30**

### Research Highlights

#### Hybrid nanomaterial/Nanosciences

- ✂ **Development of graphene-ionic liquid nanohybrid material for tribology and micromachining**
- ✂ **Successful synthesis of magnetic graphene using hybrid approach for magnetic applications**
- ✂ **Development of nanohybrid materials and design of a reactor for nano and microfiltration.**
- ✂ **Development of graphene based hybrid nanomaterials for new generation solar cell.**
- ✂ Effect of anion of ionic liquids on the growth mechanism of metal and metal oxide nanoparticles. It has been shown in my work that anions have strong effect on the growth morphology, growth mechanism and defect formation in gold nanoparticles.
- ✂ Hybrid materials of magnetic nanoparticles with ionic liquid. The nanofluids produced by dispersion of nanoparticles in ionic liquids suggest that the one can achieve dispersion of particles as small as 1 nm size. It has also been shown that anion has strong effect on the dispersion capabilities of ionic liquids.
- ✂ Nanostructure and photocatalyst: determination of molecular structure of Co Catalyst
- ✂ Development of two new methods for the coating of iron species onto the sand based on the growth morphology of the coatings.
- ✂ Introduction tribology as a new approach in the field of adhesion of minerals on rough substrates

#### Material Science

- ✂ Stability of FCI and novel approximant phases in Al-Cu-Cr quasicrystalline alloy. Establishment of models for the mechanism of the stability of these structures. Effect of various synthesis route and chemical doping (of metal and non metal) on the stability of these alloys.
- ✂ Effect of Boron substitution on the structure, mechanical properties and tribology of binary and ternary Al-based intermetallics and thin films.
- ✂ Development of new intermetallic having low friction, low wear, high hardness and low adhesion for the space and machine tools applications.
- ✂ Synthesis and characterisation of highly perfect icosahedral coatings with low friction.
- ✂ Observation of effect of substrate and indenter on the frictional behaviour of Al-Cu, Al-Cu-Fe thin films

\*Sentences in bold are related with my current position

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## Awards and Achievements

- ↵ Young Researcher Award (IUMRS ICA98IISC, BLR)
  - ↵ Award for Excellence (Department of Physics BHU-Varanasi -India)
  - ↵ Senior Research Fellowship (Council of scientific research of India-India)
  - ↵ Extended SRF (Council of scientific research of India-India)
  - ↵ Member of Organizing Committee member of International Symposium on Green Manufacturing and Applications," ISGMA 2013 (Hawaii, USA).
  - ↵ Member of Organizing Committee member of International Symposium on Green Manufacturing and Applications," ISGMA 2012 (Jeju Island, Korea).
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## Work Experience

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### Seoul National University, Korea

Department of Mechanical and Aerospace Engineering  
**BK21 Assistant Professor**

[www.mpikg.mpg.de](http://www.mpikg.mpg.de)  
2011–till now

Involved in the research on the

- ↵ Graphene based hybrid materials for energy efficient and sustainable micromachining
- ↵ Graphene based hybrid materials for magnetic applications
- ↵ Graphene based hybrid materials for nanofiltration (PI-NRF basic Science project no. 2012008196)
- ↵ Graphene based hybrid materials for DSSC (PI- NRF Mid researcher project no. 2012047189)

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### Banaras Hindu University, India

Nanoscience Centre, Hydrogen Energy Centre  
**Extended Senior Research Fellow**

[www.bhu.ac.in/science/physics](http://www.bhu.ac.in/science/physics)  
2010 – 2011

Involved in Scientific Consultancy related with nanosciences, Materials Science and Physics

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### Max Planck Institute of Colloid and Interfaces, Germany

Department of Colloid Chemistry  
**Max Planck Research Scientist**

[www.mpikg.mpg.de](http://www.mpikg.mpg.de)  
2008–2009

Involved in the research on the

- ↵ synthesis of metal nanoparticles in ionic liquids, ferrofluids of magnetic nano particles, metal carbide and nitride nanoparticles
- ↵ ionic liquid nanoparticles interactions
- ↵ Properties of nanoparticles and dispersions using X-ray absorption (XAS) and Mössbauer spectroscopy

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### Freie University, Germany

Department of Physics  
**Post-doctoral Research Scientist**

[www.fu-berlin.de/en/](http://www.fu-berlin.de/en/)

2008–2009

- ↵ Involved in the research on the Electrochemical synthesis of water splitting nano catalyst (Co catalyst)
- ↵ Involved in the research on the Structural studies of catalyst using X-Ray absorption spectroscopy (XAS)

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### Laboratoire de Chimie, Physique et Microbiologie pour l'environnement, France

Department of Chemistry and Spectro-chemistry of Interfaces  
**Post-doctoral Research Scientist**

[www.lcpe.cnrs-nancy.fr/](http://www.lcpe.cnrs-nancy.fr/)

2006 -2008

Involved in the research related to the utilisation of green rust and nano-sized iron oxides for water purification and soil remediation.

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### Ecole Des Mines De Nancy, France

Laboratoire de Science et Génie des Matériaux et de Métallurgie  
**Research Engineer**

[www.mines.inpl-nancy](http://www.mines.inpl-nancy)

2002 – 2005

- ↵ Involved in the research on structure-property (tribological and mechanical properties) correlation of quasicrystalline thin films for machine tools and aerospace industry

↪ Involved in research guidance of undergraduate and master students

**University of Dortmund, Germany**

Department of Chemical Engineering

**Post-doctoral Research Scientist**

[www.chemie.uni-dortmund.de](http://www.chemie.uni-dortmund.de)

2000 – 2001

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↪ Involved in the research on structural /microstructural study and hydrogen storage capacity of nanoquasicrystals and metallic glasses

**Ph.D. – Solid State Physics / Material Science**

1993 - 2000

Banaras Hindu University, Department of Physics, India

**Thesis Title:** Investigations on Melt Spun Solids: Synthesis Structural Characterization and Transformations Studies of Al-Cu-Cr ; Al(Si)-Cu-Cr ; Al-Cu-Cr(Fe) Quasicrystalline Alloys

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