Name :**Dr.R.Jeba Beula**
Staff ID :**RCAS05515**
Designation : **Associate Professor**
Department : **Physics**
Experience : **16 Years**
Qualification : **M.Phil., Ph.D**
Mail ID :**jebabeula.phy@rathinam.in**
Specialization : **Thin Films, Solar Cells, Energy Devices**

Dr. R. Jeba Beula specializes in the synthesis, characterization, and optimization of advanced functional materials for renewable energy applications, with a focus on dye-sensitized solar cells, perovskite solar cells, and thermoelectric thin films. Her research expertise includes the development of doped and multilayer TiO_2 photoanodes, chalcogenide and halide transport layers, and multifunctional coatings with UV-blocking, IR-reflective, and self-cleaning properties. She has also contributed to photocatalytic materials for environmental remediation and innovative thin-film solutions for wearable and building-integrated photovoltaic devices.

ACADEMICS

Degree	Branch	Institution / University	Year of Completion
B.Sc	Physics	Rani Anna Govt.College, Manonmanium Sundaranar University, Tirunelveli	April 2005
M.Sc	Physics	Sarah Tucker College, Manonmanium Sundaranar University, Tirunelveli	April 2007
M.Phil	Physics/ Multiferroics	Manonmanium Sundaranar University, Tirunelveli	Nov 2008
Ph.D	Physics/Dye Sensitized Solar Cells	Karunya Institute of Technology and Sciences, Coimbatore	Nov 2018

RESEARCH AND PUBLICATIONS

GRANTS

Title	Agency	Amount (Rs)	Year	Status
Sanction of **AICTE-ATAL (FDP)** Faculty Development Programme Grant as Coordinator	All India Council for Technical Education **(AICTE) – ATAL Academy**	3,50,000	2025-2026	

Conference Funding for National Conference on Advancing Renewable Energy and Smart Materials-NARESMA 2025" under ANRF – Seminar/Symposia SERB Scheme	ANRF- SERB (Seminar/Symposia) SSY/2025/001119	1,50,000	2025-2026	

SEED MONEY

Title	Institution	Amount	Year	Status
Establishment of Basic Thin Film Laboratory	Rathinam College of Arts and Science	90,000	2024	Completed

GUIDANCE

Program	No. of Scholars	
	Completed	Pursuing
Ph. D.	**-**	**5**

Journal Publications

S. Prince Makarios Paul, A. Abiram, S. Abisha Nancy, Parimaladevi Duraisamy, P. Selvarengan, R. Jeba Beula, First-principles investigation on the role of static electric fields in A-234 adsorption on Al12X12 (X = N, P) nanocages, Physica B: Condensed Matter,Volume 716,2025,417665, ISSN 0921-4526, https://doi.org/10.1016/j.physb.2025.417665.

Fanny Joselin M, Abiram A, Solomon Raja M, Archana Ashok, Hannah C. Bennett, Prince Makarios Paul S, Jeba Beula R*, Optimizing anatase TiO_2 through aluminium doping: A comprehensive study for enhanced dye-sensitized solar cell performance, Next Materials, Volume 9, 2025, 101006, ISSN 2949-8228, https://doi.org/10.1016/j.nxmate.2025.101006.

Archana Ashok, T. Raguram, M. Shobana, R Jeba Beula, Ramya, Sabareesh K.P. Velu, Abiram A, Shilpa Shivaram, Rare Earth Modified TiO2 Nanomaterials for High-Efficiency DSSCs and Visible-Light Photocatalysis: Emphasis on Nd-Doping, Ceramics International,2025, ISSN 0272-8842, https://doi.org/10.1016/j.ceramint.2025.06.248.

Hannah C. Bennett, R. Tamilarasi, R. Magesh, R. Nandhakumar, Narmatha Ganesan, R. Jeba Beula, A. Abiram, Sabareesh K.P. Velu, Enhanced charge transfer and stability in heterojunction perovskite solar cells with optimized Se/CuSe multi-layer hole transport layer using physical vapor deposition technique, Journal of Physics and Chemistry of Solids, Volume 206, 2025, 112835,ISSN 0022-3697, https://doi.org/10.1016/j.jpcs.2025.112835 IF: 4.3

Synergistic Effects of Co-Mn co-doping on the structural and optical properties of TiO_2 nanospheres: Dual functions for DSSC photoanodes and Degradation photocatalyst, Archana Ashok, T Raguram, R Jeba Beula*, Gokul Gopinath, Sakunthala Ayyasamy, Abiram A, Mohan A , C B Beril Ramolin, B Vidhya, Journal of Alloys and Compounds 13 August **(2024)**, 176024, https://doi.org/10.1016/j.jallcom.2024.176024 IF: 5.8

Structural and opto-electronic engineering with ZnS ETL via PVD technique for efficient and durable heterojunction perovskite solar cells , Hannah C. Bennett, Tamilarasi R, Archana Ashok,

Fanny Joselin , Nandhakumar R, Elizabeth Antony, **R Jeba Beula*,** Optical Materials 154 (**2024**) 115695 https://doi.org/10.1016/j.optmat.2024.115695 IF:3.9

Bandgap engineering of CuO/TiO_2 nanocomposites and their synergistic effect on the performance of dye-sensitized solar cells, Archana Ashok **, R. Jeba Beula** *, R. Magesh , Gayathri Unnikrishnan , Prince Makarios Paul , Hannah C Bennett, Fanny Joselin A. Abiram, Optical Materials **2024** 148, 114896 https://doi.org/10.1016/j.optmat.2024.114896 IF:3.9

Impact of Venomous Agent X (VX) Adsorption on the Structural and Electronic Properties of BN Nanosheet, Nanotube and nanocage-A DFT-D3 Study. S. Prince Makarios Paul, D. Parimala devi, G. Praveena, P. Selvarengan, **R. Jeba Beula** & A. Abiram., Journal of Cluster Science 35(5) 1-11 (**2024**). https://doi.org/10.1007/s10876-023-02539-z IF:3.061

Theoretical insights on the interaction between p-synephrine and Metformin: A DFT, QTAIM and Drug-Likeness investigation. S. Prince Makarios Paul D. Parimala Devi Abisha Nancy Sukumar G. Praveena **R. Jeba Beula** A. Abiram., Computational and Theoretical Chemistry,Volume 1233, **2024**,114473 https://doi.org/10.1016/j.comptc.2024.114473 IF:2.8

Deposition and characterization of ZnO/CdSe/SnSe ternary thin film based photocatalyst for an enhanced visible light-driven photodegradation of model pollutants, V. Deepthi, Anju Sebastian, B. Vidhya, T. Allwin Mathew, **R. Jeba Beula** & J. Suryakanth, Journal of Sol-Gel Science and Technology 109, 362–375 (**2024**) https://doi.org/10.1007/s10971-023-06268-7 . IF: 2.606

Investigation of Dihydrogen Bonded Interaction in $X_3CH\cdots HNa$, $X_2CH_2\cdots HNa$ (X = F, Cl, and Br) Binary and Ternary Complexes: A DFT and DFT-D3 Approach, Parimala devi Duraisamy, S. Prince Makarios Paul, Praveena Gopalan, **R. Jeba Beula** & Abiram Angamuthu., Russian Journal of Physical Chemistry A Dec **2023** 3068–3080 https://doi.org/10.1134/S0036024423130277 IF:0.7

Adsorption behavior of VX nerve agent on $X_{12}Y_{12}$ nanocages: a density functional theory study Prince Makarios Paul S, D. Parimala devi, G. Praveena, **Jeba Beula R** & A. Abiram., Structural Chemistry **2023** https://doi.org/10.1007/s11224-023-02256-3 . IF:1.7

Investigation of Dihydrogen Bond Interaction Between Cycloalkenes and Alkali Metal Hydrides: A Dft Approach Parimala devi, D., Praveena, G., **Jeba Beula, R**., Abiram, A. Journal of Structural Chemistry, **2022**, 63(4), pp. 501–509. http://dx.doi.org/10.26902/JSC_id88705 IF:0.8

Theoretical investigation on the interaction between Metformin and Ferulic acid - A DFT approach., Makarios Paul, S.P., Parimala devi, D., Praveena, G., **Jeba Beula, R**., Haris, M., Abiram, A. Journal of the Indian Chemical Society **2022**, 99(3), 100368. https://doi.org/10.1016/j.jics.2022.100368 IF:1.3'

Tailored TiO_2 nanorod arrays for dye sensitized solar cell applications **Beula, J.**, Devadason, S., Angamuthu, A., Bhojan, V. EPJ Applied Physics **2021**, 96(3), 30104. https://doi.org/10.1051/epjap/2021210171 IF:1.0

TiO_2 photo-electrode with gold capping for improved observation in dye-sensitized solar cell. **Beula, R.J.,** Suganthi, D. & Abiram, A. Appl. Phys. A 126, 223 (**2020**). https://doi.org/10.1007/s00339-020-3394-y IF: 2.983

Transforming polymorphs of Co-doped TiO_2 nanoparticles: an efficient photo-electrode for dye-sensitized solar cells. **Jeba Beula, R.,** Suganthi, D., Abiram, A. Appl Nanosci 10, 1173–1181 (**2020**). https://doi.org/10.1007/s13204-019-01182-3 IF:3.869

Incorporation of In in TiO_2 based photoanodes for enhancing the photovoltaic conversion efficiency of dye sensitized solar cells, **R. Jeba Beula,** D. Suganthi Devadason, B. Vidhya, Applied Nanoscience , Volume 8, Issue 6, pp1389-1397 (2018). https://doi.org/10.1007/s13204-018-0819-4 IF:3.869

Effect of titanium coating on the structural and optical properties of TiO_2 thin films for improved performance in dye-sensitized solar cells, **Jeba Beula, R**., Devadason, S., Mahesh Kumar, V.Springer Proceedings in Physics, 2017, 189, pp. 437–449. https://doi.org/10.1007/978-3-319-44890-9_40 IF:0.4

Book Chapters

Ananthi Nallamuthu, A. Magdalin, R. Jeba Beula, Jeyaseelan, A.Abiram, Indoor and Outdoor Applications of Perovskite Solar Cells - Handbook of Solar Cell Technologies: Design Architecture, Principles, Fabrication Methods, and Applications. Scrivener Publishing, ISBN: 9781394270668, 2025.

L. Vidhya , S. Vinodha, S.J. Pradeeba, **R. Jeba Beula** "Polymer/Organic Solar Cells: Progress and Current Status" Third Generation Photovoltaic Technology, Materials Research Foundations 163 (2024) 52-91, https://doi.org/10.21741/9781644903032-3

R. Jeba Beula & A. Abiram, "Advanced Insights and Applications of X-ray Diffraction in Material Analysis" , Essential Techniques Unveiled : A Novice Researcher's Guide to Fundamental Characterization, Published by Coimbatore Institute of Information Technology, 2024, ISBN 978-81-966948-1-4.

S. Vinodha, L. Vidhya, T. Ramya , **R. Jeba Beula** , P. Jegathambal, "Graphene-Metal Modified Electrochemical Sensors for Toxic Chemicals", Published as part of the book series Materials Research Foundations Volume 82 (2020) Page 91-124. ISSN 2471-8890 (Print) ISSN 2471-8904 (Online) ISBN 978-1-64490-094-9.

R. Jeba Beula, Suganthi Devadason, S .Prathiba Ponmary, "Characterization of Spin Coated TiO_2 Nanocrystalline Thin Films Via Sol-Gel Method For Fabricating Dye-Sensitized Solar Cells", International Journal of Engineering Research & Technology, ISSN: 2278-0181 (2017) 5 49-51.

R. Jeba Beula, Suganthi Devadason, "Effect of two surfactants on the physical properties of TiO_2 thin films for solar cell applications", International Journal of Advanced Material Science, ISSN 2231-1211 (2013) 4 137-143.

M. Joice Priscilla, **R. Jeba Beula**, Suganthi Devadason, "Fabrication of Dye sensitized solar cell using TiO_2 nanoparticles", International Journal of Nanotechnology and Applications, ISSN 0973-631X (2011) 5 303-307.

Books

L. Vidhya , S. Vinodha, **R. Jeba Beula**, S.J. Pradeeba, Book- Waste Recycling and Environmental Management, Scientific International Publishing House, ISBN: 978-93-6674076-8

Detail of patents

S.No	Patent Title	Name of Applicant(s)	Patent No.	Award Date	Agency/Country	Status
1	Intelligence Superconductor to Minimize the Energy Band gap	Dr. A. Sivakami Assistant Professor , Dr. P. Sakthivel Associate Professor , Dr. R. Sarankumar Associate Professor and Head , Dr. A. Satheesh Professor , Dr. N R Devi Satheesh Assistant Professor , Dr. S. Vinodha Professor , Dr. L. Suganya Assistant Professor , Dr. L. Vidhya Senior Assistant Professor , **Dr. R. Jeba Beula Assistant Professor ,** Dr. K S Balamurugan President of IIC-SITE, MHRD	202141035314	20/08/2021	Official Journal of the Patent offcie/India	Published

PRESENTATIONS

	State Level	National	International
Conference		**12**	**5**
Seminar		**10**	**5**

PARTICIPATION

	State Level	National	International
Conference		**20**	**10**
Seminar		**10**	**4**
Workshop		**15**	**3**
Orientation		**3**	
FDP/PDP	**4**	**8**	**4**

Events Organized (Seminar/Conference/Workshop)

National Conference on Advancing Renewable Energy and Smart Materials- 2025-2026, supported by ANRF under SERB Seminar/Symposia Scheme.

Six days faculty development program on Next-Generation Nanomaterials for a Sustainable, Self-Reliant India – 2025-2-26, funded by AICTE-ATAL academy.

Members in BoS/ Editorials/ Professional Bodies

Doctoral Committee member

International Journal Reviewer for

- ✓ *International Journal of Energy Research* (Wiley & Sons)
- ✓ *Solar Energy Journal* (Science Direct)
- ✓ *Current Material Science*
- ✓ *Current Physics*
- ✓ *Chiang Mai Journal of Science*
- ✓ *India's renewable energy horizon: A Roadmap to a sustainable future*
- ✓ *Nano Energy (Elsevier)*

AWARDS, HONORS AND RECOGNITION

Awards / Honors /Recognition	Agency / Institution	Year of Award
WISE-KIRAN Women in Space and Allied Science Leadership Programme- Fellowship	**WISE-KIRAN division of Department of Science & Technology (DST),** Govt.of India in Association with British Council under UKEIRI Programme	2025
Best Researcher Award	International Research Awards on Atomic, Molecular and Optical Physics	2024