

Bivas Saha

Associate Professor
International Center of Materials Science &
Chemistry and Physics of Materials Unit &
School of Advanced Materials.
Jawaharlal Nehru Center for Advanced Scientific Research

January 2025

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PROFESSIONAL EXPERIENCE

2023 – Present **Associate Professor, Jawaharlal Nehru Center for Advanced Scientific Research (JNCASR)**

- International Center of Materials Science (ICMS), Chemistry and Physics of Materials Unit (CPMU) & School of Advanced Materials (SAMat), Bangalore, Karnataka, 560064, India.

2018 – 2022 **Assistant Professor, Jawaharlal Nehru Center for Advanced Scientific Research (JNCASR)**

2014 – 2017 **Postdoctoral Scholar, University of California, Berkeley, CA, USA.**

- Department of Materials Science and Engineering & Center for Energy Efficient Electronic Sciences
- Affiliate @ Lawrence Berkeley National Laboratory (LBNL).

EDUCATION

2010 - 2014 **Ph. D. Purdue University, West Lafayette, Indiana, USA**

- School of Materials Engineering & Birck Nanotechnology Center
- Dissertation Title: *Thermal and Thermoelectric Properties of Nitride Metal/Semiconductor Superlattices.*

2007 - 2010 **M. S. Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore (JNCASR), Karnataka, India**

- Chemistry and Physics of Materials Unit & Theoretical Sciences Unit
- Dissertation Title: *Theoretical Modeling of Nanostructured (Hf, Zr)N/(Sc, Y)N Metal/Semiconductor Superlattices for Thermoelectric Energy Conversion.*

2004 - 2007 **B. Sc. Jadavpur University, Kolkata, West Bengal, India**
Department of Physics (Major)

RESEARCH INTERESTS

- Heteroepitaxy of Dissimilar Materials and Metal/Semiconductor Superlattices.
- Plasmonics and Nano-photonics.
- Phase-change Materials and Devices.
- Topological Physics and Materials.
- First-principles Modeling of Materials.

ADMINISTRATIVE RESPONSIBILITIES

- **Editor**, Solid State Communications (08/2022- Cont.)
- **Warden** of JNCASR Students Residence (2023-Cont.)
- **Faculty Director**, JNCASR Nanofabrication Laboratory. (10/2018- Cont.).
- **Faculty In-charge**, Spectroscopic Ellipsometer, Technical Research Center (TRC) (08/2019-Cont.).
- **Member:** Library Committee, Gas Cylinder Management Committee, Day-care facility committee.
- **Coordinator**, JNC Summer Research Fellowship Program in Physical Sciences, (2020-2024.).
- **Member:** Mess Committee (2020-2023)

RESEARCH GRANTS

- Project Title: “Achieving Room-Temperature Metal-insulator Transition in CrN with Epitaxial Strain Engineering”- PI: Bivas Saha, **Department of Science and Technology (DST), India Core Research Grant (CRG)**. September 2024-Present.
- Project Title: “Radiative Cooling Paint Design and Development”-PI. **Climate ETC Technology Services Private Limited**. October 2024- Present.
- Project Title: “Soft X-ray ARPES Investigation of the Valance Band in *p*-type ScN and CrN across its Metal-Insulator Phase Transition PI: Bivas Saha, **Nanomission Synchrotron and Neutron Facility Project**, September, 2023.
- Project Title: “Correlating Local Structure and Metal-Insulator Electronic Phase Transition in CrN Thin Film with EXAFS Analysis” PI: Bivas Saha, **Nanomission Synchrotron and Neutron Facility Project**, September, 2021.
- Project Title: “Low-cost Solution-processed Nanocomposite Metamaterial Radiative Cooler Paint for Household Applications”- PI: Bivas Saha, **Ras Al**

Khaimah Centre for Advanced Materials (RAC-CAM). (04/2021- Cont.)

- Project Title: Correlating Structure and Metal/Insulator Electronic Transition in Strained CrN Thin Films with High-resolution Reciprocal Space Mapping, PI: Bivas Saha, **Nanomission Synchrotron and Neutron Facility Project**, September, 2021.
- Project Title: “Achieving Cool Surfaces in High Summer with Radiative Colling Metamaterial Printing”- PI: Bivas Saha, **Ras Al Khaimah Centre for Advanced Materials (RAC-CAM). (04/2021- 12/2021.)**
- Project Title: “Epitaxial Metal/Semiconductor Nanocomposite Metamaterials for Thermoelectrics and Terahertz Devices” PI: Bivas Saha, **Board of Research in Nuclear Sciences (BRNS)** of Department of Atomic Energy for **Young Scientist Investigator Award**. Award Number: 59/20/10/2020-BRNS/59020. (09/2020- Cont.).
- Project Title: “Determination of Phononic Bandgap and Phonon Localization in Epitaxial HfN and HfN/ScN Metal/Semiconductor Superlattice Metamaterials with Inelastic X-ray Scattering”- PI: Bivas Saha, **Nanomission Synchrotron and Neutron Facility Project**, February, 2020.
- Project Title: “Scandium Nitride Schottky and *pn*-junction Didoes.” PI: Bivas Saha (JNCASR). **Start Up Grant, Science and Engineering Research Board** of Department of Science and Technology, India (2019) SRG/2019/000613. (01/2020- Cont.).
- Science and Engineering Research Board (SERB) **International Travel Award (ITA)** for ICMCTF, 2019 in San Diago California.
- Project: **Start-up Research Grant** from International Center for Materials Science and Sheikh Saqr Laboratory of Jawaharlal Nehru Center for Advanced Scientific Research.
- Project Title: “Exploration of functional nitride-based metal/semiconductor superlattices for applications as thermoelectric and plasmonic materials”. Co-PIs: Bivas Saha (UC Berkeley) and Magnus Garbrecht (LinkÖping University). **The Swedish Foundation** for International Cooperation in Research and Higher Education (STINT) Research Initiation Grant, \$12,500. (2017-2018).

PATENTS

- A Polymer Nanocomposite for Radiative Cooling. **Indian Complete after Provisional and PCT Patent, 2024**, Application 202341040136, P. Das and B. Saha.
- Artificial Synaptic Devices. **Indian Patent** Number **532159**, D. Rao and B. Saha, 2023

- TiN-based metamaterials. **US Patent**, PCT/US2013/64057, G. V. Naik, B. Saha, T. D. Sands, V. M. Shalaev and A. Boltasseva.

AWARDS, HONORS, FELLOWSHIPS

- Sheikh Saqr Career Award Fellowship, (2022-Cont.)
- Emerging Leader, Journal of Physics D: Applied Physics, 2023.
- ACS Applied Energy Materials Early Career Energy Scientist, 2022.
- Associate, Indian Academy of Sciences, (2020- 2024.)
- Young Scientist Research Award, Board of Research in Nuclear Sciences (BRNS) of Department of Atomic Energy, India, 2020.
- Outstanding Graduate Student Researcher in Materials Engineering, Purdue University, 2014.
- Best Presentation Award, Materials Research Society (MRS) of USA Fall 2013.
- Best Poster Award, (a) SIGMA XI Graduate Student Research Awards Competition; Purdue University, 2013, (b) Symposium on Nanomaterial for Energy, Purdue University, April 2012, (c) Best Poster Award, Winter School on Chemistry and Physics of Material. JNCASR, Bangalore, 2009.

TEACHING EXPERIENCES

Jawaharlal Nehru Centre for Advanced Scientific Research

- JNC 208: Characterization of Materials. Fall 2019- Cont. (*Designed this Ph.D. Course*)
- JC: 227: Optical Properties of Materials. Spring 2020 (*Designed this Ph.D. Course*)
- JC 216: Solid State Electronics. Spring-2019.
- JC 218: Materials Laboratory. Fall 2018-Cont.

Teaching Assistant (TA) in Purdue University, School of Materials Engineering.

- Fall 2013: Materials Properties Laboratory (MSE-235)
 - Student Evaluation: 4.8/5 for MSE-235-002, and 4.2/5 for MSE-235-003.
- Fall 2011: Structure and Properties of Materials (MSE-230)
 - Student Evaluation: 4.5/5 for MSE-230-003, and 4.4/5 for MSE-230-008.

STUDENT SUPERVISION

Ph.D. Students (Current)

- Anwasha Bera (09/2024- Cont.)
- Anupam Bera (09/2024- Cont.)
- Renuka Karankaje (01/2024- Cont.)
- Aritra Dey (08/2023-Cont.)
- Debmalya Mukhopadhyay (09/2022-cont.)
- Sourav Rudra (09/2021 – Cont.)
- Prasanna Das (09/2020- Cont.)

Ph.D. Students (Graduated)

- Dheemahi Rao, 2024.
- Bidesh Biswas, 2024.
- Krishna Chand Maurya, 2023.

M.S. Students (Current)

- Diksha Dadhich (08/2024- Present)
- Subhajit Manna (08/2024- Present)

M.S. Students (Graduated)

- Rahul Singh Rawat, 2024
- Deeksha Sharma, 2023.
- Dheemahi Rao, 2020.

Post-graduate Diploma in Materials Science

- Renuka Karankaje (08/2023- 12/2023)
- Ankit Kumar (Graduated, 2023)

Postdoctoral Scholar

- Dr. Bidesh Biswas (08/2024- Present)
- Dr. Abhijit Chatterjee (04/2023- 09/2023)
- Dr. Nidhi Pandey (NPDF, 03/2022- 04/2023)
- Dr. Shashidhara Acharya (05/2019-12/2020)

Project Student

- Joy Dhar (11/2024 – Present)
- Mehak Loyal (06/2022- 12/2023)

- Sneha Kobri (08/2021- 04/2022)
- Krithika Upadhaya (01/2020 – 10/2021)
- Bidesh Biswas. (03/2018 – 12/2018)

Summer Research Fellow and Short-term Visitors

- Ms. Hima Bindu Tadi (Acharya Nagarjuna University, Guntur, 2023)
- Kashish Kapoor (IISER, TVM).
- Advika Vidhyadhiraja (Manipal Institute of Technology, 2022)
- Rahul Singh Rawat (JNCASR, 2022)
- Lingesh Guru Priyan (SRM University, 2021)
- Deeksha Sharma (JNCASR, 2021)
- Avari Roy (Physics, IIT Bombay- 2019)
- Indrajit Ratan (Physics, Ferguson College, Pune- 2019)
- Dheemahi Rao (JNCASR, 2018)

Student Mentorship (2008-2017)

- Don Rollings (University of Massachusetts, Amherst- 2017)
- Jane Edgington (Rensselaer Polytechnic Institute -2016)
- Liam Dougherty (San Jose Community College, TTEREU-2016).
- Andrew Cook (University of Maryland, 2015)
- Jonathan Comparan (Purdue University, 2013-2014).
- Nelson Yaw Dzade (African University of Science and Technology, 2010)
- Jagaran Acharya (Tribhuvan University, 2008)

EVALUATION COMMITTEE

Ph.D. Qualifying Examination Committee Member

Outside JNCASR

- | | |
|-----------------------------------|------------------------------------|
| • Mr. Saager C D (IISc. Physics). | • Mr. Inder Kumar (IISc. Physics). |
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Within JNCASR

- | | |
|-----------------------------|-----------------------------------|
| • Moinak Dutta (NCU, 2018) | • Gunjan Sharma (CPMU, 2021) |
| • Payel Mondal (ICMS, 2019) | • Anita Gemmy Francis (TSU, 2021) |
| • Soumik Ghosh (TSU, 2020) | • Manish Tiwari (CPMU, 2021) |
| • Arabinda Bera (TSU, 2020) | • Anustoop Das (NCU. 2022) |
| • Animesh Bhui (NCU, 2021) | |

- Ivy Maria (NCU, 2022)
- Sohini Chatterjee (TSU, 2022)
- Biplab Patra (NCU, 2022)
- Sumukh Purohit (CPMU, 2022)
- Mohd. Arif (NCU, 2022)
- Gauttam Dash (NCU, 2022)
- Prabhat Thapliyal (NCU, 2022)

Graduate Student Advisory Committee

- Momin Ahamed (CPMU, 2023)
- Purohit Sumukh Anil (CPMU, 2023)
- Anjana Joseph (CPMU, 2023)
- Abhijit Chatterjee (CPMU 2022)
- Shivaram B Kubakaddi (CPMU, 2022)

PROFESSIONAL SERVICES

Journal Reviewer

- Nature
- Nature Physics.
- Physical Review Letters.
- Advanced Materials
- Physical Review B.
- Physical Review Applied
- Applied Physics Letters.
- Journal of Applied Physics
- ACS Nano
- ACS Omega
- ACS Applied Materials and Interfaces
- ACS Applied Energy Materials
- Journal of Physics D: Applied Physics
- RSC Advances
- Journal of Material Science
- Science of Advanced Materials
- Energy Conversion and Management
- Measurement (Elsevier)
- Optical Materials Express
- Phys. Stat. Solidi: Rapid Research Letters
- Advanced Electronic Materials
- Solid State Communication.
- Thin Solid Film.
- Physical Status Solidi A: Applications and Basic Research,
- Chemistry of Materials
- Advanced Energy Materials
- Superlattices and Microstructures,
- IEEE Transactions on Nanotechnology.
- Journal of Computational Electronics
- Materials.
- Vacuum.
- Pramana
- Advanced Photonics Research
- Advanced Surface Science
- IScience (Cell Press)

Member

- Materials Research Society (MRS) of the USA, 2010-2020.
- American Physical Society (APS), 2014-2017.

- American Vacuum Society (AVS), 2020-2021.
- Research Awareness Sub-committee: Nanotechnology Students Advisory Council (NSAC), Purdue University, 2013-2014.
- Activities Committee: Nanodays, Birck Nanotechnology Center, 2012.

Others:

- Member, Research & Academic Advisory committee of Department of Physics, MVJ College of Engineering, Whitefield, Bangalore-67.
- Technical Committee Member, XXIth International Workshop on Physics of Semiconductor Devices (IWPSD 2021) at the Indian Institute of Technology Delhi, from 14th – 17th Dec. 2021
- Ambassador, Discovery Park, Purdue University, 2012-2013.
- Ambassador, Birck Nanotechnology Center, Purdue University. 2011-2012.
- Chair, Poster Organizing Committee: Symposium on Nanomaterial for Energy, Purdue University, April 2012.
- Reviewer, Center of Energy Efficient Electronics and Sciences (E³S) Research Experience for Undergraduates (REU) Program 2015.

Professional/Scientific Review Committee:

- Reviewer for South Africa's National Research Foundation (NRF) Specialist Committee for Evaluation of Scientists and Personnels (2021).
- Proposal Review Committee for DESY India (2021, 2022, 2023)- to review proposals for their suitability to conduct synchrotron experiments in DESY, Germany.
- Scientific Proposal Review Committee: Board of Research in Nuclear Sciences, Department of Energy, India.
- Faculty Selection Committee, Chemistry and Physics of Materials Unit and International Centre for Materials Science, 2023.
- Member, Research & Academic Advisory committee of Department of Physics, MVJ College of Engineering, Whitefield, Bangalore-67.
- Technical Committee Member, XXIth International Workshop on Physics of Semiconductor Devices (IWPSD 2021) at the Indian Institute of Technology Delhi, from 14th – 17th Dec. 2021

INVITED TALKS

1. Polaritons for Near-UV-to-Far-Infrared Nanophotonics, **Frontier in Sciences Symposium, IISER Thiruvananthapuram**, January 2025.

2. Polaritonic Nitrides for Near-UV-to-Far-Infrared Nanophotonics, **MRS Fall Meeting, Boston**, December 2024.
3. Polaritonic Nitrides for Near-UV-to-Far-Infrared Nanophotonics, **Indo-Sweden and Indian Academy of Sciences joint symposium**, Coorg, November 2024.
4. Magnetic Stress-driven metal-insulator phase transition in Strongly Correlated Quantum Materials, **3rd PETRA III Beamline P08 Evaluation, DESY, Hamburg**, October 8-9th, 2024.
5. Magnetic Stress-driven metal-insulator phase transition in Strongly Correlated Quantum Materials. **Department of Physics, IISER Kolkata**, July 24th, 2024.
6. Functional nitride thin films and Superlattices for thermoelectric applications, **Indo-German Workshop on Thermoelectric Devices for emerging applications, IISER, Thiruvananthapuram**, February 26th, 2024.
7. Magnetic Stress-driven metal-insulator phase transition in Strongly Correlated Quantum Materials. **Department of Physics, IISER Pune**, January 19th, 2024.
8. Magnetic Stress as a New Chauffeur of Metal-Insulator Transition, **International Conference on Functional Materials, IIT Kharagpur** January 10th, 2024.
9. Magnetic Stress-driven metal-insulator phase transition in Strongly Correlated Quantum Materials. **14th APCTP-IACS-Academy-JNCASR Joint Meeting** December 2nd, 2023
10. Rare-earth Nitrides for 4th Industrial Revolution, **Victoria University of Wellington, New Zealand**, May 12th, 2023.
11. Polaritonic Material Platform for Tunable Nanophotonic Devices, **Advances in Low-dimensional Materials for Optoelectronic and Nano Devices (ALMOND 2023)**, March 4th, Bhubaneswar, India. 2023.
12. Phonic Bandgap and Phonon Anomalies in Epitaxial Nitride Thin Films and Heterostructures, **SPRUC Momentum-resolved Spectroscopy Conference**, March 2nd, 2023, Hoyogo, **Spring-8 Japan**.
13. Polaritonic Material Platform for Tunable Nanophotonic Devices, **International Workshop on Advanced Materials (IWAM), Ras Al Khaimah UAE**, February 22th 2023.
14. Epitaxial Nitride Thin Films and Heterostructures: Emerging Applications and Future Prospects, **PVD Products Webinar, Boston, March 30th, 2022**.
15. Lateral Metal-Semiconductor Heterostructures with Enhanced Thermoelectric Properties, **Materials Research Meeting, Yokohama, Japan**, December 13th, 2021.

16. Lateral Metal-Semiconductor Heterostructures with Enhanced Thermoelectric Properties, Sessions: Thermoelectric, **Materials Research Society of India** December Meeting, December 23, 2021.
17. Determination of Phononic Bandgap and Phonon Anomalies in Epitaxial Metal/Semiconductor Superlattices with Inelastic X-ray Scattering, **meV-resolved Inelastic X-ray Scattering Workshop** (Online), Organizer, Spring-8, Japan, 6th September, 2021.
18. Semiconducting Transition Metal Nitrides as Gateway Materials for Optoelectronic Artificial Synaptic Devices, Dept. of Condensed Matter Physics and Material Sciences, **S. N. Bose National Centre for Basic Sciences**, Kolkata, August 18th, 2021.
19. Rigid-Band Electronic Structure of ScN across n-type to p-type carrier transition regime. International Conference on Materials for Advanced Technologies (**ICMAT**) **Singapore** June 25th 2019.
20. Schottky Barrier Height of Epitaxial TiN/(Al,Sc)N Metal/Semiconductor Superlattices for Thermionic Energy Conversion. International Conference on Materials for Advanced Technologies (**ICMAT**) **Singapore** June 27th 2019.
21. Metal/Semiconductor Superlattice Metamaterials: A New Paradigm in Solid-State Energy Conversion. International Conference on Metallurgical Coatings and Thin Films (**ICMCTF**), **American Vacuum Society (AVS)**, **San Diego California US** May 19-24, 2019.
22. Epitaxial TiN/(Al,Sc)N Metal/Semiconductor Superlattices for Thermionic Energy Conversion, **Indus Synchrotron User Meeting**, Raja Ramanna Centre for Advanced Technology (RRCAT), March 28th 2019.
23. Engineering Schottky Barrier Height in Epitaxial TiN/(Al,Sc)N Metal/Semiconductor Superlattices. **International Workshop on Advanced Materials (IWAM)**, **Ras Al Khaimah UAE**, February 26th 2019.
24. Sub-50 mV Nano-electromechanical Relay Switch Devices, **14th JNC Conference on Chemistry of Materials**, **Thiruvananthapuram, Kerala**, October 5th, 2018.
25. **Plenary Talk:** Metal/Semiconductor Heterostructure: A New Paradigm in Solid-State Energy Conversion. International Science Week, **Industrial University of Santander (UIS)**, **Bucaramanga – Colombia**. September 21, 2018.
26. Metal/Semiconductor Superlattices: Promise for a New Paradigm in Solid-State Energy Conversion, Department of Physics, Chemistry and Biology, **Linköping University, Linköping, Sweden**, March 5th 2018.
27. Metal/Semiconductor Superlattices: Promise for a New Paradigm in Solid-State Energy Conversion, Department of Metallurgical Engineering and Materials Science, **Indian Institute of Technology Bombay (IIT-Bombay)**, India July 12th 2017.

28. Sub-50 mV Nano-electromechanical Relay Switch, Department of Electrical Engineering, **Indian Institute of Technology Bombay (IIT-Bombay)**, India July 12th 2017.
29. Metal/Semiconductor Superlattices: Promise for a New Paradigm in Solid-State Energy Conversion, Department of Condensed Matter Physics and Materials Science, **Tata Institute of Fundamental Research (TIFR)**, India July 11th 2017.
30. Sub-50 mV Nano-electromechanical Relay Switch, **Center for Nano and Soft Matter (CENSE)**, Bangalore, India, July 7th 2017.
31. Metal/Semiconductor Superlattices: Promise for a New Paradigm in Solid-State Energy Conversion, International Center for Materials Science and New Chemistry Unit, **Jawaharlal Nehru Center for Advanced Scientific Research (JNCASR)**, Bangalore, India July 6th 2017.
32. Metal/Semiconductor Superlattices: Promise for a New Paradigm in Solid-State Energy Conversion, Department of Materials Engineering, **Indian Institute of Science (IISc.)**, Bangalore, India July 3rd 2017.
33. Sub-thermionic Nano-electromechanical Relay Switches for Low Power Electronics and Internet of Things, **Micron Technology, Inc.** Boise, ID, June 5th, 2017.
34. Metal/Semiconductor Superlattices: Promise for a New Paradigm in Solid-State Energy Conversion, Materials Department, **UC Santa Barbara**, February 21st, 2016.
35. Materials Engineering of MEMS Relay Contact Surfaces, **NSF STC Energy Efficient Electronics Sciences Seminar, Massachusetts Institute of Technology (MIT)**, October 27, 2017.
36. Thermal and Thermoelectric Properties of Nitride Metal/Semiconductor Superlattices- **California Institute of Technology (Cal. Tech.)**, July 2014.

(Invited talks presented inside the University (JNCASR, Purdue, and UC Berkeley) while Dr. Saha is an employee or was a student are not listed here).

OUTREACH (Presentations and Tutorials)

- From Atoms to Algorithms: How Nanotech is Driving Energy and AI Breakthroughs, Bengaluru Science Gallery, November 2024.
- How to Craft Brain-inspired Computers, India Science Festival, 2024. Pune, India.
- Karnataka State Higher Education Academy, Dharwad, March 27th, 2021.
- National Science Day, JNCASR, February 28th, 2021.
- India International Science Festival Curtain Raiser, JNCASR, December 10, 2020.

- Faculty Development Program (FDP) on “Smart Materials and their emerging technologies” – BMS Institute of Technology and Management, July 2019.
- “Hands on training on Microscopy and Thin Film Measurements”- Siddaganga Institute of Technology, April 2019.
- Samagatha, “Smart Synergy” – Emerging trends in applications of smart materials. Maharani Lakshmi Ammanni College for Woman, February 2019.
- Faculty Development Program (FDP) on “Thin Films & their applications” – RV College of Engineering, February 2019.
- Popular Science Talk on “Nanotechnology and New Materials: From Energy Security to Artificial Intelligence”- CNR Rao Hall of Science, November 2018.
- Basics of Spectroscopy and Light-Matter Interactions- Project Oriented Chemical Education (POCE) Students in JNCASR.

ONLINE REPOSITORY PRESENTATIONS

- MRS OnDemand: “Pseudomorphic Stabilization of Cubic $\text{Al}_x\text{Sc}_{1-x}\text{N}$ with High Al Concentration and Large Critical Thickness on (001) MgO Substrates with TiN as Seed Layer.”
<http://www.prolibraries.com/mrs/?select=session&sessionID=2909>

NEWS AND RESEARCH HIGHLIGHTS

- New Title: “**Scientists develop flexible near-infrared plasmonic devices for wearable sensors and medical imaging tools**” https://dst.gov.in/scientists-develop-flexible-near-infrared-plasmonic-devices-wearable-sensors-and-medical-imaging?fbclid=IwY2xjawH8khVleHRuA2FlbQIxMAABHQV0G5yYCcCzM T9uDxkaC18leMBs21WKRJ_iDNI3xiE55mGQhxYSbk7GsA_aem_VFOky46UFTcfShChBsQfeg
- News Title: “**Novel Insights into Electron Scattering in Semiconductors Creates Potential for more Efficient Electronic Devices**” Department of Science and Technology, Govt. of India. October 2023.
Link:https://pib.gov.in/PressReleasePage.aspx?PRID=2066046&fbclid=IwY2xjawGa26xleHRuA2FlbQIxMAABHZVucEP0t9snD5Qfp8-3JofcVCGirXfNtvOhmPstQ3YN4IF9MMUKRDF3Ag_aem_hjan5EXOiiGUem18inJ-6A
- News Title: “**Rare electron localization phenomena demonstrated, can expand scope of semiconductors**” Department of Science and Technology, Govt. of India. October 2023.

Link:https://pib.gov.in/PressReleasePage.aspx?PRID=2049764&fbclid=IwY2xjawGa201leHRuA2FbQIxMAABHZVucEP0t9snD5Qfp8-3JofcVCGirXfNtvOhmPstQ3YN4IF9MMUKRDF3Ag_aem_hjan5EXOiiGUem18inJ-6A

- **News Title: “Newly developed affordable radiative paint can reduce electricity consumption for cooling buildings”** Department of Science and Technology, Govt. of India. November 2023. Link: https://dst.gov.in/newly-developed-affordable-radiative-paint-can-reduce-electricity-consumption-cooling-buildings?fbclid=IwAR1Wx1Q6T1fCwLdz2r98wN1_GdGJG3MvM9M7APf2KKQwzhW9rEXpl3PXMqQ

The Pioneer: “Affordable radiative cooling paint developed by scientists”- Link: https://www.dailypioneer.com/2023/india/affordable-radiative-cooling-paint-developed-by-scientists.html?fbclid=IwAR1eTz3jRBrcpHdIMTwQ4Cz3MUtGD1tE5bvAY_tZ8jzxcg3I7y46TEC1Rkk

The Hindu: “JNCASR researchers develop radiative cooling paint to cool building structures” – Link: <https://www.thehindu.com/news/national/karnataka/jncasr-researchers-develop-radiative-cooling-paint-to-cool-building-structures/article67516855.ece>

- **News Title: “Magnetic-Stress as a new chauffeur of metal-insulator transition”** Department of Science and Technology, Govt. of India. October 2023. Link: <https://dst.gov.in/magnetic-stress-new-chauffeur-metal-insulator-transition?fbclid=IwAR0u3HuMVRM5191YWJlrOzLJLbVs4BbHYT48e7mobMwKW5rSoHUFUQVEuw>
- **News Title: “New pathway designed to improve electronic properties of nitride semiconductors”**, Department of Science and Technology, Govt. of India. September, 2023. Link: <https://dst.gov.in/new-pathway-designed-improve-electronic-properties-nitride-semiconductors?fbclid=IwAR0qx9sNiOEFXrWtYZKsfYZWBHq74Hqc1f7ry-XXMiUU66eDK69cAhXPP1k>
- **News Title: “Artificial synapse developed for brain-like computing with industry-compatible nitride semiconductors”** Department of Science and Technology, Govt. of India. January, 2023. Link https://dst.gov.in/artificial-synapse-developed-brain-computing-industry-compatible-nitride-semiconductors?fbclid=IwAR1OxxUgntpVNrm9vwC_FXWwUv9QtH50EY4Hb0q4nddSySsvf_jwxUG7zHI

The Times of India: https://timesofindia.indiatimes.com/home/science/indian-scientists-develop-new-brain-like-computing-tech-dst-says-invention-holds-biz-potential/articleshow/97252132.cms?fbclid=IwAR1KWZl1fakd9LwDiTMaSoVPT7STG_HgEJT91ZjY3yu8rtoSNljSpi_36TY

The Hindu: <https://www.thehindu.com/news/cities/bangalore/jncasr-scientists-develop-brain-like-computing-with-industry-compatible-nitride-semiconductors/article66424094.ece>

- News Title: “**New artificial nanostructures for infrared absorption technologies can be useful in defence, imaging & sensing**” Department of Science and Technology, Govt. of India. December, 2022. Link: <https://dst.gov.in/new-artificial-nanostructures-infrared-absorption-technologies-can-be-useful-defense-imaging-sensing>
Press Information Bureau,
<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1886246>
- News Title: “**New material discovered can convert infrared light to renewable energy**”, Department of Science and Technology, Govt. of India. July, 2022. Link: <https://dst.gov.in/new-material-discovered-can-convert-infrared-light-renewable-energy?fbclid=IwAR2dFgy2kSSlJcyq-CmU8WQ-vY29nUI5yc2hAjl8ErVaaZoeAa-ApD67Hxc>

Industry Interaction and Collaboration

- Tata Motors, Pune.
- Trent Technologies, Bangalore.
- Collins Aerospace, Bangalore.
- Stevin Rock and RAKNOR, UAE for the development of Radiative cooling paint (2020-Present)
- India Tobacco Division at ITC LSTC, Invited talk at "Advances in Heat Generation by Direct and Indirect Methods for Aerosol Production", March 2023.

PUBLICATIONS - Bivas Saha

Total: 74 Peer-reviewed Journal Publications and 4 Book Chapters.

Citations: 2192

h- index: 25.

i10- index: 47.

Google Scholar: <https://scholar.google.com/citations?user=m0gvp6EAAAAJ&hl=en&oi=ao>

Researcher ID: <http://researchid.co/bivas-saha>

JOURNAL PUBLICATIONS

1. R. S. Rawat, D. Rao, S. Rudra, N. Raut, B. Biswas, R. Karanje, P. Das, A. I. K. Pillai, J. Bahk, M. Garbrecht, and B. Saha, "Thermionic Emission in Artificially Structured Single-Crystalline Elemental Metal/Compound Semiconductor Superlattices" *Advanced Materials*, **2413537** (2024).
2. P. Das, S. Rudra, D. Rao, S. Banerjee, A. I. K. Pillai, M. Garbrecht, A. Boltasseva, I. Bondarev, V. ShalaeV and **B. Saha**, "Electron Confinement-Induced Plasmonic Breakdown in Metals" *Science Advances* **2024, 10, 47**.
3. D. Mukhopadhyay, D. Rao, R. S. Rawat, A. I. K. Pillai, M. Garbrecht, **B. Saha**, "Flexible Near-Infrared Plasmon-Polaritons in Epitaxial Scandium Nitride Enabled by van der Waals Heteroepitaxy" *Nano Letters*, **2024, 24, 45, 14493-14499**.
4. S. Rudra, D. Rao, S. Poncé, and **B. Saha**, "Dominant Scattering Mechanisms in Limiting the Electron Mobility of Scandium Nitride" *Nano Letters*, **24, 37, 11529** (2024).
5. J. K. Dey, P. Das, S. Chowdhury, D. Prajapat, D. Perez-Salinas, P. Gupta, G. Kaura, B. Roul, S. Bhatia, S. Kaur, M. Hoesch, M. Valvidares, K. Sen, **B. Saha**, and S. Das, "Orientational Switching of Perpendicular Magnetic Anisotropy and Near-Infrared Plasmonic States in SrRuO₃ Thin Films: Implications for Spintronic Devices" *ACS Appl. Nano Mater.* **7, 16, 19765–19773** (2024).
6. N. Shukla, S. Rudra, R. Karanje, D. Mukhopadhyay, P. Das, B. Biswas, M. Baral, M. Gupta and **B. Saha**, "Strain-Induced Valence Band Splitting Enabling Above-Bandgap Exciton Luminescence in Epitaxial Mg₃N₂ Thin Films", *Chemistry of Materials*, **36, 11, 5563** (2024).
7. D. Rao, D.P. Panda, A.I.K. Pillai, A. Tayal, M. Garbrecht, and **B. Saha**, "Quasiclassical Anderson transition and thermally activated percolative charge transport in single-crystalline ScN" *Phys. Rev. B*, **109, 155307** (2024).

8. D. Mukhopadhyay, S. Rudra, B. Biswas, P. Das, **B. Saha**, "Surface scattering-dependent electronic transport in ultrathin scandium nitride films" *Appl. Phys. Lett.*, **123**, 192101 (2023)
9. P. Das, S. Rudra, K. C. Maurya and **B. Saha**, "Ultra-Emissive MgO-PVDF Polymer Nanocomposite Paint for Passive Daytime Radiative Cooling", *Adv. Mater. Technol.* **2301174** (2023).
10. B. Biswas, S. Rudra, R. S. Rawat, N. Pandey, S. Acharya, A. Joseph, A. I. K. Pillai, M. Bansal, M. de h-Óra, D. P. Panda, A. B. Dey, F. Bertram, C. Narayana, J. MacManus-Driscoll, T. Maity, M. Garbrecht, and **B. Saha**, "Magnetic stress-driven metal-insulator transition in strongly correlated antiferromagnetic CrN " *Phys. Rev. Lett.* **131**, 126302 (2023)
11. S. Rudra, D. Rao, S. Ponce, and **B. Saha**, "Reversal of Band-Ordering Leads to High Hole Mobility in Strained p-type Scandium Nitride " *Nano Letters*, **23**, 17, 8211 (2023).
12. S. Chakraborty, G. Dash, S. Mannar, K. C. Maurya, A. Das, S. Narasimhan, **B. Saha**, and R. Viswanatha, "Nonresonant Exciton-Plasmon Interaction in Metal-Chalcogenide (CuxS)/Perovskite (CsPbBr3) Based Colloidal Heterostructure " *J. Phys. Chem. C*, **127**, 31, 15353 (2023).
13. M. Loyal, B. Biswas, P. Das, and **B. Saha**, "Coexistence of Infrared Plasmon and Thermoelectricity in Rare-earth Semiconducting Ytterbium Nitride " *Appl. Phys. Lett.*, **123**, 042101 (2023).
14. K. C. Maurya, V. Caligiuri, A. I. K. Pillai, M. Garbrecht, R. Krahne, and **B. Saha**, "Radiative Volume Plasmon and Phonon-Polariton Resonances in TiN-based Plasmonic/Polar-Dielectric Hyperbolic Optical Metamaterials" *Appl. Phys. Lett.*, **122**, 221704 (2023) (*Editor's Pick*).
15. D. Sharma, D. Rao and **B. Saha**, Photonic artificial synapse with reversible multifaceted photochromic compound, *Nanoscale Horizons*, **8**, 543-549 (2023).
16. D. Rao, S. Acharya and **B. Saha**, "Demonstration of Compensated n-type Scandium Nitride Schottky Diodes", *J. Phys. D: Applied Physics*, **56**, 074004 (2023).
17. D. Rao, A. I. K. Pillai, M. Garbrecht and **B. Saha**, "Scandium nitride as a Gateway III-Nitride Semiconductor for Both Excitatory and Inhibitory Optoelectronic Artificial Synaptic Devices" *Adv. Electron. Mater.*, 2200975 (2022).
18. K. C. Maurya, A. Chatterjee, S. M. Shivaprasad and **B. Saha**, "Morphology-Controlled Reststrahlen Band and Infrared Plasmon Polariton in GaN Nanostructures" *Nano Letters*, **22**, 23, 9606–9613 (2022)
19. P. Das, B. Biswas K. C. Maurya, M. Garbrecht and **B. Saha**, "Refractory Plasmonic Hafnium Nitride and Zirconium Nitride Thin Films as an Alternative to Silver for Solar Mirror Application" *ACS Appl. Mater. Interfaces*, **14**, 41, 46708-46715(2022).

20. K. C. Maurya, A. I. K. Pillai, M. Garbrecht and **B. Saha**, "Simultaneous Light Harvesting at Visible and Mid-Infrared Frequencies with Epitaxial TiN/Al_{0.72}Sc_{0.28}N/TiN Metal/Polar-dielectric/Metal Metamaterials " *Materials Today Physics*, **27**, 100797(2022).
21. K. C. Maurya, D. Rao, S. Acharya, P. Rao, A. I. K. Pillai, S. K. Selvaraja, M. Garbrecht and **B. Saha**, "Discovery of Polar Semiconducting Scandium Nitride as an Infrared Plasmon and Phonon-Polaritonic Material" *Nano Letters* **22**, *13*, 5182-5190 (2022)
22. D. Rao., O. Chowdhury, A. I. K. Pillai, G. K. Pradhan, S. Sahoo, J. Feser, M. Garbrecht and **B. Saha**, "Multifunctional irradiation-induced defects for enhancing thermoelectric properties of scandium nitride thin films " *ACS Appl. Energy Mater.* **5**, *6*, 6847-6854 (2022).
23. K. Upadhyaya, R. Kumar, Q. Li, B. Sun and **B. Saha**, "Vibrational Spectrum and Thermal Conductivity of Rare-earth Semiconducting ErN thin films" *Phys. Status Solidi Rapid Research Letters*, **2200029** (2022).
24. S. Chowdhury, R. Gupta, P. Rajput, A. Tayal, D. Rao, R. Sekhar, S. Prakash, R. Rajagopalan, SN Jha, **B. Saha**, M. Gupta, "Detailed study of reactively sputtered ScN thin films at room temperature " *Materialia*, **22**, 101375 (2022).
25. K. Upadhyaya, R. Kumar, M. Baral, T. Ganguli and **B. Saha**, "Electronic structure of rare-earth semiconducting ErN thin films determined with synchrotron-radiation photoemission spectroscopy and first-principles analysis" *Phys. Rev. B* **105**, 075138 (2022).
26. B. Biswas, S. Chakraborty, A. Joseph, S. Acharya, A. I. K. Pillai, C. Narayana, V. Bhatia, M. Garbrecht and **B. Saha**, "Secondary Phase Limited Metal-Insulator Phase Transition in Chromium Nitride Thin Films" *Acta Materialia*, **227**, 117737 (2022).
27. P. Das, K. C. Maurya, J. L. Schroeder, M. Garbrecht and **B. Saha**, "Near-UV-to-near-IR Hyperbolic Photonic Dispersion in Epitaxial (Hf, Zr)N/ScN Metal/Dielectric Superlattices" *ACS Applied Energy Materials* **5**, *4*, 3898–3904, (2022).
28. B. Biswas, S. Chakraborty, O. Chowdhury, A. I. K. Pillai, V. Bhatia, M. Garbrecht, J. P. Feser and **B. Saha**, " In-plane Cr₂N-CrN metal-semiconductor heterostructure with improved thermoelectric properties" *Phys. Rev. Materials*, **5**, 114605 (2021).
29. R. Kumar, L. Yang, I. McCarroll, S. M. Shivaprasad, J. M. Cairney, M. Garbrecht and **B. Saha**, "Atomistic Structure and 3D Spatial Distribution of Oxide Clusters along Voids in Nitride Metal/Semiconductor Superlattices." *Phys. Rev. Materials*, **5**, 084601 (2021).
30. K. C. Maurya, A. Bhui, K. Biswas, and **B. Saha**, "Anisotropic Epsilon-near-pole (ENP) Resonance Leads to Hyperbolic Photonic Dispersion in Homologous (Bi₂)_m(Bi₂Se₃)_n Topological Quantum Materials " *Appl. Phys. Lett.* **119**, 011902 (2021). (*Editor's Pick*).

31. S. Acharya, A. Chatterjee, V. Bhatia, A. I. K. Pillai, M. Garbrecht and **B. Saha**, "Twinned growth of ScN thin films on lattice-matched GaN substrates." *Mater. Res. Bull.* **143**, 111443, (2021).
32. K. Upadhyaya, D. Rao, B. Biswas, R. Kumar, V. Bhatia, A. I. K. Pillai, M. Garbrecht, and **B. Saha**, "Reducing high carrier concentration in rocksalt-Al_{1-x}Sc_xN with Mg acceptor doping." *Appl. Phys. Lett.* **118**, 202107 (2021) (*Editor's Pick*).
33. K. Upadhyaya, V. Bhatia, A. I. K. Pillai, M. Garbrecht and **B. Saha**, "High thermoelectric power factor in ambient-stable semiconducting rare-earth ErN thin films " *Appl. Phys. Lett.*, **118**, 132103 (2021).
34. K. C. Maurya, B. Biswas, D. Rao and **B. Saha**, "Giant Enhancement of Plasmonic Response and Epsilon-Near-Zero Signature in Refractory Transition Metals (Ta, W and Mo) Deposited at High-Temperature" *Appl. Phys. Lett.* **118**, 041902 (2021).
35. R. Kumar, S. Nayak, V. Bhatia, A. I. K. Pillai, M. Garbrecht, M. Gupta, S. M. Shivaprasad, and **B. Saha** "Clustering of Oxygen Point Defects in Transition Metal Nitrides" *J. Appl. Phys.* **129**, 055305 (2021) (*Featured Article*).
36. D. Rao, B. Biswas, S. Acharya, V. Bhatia, A. I. K. Pillai, M. Garbrecht and **B. Saha**, "Effects of adatom mobility and Ehrlich-Schwoebel barrier on heteroepitaxial growth of scandium nitride (ScN) thin films " *Appl. Phys. Lett.*, **117**, 212101 (2020).
37. K. C. Maurya, V. M. Shalaev, A. Boltasseva and **B. Saha**, "Reduced Optical Losses in Refractory Plasmonic Titanium Nitride (TiN) Thin Films Deposited With Molecular Beam Epitaxy" *Opt. Mater. Express.* **10**, 2679 (2020).
38. S. Chakraborty, H. Uchiyama, M. Garbrecht, V. Bhatia, A. I. K. Pillai, J. P. Feser, D. Adroja, S. Langridge and **B. Saha**. "Phononic Bandgap and Phonon Anomalies in HfN and HfN/ScN Metal/Semiconductor Superlattices Measured with Inelastic X-ray Scattering." *Appl. Phys. Lett.* **117**, 111901 (2020). *Editor's Pick*.
39. E. Rathore, K. Maji, D. Rao, **B. Saha** and K. Biswas, "Charge Transfer in the Heterostructure of CsPbBr₃ Nanocrystals with Nitrogen Doped Carbon Dots " *J. Phys. Chem. Lett.* **11**, 8002 (2020).
40. S. Acharya, A. Chatterjee, A. Seema, M. Gupta and **B. Saha** "Influence of Sc flux on Molecular Beam Epitaxy Growth of Wurtzite Al_{1-x}Sc_xN thin films on Sapphire Substrates." *Bull. Mater. Sci.* **43**, 316 (2020).
41. B. Biswas, S. Nayak, V. Bhatia, A. I. K. Pillai, M. Garbrecht, M. H. Modi, M. Gupta and **B. Saha**, "Interfacial Chemistry and Electronic Structure of Epitaxial Lattice-matched TiN/Al_{0.72}Sc_{0.28}N Metal/Semiconductor Superlattices Determined with Soft X-Ray Scattering" *J. Vac. Sci. Technol. A* **38**, 053201 (2020).

42. D. Rao, B. Biswas, E. Flores, Chatterjee, M. Garbrecht, Y. R. Koh, V. Bhatia, A. Pillai, P. Hopkins, M. M. Gonzalez, and **B. Saha**, "High mobility and high thermoelectric power factor in epitaxial ScN deposited with plasma assisted molecular beam epitaxy" *Appl. Phys. Lett.* **116**, 152103 (2020). (*Editor's Pick*)
43. M. Garbrecht, I. McCarroll, L. Yang, V. Bhatia, B. Biswas, D. Rao, J. Cairney, and **B. Saha**, "Thermally stable epitaxial ZrN/carrier-compensated $\text{Sc}_{1-x}\text{Mg}_x\text{N}$ metal/semiconductor multilayers for thermionic energy conversion" *J. Mater. Sci.* **55**, 1592 (2020) (*Editor's Pick*).
44. S. Fathipour, S. F. Almeida, Z. A. Ye, **B. Saha**, F. Niroui, T. J. K Liu, and J. Wu, "Reducing adhesion energy of nano-electro-mechanical relay contacts by self-assembled Perfluoro (2, 3-Dimethylbutan-2-ol) coating" *AIP Advances* **9**, 055329 (2019).
45. S. Nayak, S. Acharya, B. Baral, M. Garbrecht, T. Ganguli and **B. Saha**, "Schottky barrier height of epitaxial lattice-matched TiN/AlScN metal/semiconductor superlattice interfaces for thermionic energy conversion." *Appl. Phys. Lett.*, **115**, 251901, (2019).
46. K. C. Maurya, B. Biswas, M. Garbrecht, and **B. Saha**, "Wave-vector Dependent Raman Scattering from Coupled Plasmon- Longitudinal Optical Phonon Modes and Fano Resonance in *n*-type ScN." *Phys. Status Solidi RRL*, **13**, 1900196 (2019).
47. S. Nayak, M. Baral, M. Gupta, J. Singh, M. Garbrecht, T. Ganguly, S. M. Shivaprasad and **B. Saha**, "Rigid-Band Electronic Structure of scandium nitride across the *n*-type to *p*-type carrier transition regime." *Phys. Rev. B. Rapid Communications* **99**, 161117(R) (2019).
48. B. Biswas and **B. Saha**, "Development of Semiconducting Scandium Nitride" *Phys. Rev. Materials*, **3**, 020301 (2019).
49. B. Osoba, **B. Saha**, S. F. Almeida, J. Patil, L. E. Brandt, M. E. D. Roots, E. Acosta, J. Wu and T. J. K. Liu, "Variability Study of Low-Voltage Micromechanical Relay Operation" *IEEE Transactions on Electron Devices*, **65**, 1529 (2018).
50. **B. Saha**, J. A. Perez-Taborda, J. Bahk, Y. R. Koh, A. Shakouri, M. M. Gonzalez, and T. D. Sands, "Temperature-dependent thermal and thermoelectric properties of *n*-type and *p*-type $\text{Sc}_{1-x}\text{Mg}_x\text{N}$." *Phys. Rev. B* **97**, 085301 (2018).
51. K. Dong, H. S. Choe, X. Wang, H. Liu, **B. Saha**, C. Koh, Y. Deng, K. B. Tom, S. Lou, L. Wang, C. P. Grigoropoulos, Z. You, J. Yao and J. Wu, "A 0.2-Volt Microelectromechanical Switch Enabled by a Phase Transition." *Small* **14**, 1703621 (2018). (*Cover Picture*).
52. **B. Saha**, A. Shakouri and T. D. Sands, "Rocksalt nitride metal/semiconductor superlattices: A new class of artificially structured materials". *Appl. Phys. Rev.* **5**, 021101 (2018) *Editors Pick, Feature Article, Cover Picture, and Most Downloaded Paper*.

53. M. Garbrecht, L. Hultman, M. H. Fawey, T. D. Sands, and **B. Saha**, “Tailoring of surface plasmon resonances in TiN/(Al_{0.72}Sc_{0.28})N multilayers by dielectric layer thickness variation”, *J. Mater. Sci.* **53**, 4001 (2018).
54. M. Garbrecht, L. Hultman, M. H. Fawey, T. D. Sands, and **B. Saha**. “Void-mediated coherency-strain relaxation and impediment of cubic-to-hexagonal transformation in epitaxial metastable metal/semiconductor TiN/Al_{0.72}Sc_{0.28}N multilayers” *Phys. Rev. Materials* **1**, 033402, (2017).
55. **B. Saha**, M. Garbrecht, J. A. Perez-Taborda, M. H. Fawey, Y. R. Koh, M. M. Gonzalez, A. Shakouri, L. Hultman, and T. D. Sands, “Compensation of native donor doping in ScN: Carrier concentration control and *p*-type ScN”, *Appl. Phys. Lett.* **110**, 252104 (2017).
56. M. Garbrecht, **B. Saha**, J. L. Schroeder, L. Hultman, and T. D. Sands, “Dislocation-pipe diffusion in nitride superlattices observed in direct atomic resolution.” *Sci. Rep.* **7**, 46092 (2017).
57. **B. Saha**, A. Peschot, B. Osoba, C. Ko, L. Rubin, T. J. K. Liu and J. Wu, “Reducing adhesion energy of micro-relay electrodes by ion beam synthesized oxide nanolayers.” *APL Materials*, **5**, 036103, (2017).
58. **B. Saha**, Y. R. Koh, J. P. Feser, S. Sadasivam, T. S. Fisher, A. Shakouri, and T. D. Sands, “Phonon wave effects in the thermal transport of epitaxial TiN/(Al,Sc)N metal/dielectric superlattices.” *J. Appl. Phys.* **121**, 015109 (2017).
59. **B. Saha**, S. Saber, E. Stach, E. P. Kvam, and T. D. Sands “Understanding the Rocksalt-to-Wurtzite phase transformation through microstructural analysis of (Al,Sc)N epitaxial thin films. *Appl. Phys. Lett.* **109**, 172102 (2016).
60. B. Osoba, **B. Saha**, L. Dougherty, J. Edgington, C. Qian, F. Niroui, J. H. Lang, V. Bulovic, J. Wu and T. J. K. Liu, “Sub-50 mV NEM Relay Operation Enabled by Self-Assembled Molecular Coating”. *IEEE International Electron Devices Meeting (IEDM) Technical Digest*, pp 655-658, (2016).
61. M. Garbrecht, J. L. Schroeder, L. Hultman, J. Birch, **B. Saha** and T. D. Sands, "Microstructural evolution and thermal stability of HfN/ScN, ZrN/ScN and Hf_{0.5}Zr_{0.5}N/ScN metal/semiconductor superlattices", *J. Mater. Sci.*, **51**, 8250 (2016).
62. Y. Chen, S. Zhang, W. Gao, F. Ke, J. Yan, **B. Saha**, C. Ko, J. Suh, B. Chen, J. W. Ager III, W. Walukiewicz, R. Jeanloz, J. Wu, "Pressure-induced structural transition of Cd_xZn_{1-x}O alloys", *Appl. Phys. Lett.* **108**, 152105 (2016).
63. **B. Saha**, Y. R. Koh, J. Comparan, S. Sadasivam, J. L. Schroeder, M. Garbrecht, A. Mohammed, J. Birch, T. S. Fisher, A. Shakouri, T. D. Sands, “Cross-plane thermal conductivity of (Ti,W)N/(Al,Sc)N metal/semiconductor superlattice.” *Phys. Rev. B*, **93**, 045311 (2016).

64. J. L. Schroeder, **B. Saha**, M. Garbrecht, N. Schell, T. D. Sands, and J. Birch, “Thermal stability of epitaxial TiN/(Al,Sc)N metal/semiconductor superlattices” *J. Mater. Sci.* **50** (8), 3200-3206 (2015).
65. **B. Saha**, S. K. Lawrence, J. L. Schroeder, J. Birch, D. F. Bahr, and T. D. Sands, “Enhanced Hardness in Epitaxial TiAlScN Alloy Thin Films and Rocksalt TiN/(Al,Sc)N Superlattices.” *Appl. Phys. Lett.* **105**, 151904 (2014).
66. **B. Saha**, G. V. Naik, S. Saber, C. Akatay, E. Stach, V. M. Shalaev, A. Boltasseva, and T. D. Sands, “TiN/(Al,Sc)N metal/dielectric superlattices and multilayers as hyperbolic metamaterial in the visible spectral range.” *Phys. Rev. B*, **90**, 125420, (2014). (*Editor’s Suggestion*).
67. **B. Saha**, S. Saber, G. V. Naik, A. Boltasseva, E. Stach, E. P. Kvam, and T. D. Sands, “Development of epitaxial $Al_xSc_{1-x}N$ for artificially structured metal/semiconductor superlattice metamaterials.” *Phys. Status Solidi B*, **252**, 251 (2015). (*Editor’s Choice and Cover Article, Purdue MSE News*).
68. G. V. Naik, **B. Saha**, J. Liu, S. M. Saber, E. Stach, J. M. K. Irudayaraj, T. D. Sands, V. M. Shalaev and A. Boltasseva, “Epitaxial superlattices with titanium nitride as a plasmonic component for optical hyperbolic metamaterials.” *Proc. Natl. Acad. Sci.* **111**, 7546 (2014). (*Chosen for Issue Highlight, Purdue News*).
69. **B. Saha**, G. Naik, V. Drachev, A. Boltasseva, E. E. Marinero, and T. D. Sands, “Electrical and optical properties of ScN and Mn-doped ScN deposited by dc-magnetron sputtering.” *J. Appl. Phys.*, **114**, 063519 (2013).
70. P. V. Burmistrova, J. Maassen, T. Favaloro, **B. Saha**, S. Salamat, Y. R. Koh, M. S. Lundstrom, A. Shakouri, and T. D. Sands, “High mobility and high thermoelectric power factor in epitaxial ScN films deposited by reactive magnetron sputtering onto MgO (001) substrate.” *J. Appl. Phys.* **113**, 153704 (2013).
71. **B. Saha**, T. D. Sands and U. V. Waghmare, “Electronic structure, vibrational spectra and thermal properties of HfN/ScN metal/semiconductor superlattices: A first-principles Study.” *J. Phys.: Cond. Matt.*, **24**, 415303, (2012).
72. **B. Saha**, T. D. Sands and U. V. Waghmare, “Electronic structure, vibrational spectrum, and thermal properties of yttrium nitride (YN): A first-principles study.” *J. Appl. Phys.* **109**, 083717 (2011).
73. **B. Saha**, T. D. Sands and U. V. Waghmare, “First-principles analysis of thermoelectric ZrN/ScN metal/semiconductor superlattices”, *J. Appl. Phys.* **109**, 073720 (2011).

74. **B. Saha**, J. Acharya, T. D. Sands and U. V. Waghmare, “Electronic structures, phonons and thermal properties of ScN, ZrN and HfN: A first-principles Study”, *J. Appl. Phys.* **107**, 033715 (2010).

BOOK CHAPTERS

1. K. C. Maurya and **B. Saha**, Chapter 6: “Plasmon and Phonon-Polaritons in Refractory Transition Metal Nitrides”, Book Name: Energy Materials. **World Scientific. 2023** https://doi.org/10.1142/9789811270956_0006
2. S. Acharya, D. Rao and **B. Saha**, Book Name: Frontiers of Materials Science, Chapter Title: “Advances in Heterostructure Metamaterials for Solid-State Energy Conversion.” **World Scientific Publishing Co. Pte. Ltd. (2020)**.
3. S. Acharya and **B. Saha**, Book Name: Coatings and Thin-Film Technologies, Chapter Title: “Epitaxial Nitride Thin Film and Heterostructures: From Hard Coating to Solid State Energy Conversion”. **Intech Open (2018)**.
4. **B. Saha**, and J. Wu, Center for Energy Efficient Electronics Sciences (E3S) Electronic Book on Low Voltage Switches, Chapter 6: “Role of Adhesion in Nanoelectromechanical Relay Switch Devices” **UC Berkeley (2017)**.

CONFERENCE PUBLICATIONS

1. M. Garbrecht, A. I. K. Pillai, B. Biswas and **B. Saha**, “Solving the controversy of the metal-insulator phase transition in chromium nitride thin films” The 17th European Microscopy Congress (EMC 2024), Article No. 23002, 17th October 2024.
2. M. Garbrecht, I. McCarroll, V. Bhatia, A. Indiradevi Kamalasanan Pillai, L. Yang, J. M. Cairney, and **B. Saha**, *Diffusion along defects in nitride multilayer thin films as observed by state-of-the-art (S)/TEM and APT methods*, **EMC Copenhagen 2020**.
3. M. Garbrecht, V. Bhatia, I. McCarroll, A. Indiradevi Kamalasanan Pillai, L. Yang, J. M. Cairney, and **B. Saha**, *Diffusion phenomena in nitride multilayer thin films as observed directly by aberration-corrected TEM methods*, **ACMM Canberra 2020**.
4. M. Garbrecht, I. McCarroll, L. Yang, **B. Saha**, and J. Cairney, *Correlative STEM-EDS and APT study of dopants in a metal-semiconductor nitride superlattice at the atomic scale*, **PICO 2019, Kasteel Vaalsbroek, Netherlands**.
5. M. Garbrecht, **B. Saha**, *Quantitative atomic scale analysis of diffusion phenomena in nitride multilayer thin films as observed by STEM*, **AMAS Melbourne, Australia, 2019**.

6. M. Garbrecht, **B. Saha**, *Tailoring of surface plasmon resonances in TiN/(Al,Sc)N superlattices for applications in energy-harvesting devices*, **IMC 2018, Sydney, Australia.**
7. M. Garbrecht, **B. Saha**, *STEM-based direct observation of dislocation-pipe diffusion in metal/semiconductor nitride superlattice thin films*, **IMC 2018, Sydney, Australia.**
8. M. Garbrecht, L. Hultman, T. D. Sands, **B. Saha**, *Dislocation-pipe diffusion in nitride superlattice thin films as observed by STEM in direct atomic resolution*, **MC 2017, Lausanne, Switzerland.**
9. M. Garbrecht, L. Hultman, M. H. Fawey, T. D. Sands, **B. Saha**, *Tailoring of plasmon resonances in TiN/(Al,Sc)N superlattices for applications in energy-harvesting devices*, **MC 2017, Lausanne, Switzerland.**
10. M. Garbrecht, L. Hultman, T. D. Sands, **B. Saha**, *Dislocation-pipe diffusion in nitride superlattices observed in direct atomic resolution*, **PICO Symposium 2017, Kasteel Vaalsbroek, Netherlands.**
11. M. Garbrecht, J. L. Schroeder, L. Hultman, J. Birch, **B. Saha**, T.D. Sands, *HRTEM Exploration and Development of Metal/Semiconductor Superlattice Thin Films*, **Scandem 2016, Trondheim, Norway.**
12. M. Garbrecht, J. L. Schroeder, L. Hultman, J. Birch, T. D. Sands and **B. Saha**, "Microstructural evolution and thermal stability of nitride-based metal/semiconductor superlattices for thermoelectric and hard-coating applications." **European Microscopy Congress 2016: Proceedings, pp.237-238**
13. J. Suh, **B. Saha**, J. Wu. "Novel device functionalities enabled by substitutional doping against native propensity in 2D semiconductors" **Energy Efficient Electronic Systems (E3S), 2015 Fourth Berkeley Symposium**, September 6-11, 2015.
14. M. Garbrecht, J. L. Schroeder, **B. Saha**, T. D. Sands, J. Birch. "Combined HR(S)/TEM and EDX Characterization of Nanostructured Metal/Semiconductor Superlattices." **Microscopy Conference Gottingen**, September 6-11, 2015.
15. G. V. Naik, **B. Saha**, T. D. Sands, A. Boltasseva, "A Titanium Nitride Based Metamaterial for Applications in the Visible Spectral Range." **4th International Topical Meeting on Nanophotonics and Metamaterials (NANOMETA 2013)**, Seefeld, Austria, January 2-6, 2013.
16. G. V. Naik, **B. Saha**, J. Liu, S. M. Saber, E. Stach, J. Irudayaraj, T. D. Sands, V. M. Shalaev, and A. Boltasseva, "A Titanium Nitride based Metamaterial for Applications in the Visible," *Lasers and Electro-Optics (CLEO) and Quantum Electronics and Laser Science Conference (QELS), 2013 Conference on. IEEE, 2013.*

PRESENTATIONS (ORAL and POSTER)

1. Talk: P. Das, "*Ultra-Emissive Polymer Nanocomposite Paint for Passive Daytime Radiative Cooling*", **International Workshop on Advanced Materials (IWAM), Ras-Al-Khaimah, UAE, February 20th, 2024.**

2. Poster: P. Das & B. Saha, "*Photonics-Enabled Energy Efficient Cooling and Heating Technologies for a Sustainable Future*", Industry – Academia Meet, JNCASR, September 22nd, 2023.
3. Talk: P. Das, "*Passive Daytime Radiative Cooling with Nanocomposite Metamaterial*", CPMU Unit Day, JNCASR, September 9th, 2023.
4. B. Biswas, and B. Saha, "Magnetic-stress: A New Chauffeur of Metal-Insulator Transition" 14th APCTP-IACS-Academy-JNCASR joint meeting, Bangalore, December 2023.
5. Poster: S. Rudra, B. Biswas, and B. Saha, "Strain-induced Tuning of Magneto-Structural Phase Transition in CrN from First-principles" International Winter School & RAM-90 conference, JNCASR, Bengaluru, December 2023.
6. Poster: D. Mukhopadhyay, B. Saha, " Surface scattering- dependent electronic transport in ultrathin scandium nitride" In-house symposium, JNCASR, November 2023
7. Poster: D. Mukhopadhyay, B. Saha, " Surface scattering- dependent electronic transport in ultrathin scandium nitride" CPMU day, JNCASR, September 2024
8. Talk: S. Rudra, D. Rao, S. Ponce, and B. Saha, "Reversal of Band-ordering Leads to High Hole Mobility in Strained p-type ScN" CPMU Day, JNCASR, Bengaluru, September 2024.
9. Talk: D. Rao, A. I. K. Pillai, M. Garbrecht and B. Saha, "Scandium Nitride as a Gateway III-Nitride Semiconductor for Optoelectronic Artificial Synaptic Devices" **ICMAT Singapore, July 2023.**
10. Talk: D. Rao, A. I. K. Pillai, M. Garbrecht and B. Saha, "Scandium Nitride as a Gateway III-Nitride Semiconductor for Optoelectronic Artificial Synaptic Devices" **Neuromorphic Materials, Devices, Circuits and Systems, January 23, 2023.**
11. Talk: Krishna Chand Maurya, Dheemahi Rao, Shashidhara Acharya, Pavithra Rao, Ashalatha Pillai, Shankar Kumar, Magnus Garbrecht, Bivas Saha, Infrared Plasmon and Phonon-Polaritons in Polar Semiconducting Scandium Nitride (ScN), **Materials Research Society of US, Fall Meeting, 2022.**
12. Poster: P. Das, B. Biswas, K.C. Maurya and B. Saha, "Refractory Epitaxial Transition Metal Nitrides as Solar Mirror: Alternatives to Silver", JNC Research Conference on Chemistry of Materials, JNCASR, October 20th, 2022.
13. Poster: Mehak Loyal, Bidesh Biswas, Prasanna Das, Krithika Upadhyaya and B. Saha, "Rare-earth semiconducting nitride thin film for emerging device applications" CPMU Unit Day, JNCASR, October 1st, 2022.
14. Talk: K. C. Maurya, B.Saha, "Light-Matter Interaction: Infrared Plasmon & Phonon Polariton in Polar Semiconducting Scandium-Nitride (ScN)" CPMU Day, 1st October 2022.

15. B. Biswas and B. Saha, "Lateral Cr₂N-CrN Metal-Semiconductor Heterostructure with Enhanced Thermoelectric Performance", International Winter School, JNCASR, December 6th, 2021.
16. B. Biswas, "Strain induced tunability of metal-insulator transition in Chromium Nitride thin films", CPMU Unit Day talk, September 4th, 2021.
17. Poster: P. Das, K.C. Maurya and B. Saha, "Near-UV-to-Near-IR Hyperbolic Photonic Dispersion in Epitaxial (Hf,Zr)N/ScN Metal/Semiconductor Superlattices" International Winter School, JNCASR, December 6th, 2021.
18. Talk: D. Rao, "MBE Deposited Scandium Nitride For Thermoelectric Applications", **Virtual Conference on Thermoelectrics-2020 (VCT-2020), July 22nd, 2020.**
19. Talk: K. C. Maurya, B.Saha, "Polaritons: The New Privileged Role of Refractory Transition Metals & its Nitride" In-House Symposium, 27th November 2020.
20. Poster: D. Rao and B. Saha, "Scandium nitride as a gateway material for optoelectronic artificial synaptic devices" In-house symposium, JNCASR, November 17th, 2021.
21. Poster: D. Rao, B. Biswas and B. Saha, "MBE deposited Scandium Nitride (ScN) for Thermoelectric Applications" International Winter School, JNCASR, December 4th, 2019.
22. Poster: B. Biswas, D. Rao and B. Saha, "High Thermoelectric Power Factor in MBE Deposited Scandium Nitride", JNC Annual Faculty Meeting and In-house Symposium, November 13, 2019.
23. Poster: S. Nayak, S. Acharya and B. Saha, "Schottky Barrier Height in Epitaxial Lattice-matched TiN/AlScN Metal/Semiconductor Superlattice Interfaces for Thermionic Energy Conversion." JNC Annual Faculty Meeting and In-house Symposium, November 13, 2019.
24. Poster: B. Biswas, D. Rao and B. Saha, "High Thermoelectric Power Factor in MBE Deposited Scandium Nitride", 15th JNC Conference on Chemistry of Materials, Thiruvananthapuram, Kerala, October, 2019.
25. Poster: K. C. Maurya, D. Rao and B. Saha, "Refractory Plasmonics for Solar Energy conversion" Chemistry and Physics of Materials: Glorious Past and Exciting Future, JNCASR, Bangalore February 23, 2019.
26. Poster: S. Nayak, S. Acharya and B. Saha, "Schottky Barrier Height in Epitaxial Lattice-matched TiN/AlScN Metal/Semiconductor Superlattice Interfaces for Thermionic Energy Conversion." Chemistry and Physics of Materials: Glorious Past and Exciting Future, JNCASR, Bangalore February 23, 2019.
27. Poster: K. C. Maurya, B. Biswas and B. Saha, "Wave-vector Dependent Raman Scattering from Plasmon-LO phonon modes in *n*-type ScN" International Winter School, Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore, India December 4th 2018.

28. Poster: D. Rao, S. Acharya and B. Saha, "Plasmon Enhanced Solar Energy Conversion with Metal/Semiconductor Heterostructures." JNCASR Annual Faculty Meeting and In-house Symposium, Bangalore India, November 2018.
29. Poster: K. C. Mourya, B. Biswas and B. Saha, "Wave-vector Dependent Raman Scattering from Plasmon-LO phonon modes in *n*-type ScN" JNCASR Annual Faculty Meeting and In-house Symposium, Bangalore India, November 2018.
30. Poster: B. Saha, B. Osoba, T. J. K. Liu and J. Wu, Materials Engineering of Micro-relay Contact Surfaces for milli-Volt Switches. 5th Berkeley Symposium on Energy Efficient Electronic Systems and Steep Transistors Workshop, Berkeley, CA October 19th, 2017.
31. Poster: B. Saha, B. Osoba, T. J. K. Liu and J. Wu, Materials Engineering of Micro-relay Contact Surfaces for milli-Volt Switches. IEEE S³S conference, San Francisco, CA October 17th, 2017.
32. Oral: B. Saha, B. Osoba, T. J. K. Liu and J. Wu, Sub-50 mV Nanoelectromechanical Relay Switches. NSF STC Energy Efficient Electronics Sciences Annual Review Meeting, Massachusetts Institute of Technology (MIT), Boston, MA, September 7th, 2017.
33. Poster: B. Saha, B. Osoba, T. J. K. Liu and J. Wu, Materials Engineering of Micro-relay Contact Surfaces for milli-Volt Switches. NSF STC Energy Efficient Electronics Sciences Annual Review Meeting, Massachusetts Institute of Technology (MIT), Boston, MA, September 7th, 2017.
34. Poster: B. Saha, "Metal/Semiconductor Superlattices: Development of an Elusive Heterostructure", 42nd Electronic Materials Symposium, Menlo Park, California, May 5th 2017.
35. Oral: B. Saha, M. Garbrecht, and T. D. Sands, Defects in Epitaxial Metal/Semiconductor Superlattices, Materials Research Society (MRS) Fall Meeting, Boston, MA November 30, 2016.
36. Oral: B. Saha, A. Peschot, B. Osoba, T. J. K. Liu, and J. Wu, Engineering Adhesion Properties of Micro Relay Contacts Through Surface Engineering, Materials Research Society (MRS) Fall Meeting, Boston, MA December 1, 2016.
37. Poster: B. Saha, Yee Rui Koh, A. Shakouri and T. D. Sands, Phonon wave-effects in the thermal transport of epitaxial TiN/(Al,Sc)N metal/semiconductor superlattices, Materials Research Society (MRS) Fall Meeting, Boston, MA, November 29, 2016.
38. Poster: B. Saha, B. Osoba, T. J. K. Liu, and J. Wu, Contact Surface Material Engineering Toward millivolt Relays, IEEE S³S conference, San Francisco, CA October 2016.
39. Oral and Poster: B. Saha, B. Osoba, L. Dougherty, J. Edgington, C. Qian, F. Niroui, J. H. Lang, V. Bulovic, T. J. K. Liu and J. Wu, Sub-50 mV NEM Relay enabled by Self-assembled Molecular Coating. NSF STC Energy Efficient Electronics Sciences Annual Review Meeting, UC Berkeley, CA, September 2016.
40. Poster: B. Saha, B. Osoba, T. J. K. Liu and J. Wu, Reduction of Adhesion Energy on Micro Relay Contacts Through Surface Engineering, NSF STC Energy Efficient Electronics Sciences External Review Meeting, UC Berkeley, CA, January 2016.

41. Poster: B. Saha, B. Osoba, T. J. K. Liu and J. Wu, Advanced Materials Engineering for NEM Relays, NSF STC Energy Efficient Electronics Sciences Annual Review Meeting, Massachusetts Institute of Technology (MIT), Boston, MA, September 12th, 2015.
42. Poster: B. Saha and J. Wu, Disorder and Defects in Epitaxial Materials, Singapore-Berkeley Research Initiative for Sustainable Energy (SinBeRISE) Workshop, National University of Singapore (NTU), CREATE Towers, Singapore, July 28th, 2015.
43. Poster: B. Saha, “Metal/Semiconductor Superlattices at Last”, Purdue University Prospective Future Faculty Workshop, West Lafayette, IN, March 2, 2015.
44. Oral: B. Saha, Yee Rui Koh, A. Shakouri and T. D. Sands, Effect of Period Thickness on the Cross-plane Thermal Transport of (Ti,W)N/(Al,Sc)N Metal/Dielectric Superlattices, International Thermoelectric Society, Nashville, TN, July 6-10, 2014.
45. Oral: B. Saha, Yee Rui Koh, A. Shakouri and T. D. Sands, Heat Conduction through (Ti,W)N/(Al,Sc)N Metal/Semiconductor Superlattices, Electronic Materials Conference, University of California, Santa Barbara, CA, June 2014.
46. Oral: B. Saha, Yee Rui Koh, A. Shakouri and T. D. Sands, Thermal transport in TiN/(Al,Sc)N metal/dielectric superlattices. Materials Research Society Spring Meeting, San Francisco, CA, USA, April 21-25 2014.
47. Oral: B. Saha, E. Marinero and T. D. Sands, Electronic and optical properties of ScN and (Sc,Mn)N thin films deposited by dc-magnetron sputtering, American Physical Society (APS) March Meeting, Denver, CO, March 3-7, 2014.
48. Poster: B. Saha, S. Saber, E. Kvam, E. Stach, and T. D. Sands, Pseudomorphic stabilization of cubic $Al_xSc_{1-x}N$ with high Al concentration and large critical thickness on (001) MgO substrates with TiN as a seed layer, Materials Research Society (MRS) Fall Meeting, Boston, MA, USA, December 2-6, 2013. (**Awarded best research presentation in the Fall MRS meeting, and Nominated for the Best Poster Award**).
49. Oral: B. Saha, G. V Naik, A. Boltasseva and T. D. Sands, TiN/(Al,Sc)N metal/dielectric superlattices as hyperbolic metamaterials in the visible range. Electronic Materials Conference, University of Notre Dame, IN, June 26-28, 2013.
50. Poster: B. Saha, T. D. Sands, TiN/(Al,Sc)N metal/dielectric superlattices as hyperbolic metamaterials in the visible range. School of Materials Engineering External Advisory Board Meeting, Purdue University, IN, April 25-26, 2013.
51. Oral: B. Saha, G. V Naik, A. Boltasseva and T. D. Sands, TiN/(Al,Sc)N metal/dielectric superlattices as hyperbolic metamaterials in the visible range. Materials Research Society Spring Meeting, San Francisco, CA April 1-5, 2013.
52. Poster: B. Saha, and T. D. Sands, TiN/(Al,Sc)N metal/dielectric superlattices as hyperbolic metamaterials in the visible range. SIGMA XI Graduate Student Research Awards Competition; Purdue University, IN, February 13, 2013. (**Best Poster Award**)
53. Poster: B. Saha, E. Marinero and T. D. Sands, Growth, characterization and optoelectronic properties of Mn-doped ScN. Brick Nanotechnology Center Annual Review Meeting, Purdue University, IN, October 10, 2012.

54. Oral: B. Saha, E. Marinero and T. D. Sands, Growth, characterization and optoelectronic properties of Mn-doped ScN. Electronic Materials Society. Penn. State Convention Center, Pennsylvania, June 20-22, 2012.
55. Oral: B. Saha, and T. D. Sands, Growth, characterization and optoelectronic properties of MN-doped Scan. Materials Science and Engineering Annual Day 2012, Purdue University, IN, May 2012.
56. Poster: B. Saha, and T. D. Sands, Growth, characterization and optoelectronic properties of Mn-doped ScN. Symposium on Nanomaterial for Energy, Burton. D. Morgan Center for Entrepreneurship, Purdue University, IN, April 2012. (**Best Poster Award**).
57. Poster: B. Saha, and T. D. Sands, Growth, characterization and optoelectronic properties of MN-doped Scan. The Society of Sigma Xi, Graduate Student & Post-doctoral Researcher Poster Competition, Stewart Center, Purdue University, IN, February 2012.
58. Poster: B. Saha, and T. D. Sands, Nanostructured thermoelectric for automotive waste heat recovery, Materials Science and Engineering Annual Day 2011, Purdue University, IN, May 2011.
59. Poster: B. Saha, T. D. Sands, and U. V. Waghmare, Nanostructured (Hf,Zr)N/(Sc,Y)N metal/semiconductor superlattices for thermoelectric energy conversion: Materials Research Society Spring Meeting 2010, San Francisco, California, April 5-9, 2010.
60. Oral: B. Saha, and U. V. Waghmare Ordering tendency of nitrogen in N doped MgO for spintronic Applications: Joint INDO-EU meeting on Advanced Materials, HRI, Allahabad, India, January 2010.
61. Oral: B. Saha, T. D. Sands, and U. V. Waghmare, Nitride metal/semiconductor superlattices and alloys for thermoelectric and thermionic applications: Joint INDO-EU meeting on Advanced Materials, HRI, Allahabad, India, January 2010.
62. Oral: B. Saha, T. D. Sands, and U. V. Waghmare, Nitride metal/semiconductor superlattices and alloys for thermoelectric and thermionic applications. Annual Faculty Meeting, JNCASR, India, November 2009.
63. Oral: B. Saha, T. D. Sands, and U. V. Waghmare, Metal/semiconductor superlattices for solid-state energy conversion. TSU In-house symposium. JNCASR, India August 2009.
64. Poster: B. Saha, T. D. Sands, and U. V. Waghmare, Nitride metal/semiconductor superlattices and alloys for thermoelectric and thermionic applications. Winter School on Chemistry and Physics of Materials, JNCASR, November 30 –December 6, 2009. (**Best Poster Award**)
65. Poster: B. Saha, T. D. Sands, and U. V. Waghmare, Strain, electronic structure, phonons and thermal Properties of ZrN/ScN and HfN/ScN metal/semiconductor superlattices. Indo-US Joint Conference on Advanced Materials Research. JNCASR 2009.
66. Poster: B. Saha, T. D. Sands, and U. V. Waghmare, Strain, electronic structure, phonons and thermal Properties of ZrN/ScN and HfN/ScN metal/semiconductor superlattices. CPMU In-house symposium. JNCASR 2009.
67. Poster: B. Saha, T. D. Sands, and U. V. Waghmare, Strain, electronic structure, phonons and thermal Properties of ZrN/ScN and HfN/ScN metal/semiconductor superlattices. Frontiers and Directions in Condensed Matter Physics. Indian Institute of Science, Bangalore 2009.