**Dr. Sonali Biswas**

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**RESEARCH INTERESTS**

Experimental Condensed Matter Physics, Nanomaterials, Low-Temperature measurements, Magnetocaloric.

**EXPERTISE**

My specializations are Nanomaterials Synthesis, Perovskite Manganite materials, Magneto-transport measurements, Magnetocaloric, Low-Temperature measurement, Polymer composite, and Biomedical Applications. I have nearly seven years of hands-on experience on Cryogenic systems, Vacuum systems, Ultraviolet-Visible spectroscopy, Impedance Analyzer, Fourier Transform Infrared Spectroscopy, and Photoluminescence Spectroscopy. I have also developed expertise in the structural, electrical, magnetic and functional behaviour of materials. Besides this, I am also well versed with the operation of some instruments like X-Ray Diffractometer, Field Emission Scanning Electron Microscopy, Superconducting Quantum Interference Device, Raman Spectroscopy, and Transmission Electron Microscopy.

**EDUCATION**

2021 Doctor of Philosophy in Science (Physics), Birla Institute of Technology, Mesra, Ranchi, Jharkhand, India.

 **Topic: "*Study of magnetoresistance, magnetoimpedance and magnetocaloric properties*** $La\_{0.67}Sr\_{0.33-x}K\_{x}MnO\_{3}$ ***and*** $La\_{0.67}Sr\_{0.33-x}Pb\_{x}MnO\_{3}$ ***manganite nanomaterials*"**

2011 Degree: Master of Science in Physics (Specialization- Electronics and Communication), Kolhan University, Chaibasa, India.

2009 Degree: Bachelor of Science in Physics, Ranchi University, Jharkhand, India.

2006 Higher Secondary Examination, Jharkhand Secondary Examination Board, Ranchi.

2004 Senior Secondary Examination, Jharkhand Academic Council, Ranchi.

**RESEARCH EXPERIENCE**

My Ph.D. work is devoted to Colossal Magnetoresistive (CMR) materials. My objectives were to synthesize few types of perovskite manganite nanomaterials and understand their fundamental physical properties to study the effect of sintering temperature, doping concentration and doping elements on structural, electrical and magnetic behaviours grown manganite nanomaterials, also to study their magnetoimpedance and magnetic refrigeration property. I have the expertise to synthesis different types of perovskite materials and characterize them. I have experience in sample synthesis using different techniques, the sol-gel method, hydrothermal method, co-precipitation method and solid-state reaction method. I have also developed expertise on structural (Rietveld analysis), electrical, magnetic, dielectric and functional behaviour of nanomaterials. In particular, my areas of specialization are Nanomaterials Synthesis, Perovskite Manganite materials, Magneto-transport measurements, Magnetocaloric, Magnetoimpedance, and Low-Temperature measurements. I have nearly seven years of hands-on experience on Cryogenic systems, X-Ray Diffractometer, Raman Spectroscopy, Ultraviolet-Visible spectroscopy, Impedance Analyzer, Fourier Transform Infrared Spectroscopy, and Photoluminescence Spectroscopy. Besides this, I am also well versed in the operation of some instruments like Field Emission Scanning Electron Microscopy, Superconducting Quantum Interference Device, and Transmission Electron Microscopy. I have immense experience in data analysis tools, including Origin, FullProf Suite, VASP, MATLAB, Sci-Lab, Python, and MathType.

**PROJECT EXPERIENCE**

**Post: Project Assistant (DST-RFBR) (February 2013 to November 2014)**

**Title: "*Study of Physico-Technological Principles of Preparation of New Magnetic Nanostructures for Multifunctional Biomedical Applications*".**

Organization: Birla Institute of Technology, Mesra, Ranchi

**Supervisor: Dr. Sunita Keshri, Professor, Department of Physics, Birla Institute of Technology, Mesra, Ranchi**

Description: I have worked on a DST-RFBR research project. The duties were to prepare $La\_{0.67}Sr\_{0.33}MnO\_{3}$ (LSMO) manganite nanoparticles (NPs) and study their basic properties such as structural, electrical, and magnetic properties. For Structural and morphological properties of the samples was studied using XRD, SEM and TEM. We used cryogenic temperatures for electrical resistance and magnetic properties (10-310K) and SQUID. LSMO NPs, grown using the sol-gel method, were embedded in an acrylic interpenetrating polymer network to make the sample application for biomedical purposes. The drug loading and release studies of the grown sample were carried out using an antibiotic, ciprofloxacin.

**WORK EXPERIENCE**

I am working as Assistant Professor at Koneru Lakshmaiah University, Vaddeswaram, Andhra Pradesh, India.

Date of Joining: 9th May 2022

**LEADERSHIP**

* Organized several events at the college and school level, like technical seminars, conferences, cultural fests, many more.
* Active participation in cultural activities.

**TECHNICAL SKILLS**

* Programming Languages: Basic knowledge of C++, C.
* Softwares: MS Office, MATLAB, Origin, FullProf, MathType, LabView and VASP.
* Characterization Techniques: Cryogenic system, FTIR, XRD, Vacuum System, Raman Spectroscopy, Ultraviolet-visible spectroscopy, Impedance analyzer, Spin Coating and Photoluminescence Spectroscopy.

**PUBLICATIONS**

2022 Synthesis, physical properties, and biomedical applications of magnetic nanoparticles: a review S Keshri, S Biswas Progress in Biomaterials 11 (4), 347-372

2022 Conducting Polymer Nanocomposite for Energy Storage and Energy Harvesting Systems, SK Verma, S Samanta, AK Srivastava, S Biswas, RM Alsharabi, S Rajput Advances in Materials Science and Engineering 2022

2022 S Biswas, S Keshri, and P Wiśniewski, Study of the structural, electrical and magnetic *properties of the* $La\_{0.67}Sr\_{0.33-x}Pb\_{x}MnO\_{3}$ *manganite nanocrystalline materials*. Journal of Low Temperature Physics, 1-13, 2022.

2020 S Biswas and S Keshri, *Large Magnetocaloric effect near room temperature in* $La\_{0.67}(Sr,K/Pb)\_{0.33}MnO\_{3}$ *manganite nanomaterials*, [J. of Materials Science: Materials in Electronics](https://www.springerprofessional.de/en/journal-of-materials-science-materials-in-electronics/3535054), 31, 21896–21912, 2020.

2019 S Biswas and S Keshri, *Room temperature magnetoimpedance of* $La\_{0.67}Sr\_{0.33-x}Pb\_{x}MnO\_{3}$*(x = 0–0.33) manganites*, Phase Transitions 92 (2), 172-183, 2019.

2017 S Biswas, S Keshri, S Goswami, J Isaac, S Ganguly and N Perov, *Antibiotic loading and release studies of LSMO nanoparticles embedded in an acrylic polymer*, Phase Transitions 89 (12), 1203-1212, 2017.

2016 S Keshri, S Biswas and P Wiśniewski, *Studies on characteristic properties of superparamagnetic* $La\_{0.67}Sr\_{0.33-x}K\_{x}MnO\_{3}$ *nanoparticles*, Journal of Alloys and Compounds 656, 245-252, 2016.

2021 S. Keshri, S. Rajput, S. Biswas, L. Joshi, W. Suski, P Wiśniewski, *Structural, Magnetic and Transport Properties of Ca and Sr doped Lanthanum Manganites*, Journal of Metals, Materials and Minerals 31(4), 62-68, 2021.

**WORKSHOPS CONFERENCES**

2014 S Biswas and S Keshri, Structural and electrical properties of CMR composition, $La\_{0.67}Sr\_{0.33}MnO\_{3}$ sintered at different temperatures, presented in "International Conference on Materials and Characterization Techniques (ICMCT2014)", held in VIT University during 10-12, March 2014.

2015 S Biswas, S Keshri and P Wiśniewski, Studies on characteristic properties of $La\_{0.67}Sr\_{0.33-x}K\_{x}MnO\_{3}$ nanoparticles, presented in "International Conference on Innovative Research in Applied Physical, Mathematical/Statistical, Chemical Sciences, Environmental Dynamics, Integration of Life Sciences and Engineering", held in Jawaharlal Nehru University, New Delhi during 26-27, December 2015.

2016 S Biswas and S Keshri, Studies on few Colossal Magnetoresistive Nanoparticles, presented in a "National Conference on Nanoscience, Nanotechnology and Advanced Materials", Birla Institute of Technology, Mesra, Ranchi during 26-27, September 2016.

2022 Invited as a Guest Speaker at National Virtual Conference on Current challenges and future scope in Solar Energy Materials (NCSEM-2022), an event hosted by KLEF and held at Vijayawada on 30, May 2022 to 31, May 2022.

2022 Participated on INTERNATIONAL WORKSHOP ON INTERNATIONAL AND NATIONAL PATENT DRAFTING AND FILING (INPDF2022) organized by INDUSSANCE RESEARCH CONSULTANT PRIVATE LIMITED, Date: July 23, 2022

**PERSONAL DETAILS**

* Date of Birth : 12th December, 1987
* Father's name : Mr. Shantanu Biswas
* Mother's name : Mrs. Kalayani Biswas
* Language : English, Hindi and Bengali
* Nationality : Indian

**REFERENCES**

Dr. Sunita Keshri Professor, Department of physics,

Birla Institute of Technology, mesra,

Ranchi, Jharkhand, India, 835215

Phone: 9431105821

E-mail: s\_keshri@bitmesra.ac.in

Dr. Pradeep Kr. Brahman Department of Chemistry, Associate Professor,

Koneru Lakshmaiah Education Foundation

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Dr. R. K. Paul Associate Professor, Department of Physics

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