

Full Name Dr.Basudev Pradhan

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Department of Energy Engineering
&
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Researcher Id:



<https://scholar.google.com/citations?user=EB6uR4UAAA&hl=en>

IRINS:

Scopus ID: 9744174700

Journal PUBLICATIONS 46+
Sponsored PROJECTS 7
Book and Book Chapters Book: 3 Book chapter: 6
DOCTORAL STUDENTS Awarded: 2 Ongoing: 3

Brief Profile

Dr. Basudev Pradhan is an Assistant Professor, Department of Energy Engineering, and Centre of Excellence (CoE) in Green and Efficient Energy Technology (GEET) in the Central University of Jharkhand, Ranchi, Jharkhand. He received his PhD from Jadavpur University and worked at Indian Association for the Cultivation of Science (IACS), India. He was prestigious Alexander von Humboldt research fellow in Germany for 2010-12, Ramanujan fellow funded by DST for 2013-2018, and Bhaskara Advanced Solar Energy (BASE) fellow at University of Central Florida funded by IUSSTF. He was also awarded "Best Research Award-2023" in the School of Engineering and Technology, Central University of Jharkhand. He spent more than four and half years as a postdoctoral fellow at Arizona State University, University of Wisconsin-Milwaukee, University of Surrey and University of Potsdam. He is actively involved in several R&D projects both national and international level. His research interests focus on perovskite solar cells, organic solar cells, and Nanoelectronic devices etc. He has published 45 high quality research papers in the reputed international journals and edited 3 books with international publishers. He has 3 US patents. He is one of the associate editors in Applied Physics A: Materials Science & Processing, Springer Nature Journal since 2014 and editor in Scientific Reports, Nature journal.

Present Position/Address

2012 – Present:

Assistant Professor, Department of Energy Engineering, Central University of Jharkhand, Brambe, Ranchi-835 205.

Past Experiences

- 1) 22nd July, 2024- 22nd August, 2024: **Visiting Scientist at Purdue University, West Lafayette, USA** as part of our collaborative research funded by ANRF-Purdue University OVDF (on duty leave).
- 2) 16th October, 2023- 1st November, 2023: **Visiting Scientist at Toin University of Yokohama, University of Tokyo Komaba Research Campus (RCAST), Japan** funded by India-Japan (DST-JSPS) bilateral international Joint Research project (on duty leave).
- 3) June, 2018- May, 2019: **Visiting Scientist (Bhaskara Advanced Solar Energy Fellowship)**, NanoScience Technology center, **University of Central Florida, USA** funded by Indo-US Science and Technology Forum (on study leave).
- 4) 2010 – 2012: *Alexander von Humboldt* Research Fellow at Institute of Physics and Astronomy, **University of Potsdam, Potsdam, Germany**.
- 5) 2009 – 2010: *Research Fellow* at the **Advanced Technology Institute, University of Surrey, UK**, funded by **E.ON, Germany Energy company**.
- 6) 2007 – 2009: *Postdoctoral Fellow* at Dept. of Chemistry and Biochemistry, **University of Wisconsin-Milwaukee, Milwaukee, USA**.
- 7) 2006 – 2007: *Postdoctoral Fellow* at School of Materials, **Arizona State University, Arizona, USA**.
- 8) March, 2004 – August, 2004: *Visiting Fellow* at Nanoelectronics Research Laboratory, School of Engineering, **Sheffield Hallam University, Sheffield, UK**, worked in *United States Air Force Project*.

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Education Qualification

	Ph. D. from Jadavpur University and worked at Indian Association for the Cultivation of Science, Kolkata, India
	Thesis Title: Organic Photovoltaic devices: Role of heterostructures and device architecture
	Supervisor: Prof. Amlan J. Pal
	PG : M.Sc. in Physics from Kalyani University in 2002, Special Paper: Electronics

Honours/Awards

✚	"Best Research Award-2023" in the School of Engineering and Technology, Central University of Jharkhand.
✚	Certificate of Appreciation from Central University of Jharkhand for the distinct contribution in field of research-2022
✚	Bhaskara Advanced Solar Energy Fellowship-2018
✚	Ramanujan Fellowships (2012-2017).
✚	SERC Fast Track research grant for Young Scientists, 2013-2016.
✚	Alexander von Humboldt Research fellowship , 2010-2012.
✚	Best poster presentation in Physics at Indian Association for the Cultivation of Science on its birthday 29 th July 2003.
✚	<i>Senior Research Fellowship</i> at Indian Association for the Cultivation of Science, Kolkata, India, 2004-2006.
✚	<i>Junior Research Fellowship</i> at Indian Association for the Cultivation of Science, Kolkata, India, 2002-2004.
✚	Council of Scientific and Industrial Research – <i>National Eligibility Test (NET)</i> , 2002.
✚	Graduate Aptitude Test in Engineering (GATE), 2002.
✚	Joint Entrance Screening Test (JEST), 2002.
✚	S. J. Jindal Trust Scholarship in 1998, 2001.
✚	National Scholarship in 1997-2000.

Research and Teaching Experience

RESEARCH FIELD:	✚ Solar Cells: Perovskite solar cells, Organic Solar cells, Dye-Sensitized Solar Cell (DSSC), Hybrid solar cells.
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	<ul style="list-style-type: none"> ✚ Organic Electronics: Organic Memory-Switching device, Organic photodetector, Organic light emitting diode. ✚ Nanoscale Electronic Devices: Synthesis and Characterization of various inorganic Nanoparticles, Nanorods and Nanowires and their use in different electronics and optoelectronic device applications, Gas Sensing, supercapacitor, Nanorectifier, phototransistors, neuromorphic computer. ✚ 2D materials Research: Use of functionalized Carbon Nanotubes and Graphene in various Electronic and Optoelectronic Device applications, like, transparent electrode, Infrared Sensor. 	
POST Ph.D. EXPERIENCE	17 years+	
TEACHING EXPERIENCE	12 years+	
SUPERVISING	Ph.D.: 3	M. Tech.: 2
SUPERVISED	Ph.D.: 2	M. Tech.: 90+

Research Projects(International)

1. **Title:** Development of Lead-free Perovskite solar cells with robust stability and high efficiency, in collaboration with Prof. Tsutomu Miyasaka, Toin University of Yokohama, Japan period: 2021-24
Funding Agency: Indo-Japan (DST-JSPS) Joint Research Project
Total grant: Rs. 7,38,000/-

Research Projects(National)

1. **Title:** Smart device for synchronous energy harvest and storage (CRG/2021/007016)(ongoing)
Funding Agency: SERB-CRG
Total grant: Rs.49,24,240
2. **Title:** Development of high-efficiency organic photovoltaic devices (SR/S2/RJN-55/2012)
Funding Agency: DST
Total grant: Rs. 76,40,000/-
3. **Title:** Investigation of compositional engineering for efficient perovskite solar cells (Co-PI)
Funding Agency: DST-CERI
Total grant: Rs. 99,64,200/-
4. **Title:** Development of highly efficient inverted organic solar cells (SB/FTP/PS-148/2013)
Funding Agency: SERB
Total grant: Rs.22,70,000/-
5. **Title:** Development of highly efficient hybrid solar cells
Funding Agency: UGC
Total grant: Rs.6,00,000/-
6. **Title:** Centre of Excellence (CoE) in Green & Efficient Energy Technology (GEET) (with other 4 faculty members)
Funding Agency: HRD, Govt. of India
Total grant: Rs. 2,50,00,000/-

Courses Taught

1. **Post Graduate:** Renewable Energy Resources, Advanced PV Technology, Energy Efficient Building, New Generation Photovoltaic Devices, Advanced Energy Materials, Rural Energy Technology, Human Values & Professional Ethics, Research Methodology & IPR.
2. **Under Graduate:** Energy Resources and Utilization, Solar PV Technology, Basics of Renewable Energy Resources, Materials Science for Energy Applications, Engineering Thermodynamics, Basics of Electronics , Rural Energy Technology

Additional roles/ responsibility

1. Member of the Board of Studies, Dept. of Energy Engineering, 2012-2018, 2023-26
2. Member of the Institutional Development Plan
3. Departmental representative in university Alumni cell
4. Departmental Member in T & P cell

Patent (US):

- a. In-situ growth of quantum dots and nano-crystals from one, two, or three dimensional material, J. Thomas, **B. Pradhan**, F. Chowdhury, (US Patent No. 11,217,760 dated 4/01/2022) (*Granted*).
- b. Photonic synapse based on graphene-perovskite quantum dot for neuromorphic computing, J Thomas, T Roy, S Das, **B Pradhan**, J Li, US Patent No. 11,574,177 (dated 07.02.2023) (*Granted*).
- c. Photodevices including at least one of quantum dots and nano-crystals, J. Thomas, **B. Pradhan**, F. Chowdhury (US Patent filed, 12,02,905, dated 02/07/2024) (*Granted*)).

Major Media Attentions for the Research:

Natural dye extract for solar cell application

1. The Hindu : [Can the ayurvedic kamala fruit harness the power of the sun?](#)
2. Dainik Jagaran: [Rori fall se Solar cell](#)
3. Sangbad Pratidin: [সূর্য থেকে আলো শুষে শক্তি জোগাচ্ছে জঙ্গলমহলের বিশেষ ফল. আবিষ্কার বাঙালি গবেষকের](#)
4. Prabhat Khabor: [Rori fall se Solar cell](#)
5. [সঁত্রল য়্নিৱর্সিটী অঁফ্ ড়়ারখন্ড নে রোরী \(কমলা\) ফল সে সোলর সেল বনায](#)
6. lagatar 24: [Central University of Jharkhand researchers make solar cells from Jharkhandi fruit](#)
7. The times of truth : [Can the ayurvedic kamala fruit harness the ability of the solar?](#)
8. Time Break: [Can kamala fruit harness the power of the sun?](#)
9. Divya-bharat: [Can kamala fruit harness the power of the sun?](#)
10. Granthsala India: [Central University of Jharkhand made solar cell from the fruit of Rory, research published in International Journal of Energy Research](#)

Perovskite Solar Cells

1. PV – Magazine <https://www.pv-magazine.com/2021/05/31/lead-free-perovskite-solar-cell-with-potential-efficiency-of-27-4/>

2. UCF Today <https://www.ucf.edu/news/artificial-intelligence-may-help-scientists-make-spray-on-solar-cells/>
3. PV – Magazine <https://www.pv-magazine.com/2019/12/17/ai-selecting-best-solar-perovskites/>
4. Phys.org <https://phys.org/news/2019-12-artificial-intelligence-scientists-spray-on-solar.html>
5. Perovskite-info <https://www.perovskite-info.com/artificial-intelligence-could-help-scientists-identify-best-perovskite-materials>
6. Eure alert https://www.eurekalert.org/pub_releases/2019-12/uocf-aim121619.php
7. Science daily <https://www.sciencedaily.com/releases/2019/12/191216122415.htm>
8. Futurism <https://futurism.com/the-byte/scientists-spray-on-solar-panels>
9. Photonics
[https://www.photonics.com/Articles/Machine Learning Predicts How to Develop/a65379](https://www.photonics.com/Articles/Machine_Learning_Predicts_How_to_Develop/a65379)
10. Medium https://medium.com/@aliamalhotra/ai-may-assist-researchers-with-making-spray-on-solar-cells-92193004c9b8?source=rss-----artificial_intelligence-5
11. PV Buzz <https://pvbuzz.com/artificial-intelligence-spray-on-solar-cells/>
12. Focustechnica <https://www.focustechnica.com/ai-selecting-best-solar-perovskites/>
13. Compound semiconductor
[https://compoundsemiconductor.net/article/109796/AI may help make spray-on perovskite cells](https://compoundsemiconductor.net/article/109796/AI_may_help_make_spray-on_perovskite_cells)
14. The mindunleashed <https://themindunleashed.com/2019/12/scientists-creating-solar-panels-sprayed-homes.html>
15. The Telegraph: <https://www.telegraphindia.com/states/jharkhand/varsitys-solar-breakthrough/cid/1735181>
16. Anandabazar patrika: special interview.

PV- powered underground heat exchanger for buildings

1. PV-Magazine International: [PV-powered underground heat exchanger for buildings](#)
2. Times of India(pdf) : [Central University of Jharkhand comes up with model for controlling room temperature](#)
3. Vigyan Prasar(India Science wire): [Researchers design Net Zero Heat exchanger System](#)
4. EE times India: [Researchers Design Net Zero Heat Exchanger System](#)

Phototransistors & Photonic synapses

1. Nature Electronics: <https://www.nature.com/articles/s41928-020-0392-1>
2. Advanced Science News: <https://www.advancedsciencenews.com/helping-robots-think-like-humans/>
3. New-medical.net: <https://www.news-medical.net/news/20200216/Breakthrough-in-artificial-biomimetic-sight.aspx>
4. Phys.org: <https://phys.org/news/2020-02-device-mimics-brain-cells-human.html>
5. EurekaAlert: UCF researchers develop device that mimics brain cells used for human vision https://www.eurekalert.org/pub_releases/2020-02/uocf-urd021220.php

6. Photonics.org:
https://www.photonics.com/Articles/Optoelectronic_Superstructure_Could_Be_Applied_in/a65564
7. ScienceDaily: <https://www.sciencedaily.com/releases/2020/02/200214144252.htm>
8. UCF news: <https://www.ucf.edu/news/ucf-researchers-develop-device-that-mimics-brain-cells-used-for-human-vision/>
9. The Telegraph: <https://www.telegraphindia.com/science/a-machine-that-mimics-human-sight/cid/1753999>

Scientific Reviewer

Nature Communications, Scientific Reports, American Institute of Physics (Applied Physics Letters), American Chemical Society (Chem. Mater., Energy & Fuels, ACS Applied Optical Materials), Wiley-VCH (Advanced Materials, Advanced electronic Materials, Small, Advanced Functional Materials, Physica Status solids(a)), Springer (Appl. Phys. A), RSC (Energy & Environmental Science, RSC Advanced, Materials Advance), Elsevier (Solar Energy, Materials Today Physics, Organic electronics, Composites Science and Technology, Energy Technology, Ceramics International), Journal of Materials Science: Materials in Electronics, IET Circuits, Devices & Systems, and Materials, Journal of Electronic Materials, International J. of Energy Res., Inorganic Chemistry Communications, Energy Reports, IEEE.

Popular science article:

Machine adapting to its environment, **B. Pradhan**, J. Thomas, TheScienceBreaker, published on Jan 6, 2021, <https://doi.org/10.25250/thescbr.brk446>

Publications

Journal Articles:

- 1) Numerical simulation of stand-alone photovoltaic integrated with earth to air heat exchanger for space heating/cooling of a residential building, K. Anshu, P. Kumar, **B. Pradhan***, *Renewable Energy*, 2023, 203, 763-778, *Impact factor: 8.7*
- 2) Nanoarchitectonics of low process parameter synthesized porous carbon on enhanced performance with synergistic interaction of redox-active electrolyte for supercapacitor application, R. Samantray, K. Manickavasakam, Vivekanand, **B. Pradhan**, M. Kandasamy, S.C. Mishra, I. I. Misnon, Rajan Jose, *Mater. Chem. Phys.*, 2024, 314, 12885, *Impact factor: 4.6*
- 3) Performance optimization of efficient PbS quantum dots solar cells through numerical simulation, S Kumar, P Bharti, **B. Pradhan***, *Scientific Reports* 2023, 13 (1), 10511, *Impact factor: 4.99*
- 4) Recent progress in bifacial perovskite solar cells, P. Kumar, G. Shankar, **B. Pradhan*** *Appl. Phys. A*, 2023, 129,63 (invited), *Impact factor: 2.7*.
- 5) Synergetically optimized perovskite subcells with a V_{OC} beyond 2 V in tandem architecture, G Shankar, P Kumar, **B. Pradhan***, *Energy & Fuels* 2023(**front cover page**) *Impact factor: 5.3*

- 6) Comparative study of natural dye-sensitized solar cells using inedible extracts from kumkum, kamala and malabar spinach fruits, A. Mahapatra, P. Kumar, A. K. Behera, A. Sen, **B. Pradhan***, *J. Photochem. Photobiol. A: Chem*, 2023, 436, 114385. *Impact factor: 4.3*
- 7) All-perovskite two-terminal tandem solar cell with 32.3% efficiency by numerical simulation, G. Shankar, P. Kumar, **B. Pradhan***, *Mater. Today Sustain.*, 2022, 20, 100241. *Impact factor: 7.8*
- 8) Efficiency approaching 26% in triple cation mixed halide perovskite solar cells by numerical simulation, S. K. Tiwari, G. Shankar, P. Kumar, A. Laref, **B. Pradhan***, *IEEE J. Photovolt.*, 2023, 13(2), 242-249. *Impact factor: 4.40*
- 9) Development of dye-sensitized solar cell using *M. philippensis* (kamala tree) fruit extract: A combined experimental and theoretical study, A. Mahapatra, P. Kumar, J. Bhansare, S.M. Surapaneni, A. Sen, **B. Pradhan***, *Int. J. Energy Res.* 2021, 45, 21509. *Impact factor: 4.67*, highlighted in *The Hindu and other national media.*
- 10) Comparative performance analysis of lead-free perovskites solar cells by numerical simulation, S. Srivastava, A.K. Singh, P. Kumar, **B. Pradhan***, *J. Appl. Phys.* 2022, 131, 175001. *Impact factor: 2.88*
- 11) Recent progress in perovskite solar cells: challenges from efficiency to stability, A. Mahapatra, S. Kumar, P. Kumar, **B. Pradhan*** *Mater. Today Chem.* 2022, 23,100686. *Impact factor: 7.3*,
- 12) Lyophilized tin-doped MoS₂ as an efficient photocatalyst for overall degradation of Rhodamine B dye, P. Nandigana, S. Mahato, M. Dhandapani, **B. Pradhan**, B. Subramanian, S. K. Panda, *J. Alloys Compd.* 2022, 907, 25, 164470. *Impact factor: 6.2*,
- 13) Sensing of alphacypermethrin pesticide using modified electrode of chitosan-silver nanowire nanocomposite langmuir blodgett film, S. Bhandari, A. Nath, L. R. Singh, M. Gogoi, **B. Pradhan**, M. Mahato, *Int. J. Environ. Anal. Chem.* 2022. *Impact factor: 2.6*.
- 14) Enhanced efficiency of DSSC by lyophilized tin doped molybdenum sulfide as counter electrode, S. Mahato, P. Nandigana, **B. Pradhan**, B. Subramanian, S. K. Panda, *J. Alloys Compd.* 2022, 894, 162406. *Impact factor: 6.2*,
- 15) Performance optimization of lead free-MASnI₃ based solar cell with 27% efficiency by numerical simulation, A.K. Singh, S. Srivastava, A. Mahapatra, J.K. Baral, **B. Pradhan***, *Optical Materials*, 2021, 117, 111193 *Impact factor: 3.9*, highlighted in *PV Magazine international*,
- 16) Ultrasensitive and ultrathin phototransistors and photonic synapses using perovskite quantum dots grown from graphene lattice, **B. Pradhan**, S. Das, J. Li, F. Chowdhury, J. Cherusseri, D. Pandey, D. Dev, A. Krishnaprasad, E. Barrios, A. Towers, A. Gesquiere, L. Tetard, T. Roy, J. Thomas, *Science Advances*, 2020, Vol. 6, no. 7, eaay5225 (*front cover page*). *Impact factor: 14.13*, highlighted in *Nature Electronics*.
- 17) Performance enhancement of heterojunction ZnO/PbS quantum dot solar cells by interface engineering, S. Kumar, R. Upadhyay, **B. Pradhan***, *Solar Energy*, 2020, 211, 283-290. *Impact Factor: 6.7*
- 18) Perovskite quantum dot-reduced graphene oxide superstructure for efficient photodetection, F.A. Chowdhury, **B. Pradhan**, Y. Ding, A. Towers, A. Gesquiere, L. Tetard, J. Thomas, *ACS Applied Materials & Interfaces*, 2020, 12 (40), 45165-45173. *Impact Factor: 9.5*
- 19) Optical tunability of lead free double perovskite Cs₂AgInCl₆ via composition variation, B. Nath, **B. Pradhan**, S.K. Panda, *New J. Chem.*, 2020,44, 18656-18661. *Impact Factor: 3.3*
- 20) Predictions and strategies learned from machine learning to develop high-performing perovskite solar cells, J. Li, **B. Pradhan** (*joint 1st author*), S. Gaur, J. Thomas, *Adv. Energy Mater.* 2019, 9, 1901891 with (*front cover page*). *Impact factor: 27.8*

- 21) Improved performance of cadmium sulfide-sensitized solar cells by interface engineering, A. Mahapatra, P. Kumar, **B. Pradhan***, *Journal of Materials Science: Materials in Electronics*, 2020, 31, 6274. *Impact factor: 2.8*
- 22) Synthesis of air-stable two-dimensional nanoplatelets of Ruddlesden-Popper organic-inorganic hybrid perovskites, J. Cherusseri, S. Varma, **B. Pradhan**, J. Li, J. Kumar, E. Barrios, M. Amin, A. Towers, A. J Gesquiere and Jayan Thomas, *Nanoscale*, 2020,12, 10072-10081, *Impact factor: 6.7*
- 23) Carbon nanotube-polymer nanocomposite infrared sensor, **B. Pradhan**, K. Setyowati, H. Liu, D. H. Waldeck, and J. Chen, *Nano Letters*, 2008, 8, 1142. *Impact factor: 10.8*,
- 24) Role of new bis(2,2'-bipyridyl)(triazolopyridyl)ruthenium(II) complex in the organic bistable memory application, **B. Pradhan***, and S. Das*, *Chemistry of Materials*, 2008, 20, 1209. *Impact factor: 8.6*
- 25) Functionalized carbon nanotubes in donor/acceptor-type photovoltaic devices, **B. Pradhan**, S. K. Batabyal, and A. J. Pal, *Appl. Phys. Lett.* 2006, 88, 093106. Selected for publication in *Virtual Journal of Nanoscale Science & Technology* (volume 13, issue 10, 2006). Cited in "Carbon nanotubes in photovoltaics", **Wikipedia**.
- 26) Vertically aligned ZnO-nanowire arrays in rose bengal-based dye sensitized solar cell, **B. Pradhan**, S. K. Batabyal, and A. J. Pal, *Solar Energy Materials & Solar Cells*, 2007, 91, 769. *Impact factor: 6.9*
- 27) Electrical bistability and memory phenomenon in carbon nanotube-conjugated polymer matrices, **B. Pradhan**, S. K. Batabyal, and A. J. Pal, *J. Phys. Chem. B*, 2006, 110, 8274. *Impact factor: 3.3*
- 28) Advanced carbon nanotube-polymer composite infrared sensors, **B. Pradhan**, R. R. Kohlmeyer, K. Setyowati, H. A. Owen, and J. Chen, *Carbon*, 2009, 47, 1686. *Impact factor: 10.9*,
- 29) Fabrication of in-plane aligned carbon nanotube-polymer composite thin films, **B. Pradhan**, R. R. Kohlmeyer, and J. Chen, *Carbon*, 2010, 48, 217. *Impact factor: 10.9*
- 30) Organic heterojunction photovoltaic cells: role of functional groups in electron acceptor materials, **B. Pradhan**, and A. J. Pal, *Solar Energy Materials & Solar Cells*, 2004, 81, 469. *Impact factor: 6.9*
- 31) Electrical and Dielectric Properties of Hydroxylated Carbon Nanotube–Elastomer Composites, R. R. Kohlmeyer, A. Javadi, **B. Pradhan**, S. Pilla, K. Setyowati, J. Chen, and S. Gong, *J. Phys. Chem. C*, 2009, 113, 17626. *Impact factor: 3.7*
- 32) Molecular level control of donor-acceptor heterostructures in organic photovoltaic devices, **B. Pradhan**, A. Bandyopadhyay, and A. J. Pal, *Appl. Phys. Lett.* 2004, 85, 663. Selected for publication in *Virtual Journal of Nanoscale Science & Technology* (volume 10, issue 6, 2004). *Impact factor: 4*
- 33) Rectifying junction in a single ZnO vertical nanowire, **B. Pradhan**, S. K. Batabyal, and A. J. Pal, *Appl. Phys. Lett.* 2006, 89, 233109. Selected for publication in *Virtual Journal of Nanoscale Science & Technology* (volume 14, issue 25, 2006). **The 3rd most downloaded Applied Physics Letters paper in December 2006.** *Impact factor: 4*
- 34) Electron-doping of small-diameter carbon nanotubes with exohedral fullerenes, **B. Pradhan**, R. R. Kohlmeyer, K. Setyowati, and J. Chen, *Appl. Phys. Lett.* 2008, 93, 223102. *Impact factor: 4*,
- 35) Conduction studies on chemical bath-deposited nanocrystalline CdS thin films, **B. Pradhan**, A. K. Sharma, and A. K. Ray, *Journal of Crystal Growth*, 2007, 304, 388. *Impact factor: 1.8*
- 36) Role of dielectric properties in organic photovoltaic devices, **B. Pradhan**, and A. J. Pal, *Chem. Phys. Lett.* 2005, 416, 327. *Impact factor: 2.72*,
- 37) A simple hybrid inorganic-polymer photodiode, **B. Pradhan**, A. K. Sharma, and A. K. Ray, *J. Phys. D: Appl. Phys.* 2009, 42, 165308 (4pp). *Impact factor: 3.4, Times cited:32*

- 38) Optical studies on chemical bath deposited nanocrystalline CdS thin films, **B. Pradhan**, A. K. Sharma, and A. K. Ray, *J. Nanosci. Nanotech.* 2005, 5, 1130. *Impact factor: 1.35*,
- 39) Organic photovoltaic devices: Concentration gradient of donor and acceptor materials in the molecular scale, **B. Pradhan**, and A. J. Pal, *Synth. Met.* 2005, 155, 555. *Impact factor: 4.4*
- 40) Electrical bistability in zinc oxide nanoparticle-polymer composites, **B. Pradhan**, S. K. Majee, S. K. Batabyal, and A. J. Pal, *Journal of Nanosci. Nanotech.* 2007, 7, 4534. *Impact factor: 1.35*
- 41) Nanoscale films of organic dyes for broadband environmental sensing, **B. Pradhan**, A. K. Sharma, and A. K. Ray, *Journal of Materials Science: Materials in Electronics* 2009, 20, 267. *Impact factor: 2.8*
- 42) Inverted organic solar cells comprising low temperature processed ZnO films, **B. Pradhan***, S. Albrecht, B. Stiller, and D. Neher, *Appl. Phys. A* 2014, 115,365 *Impact factor: 2.7*
- 43) Photophysical and photochemical properties of a family of isoelectronic tris chelated ruthenium(II) aza-/azo-aromatic complexes, S. Das*, and **B. Pradhan*** (2015), *RSC. Adv.* 2015, 5, 73726 *Impact factor: 3.9*

E-Content Development/ Books/ Book Chapters

1.

Authored/Edited Books:

1. Book on “Perovskite Optoelectronic Devices” edited by **B. Pradhan**, Springer Nature, 20th July, 2024, 1st edition (ISBN: 9783031-57662-1)
2. Book on “Carbon Quantum Dots for Sustainable Energy and Optoelectronics” edited by S. Batabyal, **B. Pradhan**, R. R. Bhattacharjee and K. Mohanta, Elsevier, 14th January 2023, 1st edition (ISBN: 9780323908955).
3. Materials Today: Proceedings on “Condensed Matter Physics (CMDAYS 2021)”, edited by A. Ghosh, **B. Pradhan**, 66 (7) 3199-3422 (2022)

Book Chapters

- 1) A. Mahapatra, P. Kumar, and **B. Pradhan**, Introduction to perovskite, page no- 1–17, Book title “Perovskite Optoelectronic Devices”, Springer Cham, 2024.
- 2) P. Kumar, A. Mahapatra, and **B. Pradhan**, Perovskite solar cells: fundamental to commercialization, page no- 149–214, Book title “Perovskite Optoelectronic Devices”, Springer Cham, 2024.
- 3) M. A. Uddin, P. Kumar, P. J. S. Rana, **B. Pradhan**, Two-Dimensional (2D) Perovskite and its applications, Page no- 537-571, Book title “Perovskite Optoelectronic Devices”, Springer Cham, 2024.
- 4) P. Kumar, A. Mahapatra, S. Kumar, and **B. Pradhan**, Photovoltaic application of carbon quantum dots, page no-135-158, Book title “Carbon quantum dots for sustainable energy and optoelectronics”, Elsevier, 2023.
- 5) A. Banerjee, S. K. Batabyal, **B. Pradhan**, K. Mohanta, R. R. Bhattacharjee, Future perspectives of carbon quantum dots, Page No-473-479, Book title “Carbon quantum dots for sustainable energy and optoelectronics”, Elsevier, 2023.

- 6) S. Kumar, P. Kumar, A. Mahapatra, and **B. Pradhan**, Flexible quantum dot solar cells, editors: Gupta, R. K., Nguyen, T. A, Book title “Smart and Flexible Energy Devices”, **CRC Press**, 2022.

Papers in Conference Proceedings

1. Improved performance study of monolithic all perovskite tandem solar cell in nip and pin structure, P. Kumar, G. Shankar, **B. Pradhan**, *Materials Today: Proceedings*, 2022,66, 3392-3396.
2. Hybrid graphene-perovskite quantum dot phototransistor with high Responsivity, **B. Pradhan**, S. Das, F. Chowdhury, J. Cherusseri, J.Thomas, Nano Boston conference, Boston, USA , from 22nd – 24th April(2019).
3. H. Kumar, S. Agrawal, R. Rane, S. Mukherjee, and **B. Pradhan**, Investigation of sulfurization effect on magnetron sputtered CZTS thin film, AIP Conference Proceedings, 2115, 030335, 2019.
4. Large response of a hybrid inorganic-polymer photodetector, **B. Pradhan**, A. K. Ray, and A. K. Sharma, 5th IEEE Conference on Nanotechnology, *IEEE proceedings*, 11-15 July 249 – 251 (2005).
5. Role of functionalized carbon nanotubes in organic photovoltaic devices, **B. Pradhan**, S. K. Batabyal, and A. J. Pal, *DAE Solid State Physics Symposium*, BARC, Mumbai, India (2005).
6. Photocurrent response of the CdS/PVK photodetector, **B. Pradhan**, A. Hassan, and A. K. Ray, *DAE Solid State Physics Symposium*, Amritsar, India (2004).
7. Molecular scale architecture of organic photovoltaic devices based on layer-by-layer electrostatic Self-assembled films, **B. Pradhan**, and A. J. Pal, *DAE Solid State Physics Symposium*, Gwalior, India (2003).

Seminar/ Conference Participation (Invited Talks/ Session Chair/ Co-Chair/ Panelists/ Resource Person/ Oral Presentations)

International Seminar/ Conferences (abroad)

- 1) Hybrid graphene-perovskite quantum dot phototransistor with high Responsivity, **B. Pradhan**, S. Das, F. Chowdhury, J. Cherusseri, J.Thomas, Nano Boston conference, Boston, USA , from 22nd – 24th April(2019).
- 1) Zinc oxide-based hybrid photovoltaic devices, **B. Pradhan**, and D. Neher, *Network Meeting of the AvH Foundation*, 02–04 February, Göttingen, Germany (2011).
- 2) Electronic and optical data read out from single layer organic memory device, **B. Pradhan**, and G. E. Jabbour, *MRS spring meeting 2008*, Sun Francisco, USA (2008).
- 3) Large response of a hybrid inorganic-polymer photodetector, **B. Pradhan**, A. K. Ray, and A. K. Sharma, 5th IEEE Conference on Nanotechnology, Japan, *IEEE proceedings*, 11-15 July 249 – 251 (2005).

International Seminar/ Conferences (in India)

- 1) **International conference on advances in novel Materials: Towards Sustainable Future** organized by St. Xavier's College, Ranchi, India on 20-22 January 2024 on "*Recent Advances in Solar Photovoltaic Materials for Sustainable Future*" as invited speaker.
- 2) **International conference on low-energy digital devices and computing (ICLED-2023)** organized by NUS Department of Architecture, Singapore on 29 June to 1st July, 2023 on "*Graphene-perovskite quantum dots superstructure for low power phototransistor and photonic synapse application*"
- 3) **International conference on Green & Efficient Energy Technology and Materials** organized by CoE-Geet, Central University of Jharkhand during March 6 to 8, 2019 on "recent progress in Organic Photovoltaic Cells".
- 4) **1st International Conference on the Energy, Materials and Information Technology (ICEMIT'17)** organized by Amity University Jharkhand during 23-24 December 2017 on "Recent Progress in Next Generation Photovoltaic Cell".
- 5) **International Conference on Nanoscience, Nanotechnology & Advanced Materials (NANOS 2015)** at Gitam Institute of Science, Gitam University, Rushikonda, Visakhapatnam, India during 14-17th December, 2015 on "Zinc oxide-based hybrid Solar cells".
- 6) **Second International Conference on Nanostructured Materials and Nanocomposites (ICNM 2014) 19-21st December, 2014** at Mahatma Gandhi University, Kottayam, Kerala, India on "Use of zinc oxide nanomaterials in organic solar cells.
- 7) Inverted organic solar cells using low temperature annealed ZnO film as an electron transport layer, **B. Pradhan**, and D. Neher, *IUMRS-ICA-2013* at Indian Institute of Science (IISc) in Bangalore, from 16th -20th December (2013)
- 8) Conductance switching and memory applications of carbon nanotubes in polymer matrix, **B. Pradhan**, S. K. Batabyal, and A. J. Pal, *International Conference on Electronic and Photonic Materials, Devices and Systems (EPMDS) (Oral Presentation)*, Calcutta University, Kolkata, India. (2006)..

National Seminar/ Conferences

- 9) Refresher Course on MATERIAL-PHYSICS & NANOTECHNOLOGY from 16.02.2024 to 01.03.2024, organized by UGC human resource development centre, University of North Bengal, on "*Recent Advances in Solar Photovoltaic Materials for Sustainable Future*" as a resource person.
- 10) **Short-Term Course on Workshop on Heterocyclic Drug Design, Materials Science & Nanotechnology** from 06.02.2024 to 08.02.2024 organized by UGC human resource development centre, University of North Bengal, on "*Recent Advances in Solar Photovoltaic Materials for Sustainable Future*" as a resource person.
- 11) **Five days faculty development program on advanced semiconductor devices** organized by IEEE NTC chapter, PDPM Indian Institute of Information Technology, Design and Manufacturing Technology (IIITDM) Jabalpur, India on 29th January to 2nd February, 2024 on "*Progress and challenges in the development of next generation solar cells technology*" as resource person.
- 12) **Symposium on integrated photonics and quantum optics(SPIQO-2023)** organized by Centre for Quantum Engineering, Research and Education, TCG-CREST, Kolkata on 18-19th July, 2023 on "*Building Ultrasensitive and Ultrathin Phototransistor using Graphene-Perovskite Quantum Dots Superstructure*" as keynote speaker.

- 13) National symposium on “*Sustainable Living: A Scientific Approach*” organized by the Department of Physics, Sundarban Mahavidyalaya, Kakdwip on 23rd July, 2022 on “Solar energy: the future of clean and Sustainable living”.
- 14) **Certificate Course on "Material Characterization"** jointly organized by Entrepreneurship & Career Hub and Department of Physics, University of Kalyani under RUSA Grant on 20th February, 2022 on “fabrication and characterization of next generation solar cells”.
- 15) **AICTE-ATAL-FDP Course on desalination by using green technologies** organized by NIFFT Ranchi, Jharkhand on 9th-13th August, 2021 on “next generation photovoltaic cells”.
- 16) **National conference on frontiers of material science and photonics: issues and developments**, organized by department of Physics, Sidho-Kanho-Birsha University on 05-06 March, 2020 on “progress and challenges in the development of next generation photovoltaic cells”.
- 17) **National conference on current challenges & opportunities in chemical sciences**, organized by department of Chemistry, Aliah University on 8th August, 2019 on “progress and challenges in the development of highly efficient organic photovoltaic cells”.
- 18) **9th Vidyasagar-Satyendranath Bose National Workshop 2018** on “**Science of Materials: Challenges and Prospects (SMCP-2018)**” organized by the Vidyasagar University, Midnapore, West Bengal during 17 – 19th January 2018 on “Next generation photovoltaic cells”
- 19) **Two days National conference on “Advances in Interdisciplinary sciences**” organized by Science forum, Bhairab Ganguly college, Kolkata, West Bengal, during 27-28th January, 2017 on “Solar Energy: The Superior Solution for Future Energy Crisis”.
- 20) **UGC sponsored National Level Seminar on “Recent advances in chemical science and application”** at Vidyasagar College for Women, Kolkata, West Bengal, during 6-7th January, 2017 on “Recent progress in organic Photovoltaic cells”.
- 21) **UGC sponsored seminar on Canvas of Micro to Macro world of Physics** at Gobardanga Hindu College, West Bengal during 27-28th September, 2016 on “Understanding the basics of Photovoltaic cell”. **One day State Level Seminar on “Role of power Electronics in Renewable Source of Energy System”** at RTC Institute of Technology, Ormanjhi, Ranchi, Jharkhand, India during 27th August, 2016 on “Next Generation Photovoltaic cells”.
- 22) Round Table discussion on **Renewable Energy as Sustainable Alternative** organized by Centre for Environment and Energy Development (CEED) and OXFAM India on 17th March, 2016 at Ranchi.
- 23) **National Level Seminar on “Environmental Hazards of Electronic-waste”** at Mallabhum Institute of Technology, Bishnupur, Bankura, West Bengal, India during 17-18th March, 2016 on “Sustainable E-Waste Management in India”.
- 24) **National Seminar on Nanoscience and Nanotechnology: NSNN 2015** at Haldia Institute of Technology during 9-10th October, 2015 on “Application of Zinc oxide nanomaterials in Organic Solar Cell”.
- 25) **UGC-SAP Sponsored One Day Workshop On Solar Cell, 15th May, 2014** organized by Department of Applied Physics, Birla Institute of Technology, Mesra 835215, Ranchi, India, on Organic Solar cells.
- 26) **Training Programme on “Functioning and Maintenance of Solar Radiation Resource Assessment (SRR) Station officers” of Eastern Region states** on July 1-2nd July, 2014, jointly organized by CEE, CUJ and Centre for Wind Energy Technology (CWET) of

MNRE, New Delhi, on New Generation Solar Photovoltaics.

Seminar/ Conference Organized

International/ National/State

1. 29th National (Virtual) conference on Condensed Matter Physics (10th- 12th December, 2021) ([CMDAYS2021](#)) at Central University of Jharkhand, Ranchi, as joint convener

Participation in Refresher/Orientation/Training (One week/ more than one week)

1. Refresher course in Physics organized by the Teaching Learning Centre (TLC) of Ramanujan college, University of Delhi from 27/10/2021 to 10/11/2021.
2. Refresher program through ICT Mode on “Testing and Health Benefits of Drinking Water” from National Institute of Technical Teachers' Training and Research, Kolkata from 07/09/2020 to 18/09/2020.
3. Participated in the Refresher Course (Inter-disciplinary) on Disaster Management & Environment, Organized by School of Oceanographic Studies and UGC-HRDC, Jadavpur University, from 23/10/2017 to 13/11/2017.
4. Faculty Development Programmes: AICTE Training And Learning (ATAL) Academy FDP on "3D Printing & Design organized by Central University Of Jharkhand by AICTE Training And Learning (ATAL) Academy, Guwahati, 03/02/2020 to 07/02/2020
5. Faculty Development Programmes: AICTE Training And Learning (ATAL) Academy FDP on “Robotics” organized by Central University Of Jharkhand by AICTE Training And Learning (ATAL) Academy, Guwahati, 16/12/2019 to 20/12/2019.
6. Participated in the 57th Orientation Program of UGC–Human Resource Development Centre, Jadavpur University starting from 15.06.2015 and continues upto 11.07.2015

Any Other Information

Membership of Professional Bodies/Societies, etc.

- 1) Indian Science Congress (Life member)
- 2) Indian Association for the Cultivation of Science (Life member)
- 3) Alumni Member of Alexander von Humboldt (AvH) Foundation
- 4) American Association for the Advancement of Science (AAAS), 2009-10
- 5) Materials Research Society (MRS), 2008-09

Editorial Assignments and Other Recognitions

- Associate Editor: **Applied Physics A, Springer Nature**, since 2014
- Editor: **Scientific Reports, Nature**
- Guest Associate Editor: **Frontiers in Materials**

