

Dr. Anjan Kumar Jena

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About Me

Currently, I am a postdoctoral researcher at the Institute of Physics (IOP), Bhubaneswar, India, since December 2020. My basic research topic is based on studying different properties, such as magnetic, dielectric, piezoelectric, magnetoelectric, etc., of the multiferroic materials and their applications in RRAM devices. Currently, I am focussing on both experimental and theoretical (DFT) studies of magnetic and resistive switching properties of the advanced 2D materials.

Education

- 2020 📖 **Doctor of Philosophy, Indian Institute of Technology Hyderabad, India.**
Thesis title: *"Exploring Many-body effects in Doped Multiferroic BiFeO₃ for Possible Applications."*
Supervisor: Dr. Jyoti Ranjan Mohanty
📖 **CGPA:** 9.15
- 2014 📖 **Masters in Science, National Institute of Technology Rourkela, India.**
Thesis title: *"Study of structural and electrical Properties of few Double Perovskite Compounds."*
Supervisor: Dr. Suryanarayan Das
📖 **CGPA:** 7.64
- 2012 📖 **Bachelor in Science, SVM Autonomous College Jagatsinghpur, India.**
📖 **%:** 79.38
- 2009 📖 **Higher Secondary Examination (12th Class), Balikuda College Balikuda, India.**
📖 **%:** 75.83
- 2006 📖 **Secondary Examination (10th Class), MP Raj High School Mulugaon, India.**
📖 **%:** 74.66

Affiliation






- Dec 2020-continue 📖 **Postdoctoral Fellow, Experimental Condensed Matter Physics, Institute of Physics Bhubaneswar, India.**
- Aug 2020– Nov 2020 📖 **Research Associate (RA), Dept. of Physics, Indian Institute of Technology Hyderabad, India.**

Affiliation (continued)

- Jan 2020– Jul 2020  **Postdoctoral Fellow**, Dept. of Physics, Indian Institute of Technology Hyderabad, India.
- Aug 2017– Jan 2020  **Senior Research Fellow**, Dept. of Physics, Indian Institute of Technology Hyderabad, India.
- Aug 2015– Jul 2017  **Junior Research Fellow**, Dept. of Physics, Indian Institute of Technology Hyderabad, India.

Miscellaneous Experience

Scholarship, Fellowships

- 2020-present  Postdoctoral Fellow by DAE, India.
- 2020  Research Associate (RA) Fellowship by SERB, India for the period of 4 months.
- 2020  Postdoctoral Fellow by MHRD, India for the period of 6 months.
- 2017-2020  Senior Research Fellow (SRF) by CSIR, India.
- 2015-2017  Junior Research Fellow (JRF) by CSIR, India.

Awards and Achievements

- 2020  **Research Excellence Award 2020** at IIT Hyderabad, India.
- 2020  **Young Scientist Award** at Advances in Functional Materials (AFM) 2020 at KIIT University, India.
- 2019  **Travel Award** for IEEE Magnetic Society Summer School 2019 at Virginia commonwealth university (VCU), Richmond, USA.
- 2019  **Research Appreciation Award 2019** at IIT Hyderabad.
- 2019  **Travel Award** for Joint MMM-INTERMAG 2019 at Washington DC, USA.
- 2018  **Best Poster Award** at NCCM: A journey over 25 years, NCCM Hyderabad, India.
- 2018  **Research Excellence Award 2020** at IIT Hyderabad.
- 2015  **National Eligibility Test (NET)** Dec 2014 in Physical Sciences (Rank- 81).

Research Area and Expertise

- **Area of Interest:** Multiferroic, Ferroelectric, Dielectric, Resistive Switching RRAM, and THz spectroscopy.
- **Bulk ceramic sample:** solid state synthesis and high-energy ball milling.
- **Thin films deposition:** sol-gel spin-coating, thermal evaporation and pulse laser deposition (PLD).
- **Structural and bulk properties:** XRD (Reitveld refinement: fullprof), RAMAN.

- **Magnetic behavior analysis:** SQUID and VSM.
- **Electrical characterizations:** LCR meter and Ferroelectric loop Tracer.
- **Microscopic imaging:** AFM, MFM, PFM, CAFM and TEM.
- **Multifunctional non-volatile RRAM memories:** Keitheley 4200/2400.
- **High frequency dynamic phonon and magnon behavior:** Continuous wave (CW) terahertz spectroscopy under femtosecond laser (Collaborating facility with Prof. S. Prabhu, TIFR Mumbai)
- **X-ray spectroscopy:** XPS (Collaborating facility with Dr. Srinibas Satapathy, RRACT, India).

Current Projects

- Experimental and theoretical (Density Functional Theory: DFT) evidence for Resistive Switching characteristics in ion beam irradiated nanoionic resistive random access memory (RRAM) non-volatile memory devices.
- Transport and resistive switching properties in 2D materials grown by Chemical Vapor deposition (CVD).

Future Interest

- Magnetic/Voltage controlled ferroelectric/ferromagnetic properties.
- Magnetic skyrmions and resistive switching based Neuromorphic computing.
- Dynamic magnetoelectric coupling in nano-structure multiferroic based films.

Research Publications

I. Papers Published in International Refereed Journals

1. **A. K. Jena**, Himadri Nandan Mohanty, J. Mohanty. *Forming-free resistive switching in ferroelectric $Bi_{0.97}Y_{0.03}Fe_{0.95}Sc_{0.05}O_3$ film for RRAM application.* [Physica Scripta](#) **96**, 045808 (2021).
Impact Factor: **1.985**
2. **A. K. Jena**, Ajit Kumar Sahoo, and J. Mohanty. *Effects of magnetic field on resistive switching in $Ag/BiFeO_3/FTO$ RRAM device.* [Applied Physics Letter](#) **116**, 092901 (2020).
Impact Factor: **3.597**
3. **A. K. Jena**, Arout J Chelvane and J. Mohanty. *Evidence for dielectric suppression in non-magnetic modified $BiFeO_3$ ceramic.* [Journal of Applied Physics](#) **126**, 184101 (2019).
Impact Factor: **2.286**
4. **A. K. Jena**, S Satapathy and J. Mohanty. *Magnetic properties and oxygen migration induced resistive switching effect in Y doped multiferroic Bismuth ferrite.* [Physical Chemistry Chemical Physics](#) **21**, 15854-15860 (2019).
Impact Factor: **3.43**

5. **A. K. Jena**, Arout J Chelvane and J. Mohanty. *Simultaneous improvement of piezoelectric and magnetic properties in diamagnetic ion modified $BiFeO_3$ film*. [Journal of Alloys and Compounds](#) **805**, 1168-1174 (2019).
Impact Factor: **4.650**
6. N. Pradhani, P. K. Mahapatra, RNP Choudhary, **A. K. Jena**, J. Mohanty. *Investigation on the Effect of Mn Substitution on the Structural, Electrical and Ferroelectric Characteristics of $Bi_{0.5}Na_{0.5}TiO_3$ Ceramic*. [Material Research Bulletin](#) **119**, 110566 (2019).
Impact Factor: **4.019**
7. **A. K. Jena**, S Satapathy and J. Mohanty. *Magnetic and Dielectric Response in Yttrium(Y) - Manganese (Mn) substitute multiferroic $Bi_{1-x}Fe_xFe_{1-y}Mn_yO_3$ ($x=y=0; x=0.03, 0.06, 0.12, y=0.05$) co-doped Bismuth Ferrite*. [Journal of Applied Physics](#) **124**, 174103 (2018).
Impact Factor: **2.286**
8. **A. K. Jena** and J. Mohanty. *Enhancing ferromagnetic properties in bismuth ferrites with non-magnetic Y and Sc co-doping*. [Journal of Materials Science: Materials in Electronics](#) **29**, 5150-5156 (2018).
Impact Factor: **2.220**
9. Himadri Nandan Mohanty*, **Anjan Kumar Jena***, Urvashi Yadav, Ajit Kumar Sahoo, Syam Prasad P. and J. Mohanty. *Tunable multiferroic and forming-free bipolar resistive switching properties in multifunctional $BiFeO_3$ film by doping engineering*. (Under Revision)
10. **Anjan Kumar Jena**, Mousam Charan Sahu, Sandhyarani Sahoo, Sameer Kumar Malik, Gopal K Pradhan, J. Mohanty and S. P. Sahoo. *Multilevel Resistive Switching in Graphene Oxide-Multiferroic Thin-film based Hybrid RRAM Device by Interfacial Oxygen Vacancy Engineering*. (Under Revision)
11. **Anjan Kumar Jena**, Mousam Charan Sahu, Sandhyarani Sahoo, Sameer Kumar Malik, J. Mohanty and S. P. Sahoo. *Overview on Multidimensional Approaches for Advance Development in Resistive Random Access Memories*. (Under preparation)

II. Papers Published in in National Symposium and Conferences

1. **A. K. Jena**, Arout J Chelvane and J. Mohanty. *Enhanced Ferromagnetic properties in Nd-Gd co-doped $BiFeO_3$ ceramics*. [AIP Conference Proceedings](#) **1953**, 120072 (2018).

III. Patents

1. **A. K. Jena**, Ajit Kumar Sahoo and J. Mohanty. *Multilevel RRAM device and a method thereof*, Indian patent application no. 202041007963; dated 25 February 2020. (patent filed)

Academic Visits and Schools/Symposium/Conferences Attended

1. Oral presentation at, 26th – 27th November 2020
[“Advances in Functional Materials \(AFM\) 2020”](#),
IIT Delhi, India. (Virtual)
2. Oral presentation at, 26th – 28th August 2020
[“Advances in Functional Materials \(AFM\) 2020”](#),
KIIT University, Bhubaneswar, Odisha, India. (Virtual)

3. Joint Workshop (IITH-Hokkaido University) on, 1st August 2019
["Electron Transfer system in Artificial Photosynthesis"](#),
IIT Hyderabad, India.
4. A work-shop on, 17th June 2019
["PARK AFM Advanced Technique"](#),
IIT Hyderabad, India.
5. Poster and Oral presentation at, 2nd – 7th June 2019
["IEEE Magnetic Society Summer School 2019"](#),
Virginia commonwealth university (VCU), Richmond, USA.
6. A school on, 17th – 22nd February 2019
["Indo-Japan Accelerator School"](#),
IIT Hyderabad, India.
7. Poster presentation at, 14th – 18th January 2019
["Joint MMM-INTERMAG 2019 conference"](#),
Washington DC, USA.
8. Poster presentation at, 9th – 13th December 2018
["International conference on magnetic materials and application"](#),
NISER Bhubaneswar, India.
9. Poster presentation at, 30th November-1st December 2018
["Analytical Sciences at NCCCM: A journey over 25 years"](#),
NCCCM, BARC, Hyderabad, India.
10. Poster presentation at, 06th – 09th March 2018
["International School on Electron accelerator, Free Electron Laser and Application of Electron beam/THz radiation"](#),
IUAC Delhi, India.
11. A school on, 06th – 09th March 2018
["International School on Electron accelerator, Free Electron Laser and Application of Electron beam/THz radiation"](#),
IUAC Delhi, India.
12. A school on, 06th – 09th March 2018
["International School on Electron accelerator, Free Electron Laser and Application of Electron beam/THz radiation"](#),
IIT Hyderabad, India.
13. Poster presentation at, 24th – 25th November 2017
["International Conference on Condensed matter and applied physics \(ICC 2017\)"](#),
Bikaner, Rajasthan, India.
14. A School on, 22nd October – 03rd November 2017
["Nano Mission School on Nanoscience & Nanotechnology-Physical Sciences"](#),
CeNS, Bangalore, India.
15. Poster presentation at DAE-BRNS Symposium on, 23rd – 24th March 2017
["Two Decades of Ion Beam Analysis at 3 MV Tandetron"](#),
NCCCM, BARC, Hyderabad, India.

Skills

Languages	English, Hindi, Odia
Coding	Fortran, C++, L ^A T _E X, VASP, ...
System	Linux (Ubuntu, Fedora), Window
Graphing	Origin
Image editing	Coreldraw, ImageJ
Plot fitting tools	Fullprof, EIS spectrum analyzer

Experience

- Instrument operating: VSM, SQUID, Scanning Probe Microscopy (SPM), etc.
- Characterization (Clean Room-Class 10000): Photolithography, transport (Keithley 4200 using probe-station).
- Student in-charge of Scanning Electron Microscope (SEM) from Dept. of Physics.
- Carrying out experiments at different national facilities Terahertz Spectroscopy at FOTON Lab TIFR Mumbai (India), and Pulse laser deposited (PLD) films at Hokkaido University (Japan).
- Teaching Assistant (TA) in the BTech Laboratory, IIT Hyderabad for 3 years

Qualities

- Motivated towards doing high quality research work
- Proper in time management
- Capable of handling multiple assignments
- Good at group activities

References

1. Dr. Jyoti Ranjan Mohanty (Ph.D. Supervisor)

Associate Professor, Dept. of Physics, Indian Institute of Technology Hyderabad, India.

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2. Dr. Satyaprakash Sahoo (Postdoctoral Supervisor)

Reader-F, Institute of Physics Bhubaneswar, India.

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3. Dr. Kaushik Nayak (Doctoral committee member)

Assistant Professor, Dept. of Electrical Engineering, Indian Institute of Technology Hyderabad, India.

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