

Jelmy E.J, Ph.D *Postdoctoral Researcher*

 jelmyej@gmail.com

 Cochin, Kerala

 <https://linkedin.com/in/jelmy-johny-91373719>

 <https://scholar.google.co.in/citations?user=4rAZu4UAAAJ&hl=en>

 +91-9495160791

 India

 <https://orcid.org/0000-0002-7668-8134>



Profile

A researcher focussing in triboelectric nanogenerators, adsorption-driven environmental remediation, and electrocatalytic water splitting, with knowledgen EMI shielding for multifunctional energy applications.

Education

06/2018 – present Kalamassery, Cochin, India	Postdoctoral researcher/teaching <i>Cochin University of Science and Technology</i>
05/2009 – 04/2016 Coimbatore, India	Ph.D in Chemistry <i>Amrita Vishwa Vidyapeetham University</i>
08/2006 – 06/2008 Malappuram, India	Master of Science/Chemistry <i>University of Calicut, Thenjippalam</i> Score 74%
08/2003 – 04/2006 Thrissur, India	Bachelor of Science/Chemistry <i>Little Flower College Guruvayur, University of Calicut</i> Score 95.4 %

Professional Experience

07/2025 – Present	Postdoctoral Researcher under "RUSA" Scheme Since July 2025, I have been working as a Postdoctoral Fellow under a RUSA-funded project, focusing on MXene-based electrocatalysts for hydrogen evolution reactions (HER). Here, my research centers on tuning surface chemistry, defect structures, and interfacial charge dynamics to enhance catalytic performance and stability, providing fundamental insights into material–property relationships.
01/2023 – 06/2025 Kalamassery, Cochin, India	Project Associate <i>Cochin University of Science and Technology</i> Project Associate in an ANRF India funded project titled "Wearable wireless triboelectric nanogenerator sensor for respiratory rate and sleep monitoring". Development of Sustainable Triboelectric Energy Harvesting Materials - Engineered sustainable triboelectric materials through electrospinning of polymeric systems for application in Triboelectric Nanogenerators (TENGs). - Fabricated thin, flexible polymer films using doctor blade techniques to enhance performance in advanced triboelectric energy harvesting systems. Breath Sensor Development - Developed a high-performance TENG-based breath sensor using tribopositive electrospun nylon-6 nanofibers and tribonegative fluorinated ethylene propylene (FEP), demonstrating high sensitivity and responsiveness. Lab Maintenance and Teaching Activities - Actively involved in teaching duties and laboratory management, supporting academic training and ensuring smooth operation of research facilities.

Project Supervision

- Supervised an internship project on triboelectric nanogenerator development using electrospun nylon and an M.Sc project on pollutant adsorption utilizing MXene/polyaniline hybrid materials.

Project Proposal Writing

- Contributed actively to research proposal development, helping to secure funding from government agencies and industry partners for advanced materials and energy research.

07/2021 – 12/2022
Kalamassery, Cochin,
India

Part-Time Educator and Researcher

Cochin University of Science and Technology

- Developed electrospun polymer samples for TENG applications
- Teaching B.Tech and M.Tech students
- Communicating research papers to journals
- Supervised undergraduate student projects
- Writing research proposals

06/2018 – 06/2021
Kalamassery, Cochin,
India

Postdoctoral Researcher

Cochin University of Science and Technology

Department of Polymer Science and Rubber Technology, Cochin University of Science and Technology (CUSAT), Kerala, India

- Synthesized a range of 2D nanomaterials including graphene oxide, reduced graphene oxide, and MXenes for applications in energy storage, triboelectric harvesting, and environmental remediation.
- Developed highly durable and mechanically robust PVA-based composite aerogels for the adsorption of organic pollutants and CO₂ capture.
- Engineered bulk-modified PDMS composites for efficient and flexible triboelectric nanogenerator (TENG) applications.
- Skilled in a wide array of characterization techniques, including electrochemical analysis, spectroscopy, and advanced microscopy.
- Mentored postgraduate and PhD students, providing guidance on experimental design, data analysis, and research writing.
- Actively involved in writing competitive research proposals for national and international funding agencies.
- Contributed to lab management, led group meetings, and participated in national and international conferences to present research findings.
- Supervised undergraduate student projects, fostering hands-on learning and research engagement.
- Responsible for drafting manuscripts for publication and ensuring adherence to laboratory safety protocols.

04/2009 – 05/2012
Coimbatore, India

Junior Research Fellow

Amrita Vishwa Vidyapeetham, University

Junior Research Fellow, in a project titled “Development of novel carbon-intrinsically conducting polymer (C-ICP) and C-ICP metal nanocomposites with unusually high conductivity for microwave absorption” funded by DRDO, Government of India.

- Synthesized conducting polyaniline (PANI) using chemical oxidative polymerization reaction and statistically optimized the synthesis parameters for optimizing the properties.
- Optimized the electrical conductivity and yield of carbon nanotube/polyaniline (CNT/PANI) nanocomposite via design of experiments (DOE, Box-Bhenken design).
- Developed structurally strong glass fiber incorporated electromagnetic radiation absorbing materials, by modifying the insulating epoxy matrix with PANI/CNT filler.
- Applications studies were electromagnetic interference shielding and on dye sensitized solar cells.
- Supervised undergraduate student projects.

Awards

Postdoctoral Fellowship

Cochin University of Science and Technology

Jawaharlal Nehru Memorial Fellowship for Doctoral Studies

Jawaharlal Nehru Memorial Fund, India

Junior Research Fellowship

DRDO

Best Oral Presentation

Little Flower College, Guruvayur

Award in national seminar “Emerging developments in chemistry”.

3rd Rank in B.Sc. degree examination

University of Calicut

Professional Activities

- Peer reviewer of academic papers for Results in Engineering, Chemical Engineering, and Current opinion in Chemical Engineering.
- Delivered a talk in “International Conference on Multidisciplinary Approaches to SDGs & International Partners Meet 2024” on ‘Wearable Respiration Monitoring Sensor Utilizing Electrospun Nylon 6’ during 10 to 13 January 2024.

Student Supervision (Informal)

- M.Sc project on “Development of MXene-polyaniline hybrid for anionic dye adsorption”.
- M.Sc project on the “Development of electrospun nylon 6 for triboelectric nanogenerator application”.
- B.Tech project on “Natural rubber latex and its composite with polyaniline as flexible triboelectric nanogenerator”.
- B.Tech project on “Natural rubber/polyaniline composite films with enhanced CO₂ gas permeation for gas separation applications”.
- M.Sc project on “Synthesis, characterization and dielectric studies of ZnO/polyaniline hybrids and their composites with PDMS”.
- B.Tech project on “Preparation of polyaniline/poly (vinyl alcohol) blend for the removal of anionic dye from aqueous solution.
- Supervised four undergraduate students on “Synthesis and characterization of polyaniline- A design of experiments approach”, at Amrita Vishwa Vidyapeetham University, Tamil Nadu.

Skills

Materials Characterization Techniques — UV-Visible Absorption Spectroscopy | Fourier Transform Infrared Spectroscopy | X-ray Diffraction analysis | Raman Spectroscopy | XPS analysis, Atomic Force Microscopy | Scanning Electron Microscopy | Transmission Electron Microscopy | Thermogravimetric Analysis | Current-Voltage (I-V) Measurements | Electrical Conductivity measurements | Charge, current and voltage measurements with Electrometer | Dielectric & AC Conductivity | Impedance Analysis | Electrochemical studies using electrochemical work station | Triboelectric nanogenerator studies

Patents

- Honey John, Divya Jose, E. J. Jelmy, Saji K. J., Vijoy K V. M K Jayaraj, Antony Sharon, “Reduced Graphene Oxide-Conducting Polymer – Process for preparation Thereof, And Energy Harvester” IN 397451 has been granted on 24th May 2022.

- Honey John, Divya Jose, E.J. Jelmy, Rani Joseph, “Conducting Polymer- Dopant Polydimethoxysiloxane Composites and Process For Preparation Thereof”, Indian IN 511688 has been granted on 16th February 2024.
- Honey John, Divya Jose, Vijoy K J, Saji K J, E.J. Jelmy Manoj N. “Nanohybrids of conducting polymer-graphene oxide based PDMS composites for smart devices” Indian patent granted IN 569569 on 5th September 2025.

Publications

- 2025 **Amrutha Thomas, Nisha T. Padmanabhan, E.J. Jelmy, Pramod Gopinath, and Honey John “Multifunctional carbonaceous materials derived from tea waste: Towards sustainable solutions for wastewater treatment and hydrogen evolution” Cleaner waste systems, 10, 100233, 2025.**
Elsevier
- 2025 **Aparna Jayan, Athira Sony, Reshma Varghese, Mathew Sunil, E.J. Jelmy, Jayalatha Gopalakrishnan, Honey John, Suresh C Pillai**Stretching the Future: Role of Elastomers in Sensor Innovations , *Sensors and Actuators A: Physical*, 395, 117056, 2025
Elsevier
- 2025 **Mathew Sunil, E. J. Jelmy, Rinku M Thomas, KJ Saji, Honey John, Self-powered impact sensor based on electrospun Acrylonitrile butadiene styrene triboelectric nanogenerator for wearable helmet application , RSC Applied Polymers, Accepted, 2025**
RSC
- 2025 **Athira Sony, Sithara Radhakrishnan, E.J. Jelmy, Rinku M. Thomas, Thomas Kurian, Honey John, Filler-Enhanced Conductive Elastomers for Next-Generation Electronics Applications: A Short Review,, Discover Applied Sciences, 2025, Accepted**
Springer
- 2025 **Abdul Khayum Mohammed, Jelmy Elavathingal Johny, José Ignacio Martínez, Mahira Bashri, Nada Elmerhi, Sithara Radhakrishnan, Ammar Nayfeh, Honey John, Dinesh Shetty, A Polarized Broken Framework for Electrical Energy Harvesting from Mechanical Friction, RSC Materials Horizon, 2025 Accepted**
RSC
- 2024 **E J Jelmy, Mathew Sunil, Chitra Kandappanthodi, P Rincy, K J Saji, Suresh C Pillai and Honey John, Sustainable energy harvesting and breath sensing with electrospun triboelectric nylon-6, J Phys Energy, 6 025010, 2024.**
IOP
- 2024 **E.J. Jelmy, Rinku Thomas, Ushamani Mythili and Honey John, Selective adsorption of anionic dyes and carbon dioxide using uncarbonized PVA aerogels incorporated with GO/PANI hybrids, Adsorption, 30, 1273, 2024.**
Springer
- 2023 **Mathew Sunil, E.J. Jelmy, Vijoy K.J., Saji K.J., Honey John, Triboelectric Smart Shoes for Real Time Position Detection, Sensors and Actuators: A. Physical, 363, 114730, 2023.**
Elsevier
- 2023 **E.J. Jelmy, Divya Jose, Vijoy K.J., Saji K.J., Honey John, Enhanced Mechanical Energy Harvesting in Triboelectric Nanogenerator by the Reinforcement of Polypyrrole Decorated rGO Sheets in PDMS, Advanced Engineering Materials, 25, 2201789, 2023.**
Wiley Online Library

- 2022 E.J. Jelmy, Divya Jose, Vijoy K.J., Saji K.J., Honey John, Enhanced Triboelectric Performance of Graphene oxide-Conducting Polymer Hybrid Modified Polydimethylsiloxane Composites, *Materials Advances*, 36897, 2022.
RSC
- 2022 Divya Jose, E.J. Jelmy P.S. Subin, Rani Joseph, Honey John (1st and 2nd authors have equal contribution) Triboelectric Nanogenerator Based on Polyaniline Nanorods Incorporated PDMS Composites through a Facile Synthetic Route, *Journal of materials science: Materials in electronics*, 3315421, 2022.
Springer
- 2022 Sithara Radhakrishnan, Sherin Joseph, Jelmy E J, K J Saji, Sanathanakrishnan T, Honey John. Triboelectric nanogenerators for marine energy harvesting and sensing applications, *Results in Engineering*, 15100487, 2022.
Elsevier
- 2021 E. J. Jelmy, Nishanth Thomas, Dhanu Treasa Mathew, Jesna Louis, Nisha T. Padmanabhan, Vignesh Kumaravel, Honey John and Suresh C. Pillai Impact of structure, doping and defect engineering in 2D materials on CO2 capture and conversion, *Reaction Chemistry and Engineering*, 61701, 2021.
RSC
- 2020 S Stanly, E. J. Jelmy, Honey John, Studies on Modified Montmorillonite Clay and Its PVA Nanohybrid for Water Purification, *Journal of Polymers and the Environment*, 28, 2433, 2020.
Springer
- 2019 S Stanly, E.J. Jelmy, CPR Nair, Honey John, Carbon dioxide adsorption studies on modified montmorillonite clay/reduced graphene oxide hybrids at low pressure, *Journal of Environmental Chemical Engineering*7, 103344, 2019.
Elsevier
- 2018 S Ramakrishnan, E.J. Jelmy, R Senthilkumar, M Rangarajan, NK Kothurkar One-step RF-CVD method for the synthesis of graphene decorated with metal and metal oxide nanoparticles, *Journal of nanoscience and nanotechnology*, 18, 1089, 2018.
Ingenta connect
- 2018 KK Ajekwene, E.J. Jelmy, T Kurian Sodium Salt of Polyethylene-Co-Methacrylic Acid Ionomer/Polyaniline Binary Blends for EMI Shielding Applications, *Progress In Electromagnetics Research* 88207, 2018.
- 2016 E.J. Jelmy, S Ramakrishnan, NK Kothurkar EMI shielding and microwave absorption behavior of Au/MWCNT/polyaniline nanocomposites, *Polymers for Advanced Technologies*27,1246, 2016.
Wiley Online Library
- 2014 S Ramakrishnan, E.J. Jelmy, M Dhakshnamoorthy, Murali Rangarajan, Nikhil Kothurkar Synthesis of Carbon Nanotubes from Ethanol Using RF-CCVD and Fe–Mo Catalyst, *Synthesis and Reactivity in Inorganic, Metal-Organic, and Nano-Metal Chemistry*, 44873, 2014.
Taylor and Francis
- 2014 S Ramakrishnan, M Dhakshnamoorthy, E.J. Jelmy, R Vasanthakumari, Nikhil K Kothurkar Synthesis and characterization of graphene oxide–polyimide nanofiber composites, *RSC Advances* 4, 9743, 2014.
RSC

- 2013 E.J. Jelmy, S Ramakrishnan, S Devanathan, M Rangarajan, NK Kothurkar Optimization of the conductivity and yield of chemically synthesized polyaniline using a design of experiments Journal of Applied Polymer Science 130, 1047, 2013.
Wiley Online Library
- 2013 E.J. Jelmy, S Ramakrishnan, M Rangarajan, NK Kothurkar, Effect of different carbon fillers and dopant acids on electrical properties of polyaniline nanocomposites, Bulletin of Materials Science, 36, 37, 2013.
Springer

Manuscripts under review/communicated/under preparation

- 2025 Jith C.J, Jelmy E.J, Christy Ann Biji "A Multifunctional MXene/MoS₂ Hybrid for Integrated Triboelectric Energy Harvesting and Storage" *manuscript under preparation.*

Conference Papers

- 2025 Jelmy E.J., Honey John "Wearable Triboelectric Sensor for Respiration Monitoring Using Electrospun Nylon-6", Poster presented in "The 4th International Conference on Optoelectronic and Nanomaterials for Advanced Technology (icONMAT 2025) held at Cochin University of Science and Technology, during February 11-14, 2025.
- 2023 Jelmy E.J. Honey John "Development of Triboelectric Nanogenerators with Electrospun Nylon 6 for Self-Sustaining Low-Power Electronics", Poster presented in the International Conference "Polymer Processing Society (PPS)-2023" held at hotel Uday Samudra, Kovalam Trivandrum during 29th November 2023 to 2nd December 2023.
- 2021 Jelmy E.J., Honey John "Polyaniline intercalated graphene oxide for enhanced selective adsorption and removal of anionic dyes from aqueous solutions", Poster presented in the International Conference on Advanced Materials and Mechanical Characterisation (ICAMMC-2021) held at SRM Institute of Science and Technology, Chengalpattu Tamil Nadu, India, on December 2021. (Preceding with ISBN)
- 2021 Jelmy E.J., Yadukrishnana B.M., Vyshak M.P., Honey John "Natural Rubber/Polyaniline Composite Films with Enhanced CO₂ Gas Permeation for Gas Separation Applications, Poster presented in the International Conference "Advanced in Polymer Technology (APT 2021)" held at the Department of Polymer Science and Rubber Technology, Cochin, Kerala, India on May 2021. (Preceding with ISBN)
- 2021 Mathew Sunil, E.J. Jelmy, Vijoy K.V., Honey John Enhanced output of triboelectric nanogenerator using PDMS/PANI composite, Poster presented in the International Conference "Advanced in Polymer Technology (APT 2021)" held at the Department of Polymer Science and Rubber Technology, Cochin, Kerala, India on May 2021. (Preceding with ISBN)
- 2019 Divya Jose, Arha M., Nilina Anto Jelmy E.J., Honey John "Comparison of morphological and dielectric properties of nanostructures of polyaniline and polypyrrole", Poster presented in the National Conference "Current Trends in Polymer Science (CTPS 2019)" held at the Department of Polymer Science and Rubber Technology, Kochi, Kerala, India on March 2019.

- 2019 Jelmy E.J., Mohammed Aslam P.K., Nirmal Rag S., Honey John, "Preparation of polyaniline/poly(vinyl alcohol) blend for the removal of anionic dyes from aqueous solution", Poster presented in the National Conference "Current Trends in Polymer Science (CTPS 2019)" held at the Department of Polymer Science and Rubber Technology, Kerala, on March 2019.
- 2019 E.J. Jelmy, M Lakshmanan, NK Kothurkar Microwave absorbing behavior of glass fiber reinforced MWCNT-PANi/epoxy composite laminates Materials Today: Proceeding 26, 36, 2019 ((Proceedings with ISSN)
- 2013 E.J. Jelmy, S.Ramakrishnan, N.K. Kothurkar, Synthesis and characterization of gold- multiwalled carbon nanotube/polyaniline nanocomposite, Paper presented in "Emerging developments in chemistry", Little flower College Guruvayoor, January 2013.
- 2013 E.J. Jelmy, S. Mohanraj, A.R. Rajamani, D. Kumaresan, N.K. Kothurkar, Secondary doped polyaniline as counter electrode in dye sensitized solar cells, Poster presented in "3rd FAPS Polymer Congress and MACRO-2013", Indian Institute of Science, Bangalore, May 2013.
- 2012 E.J. Jelmy, S.Ramakrishnan, N.K. Kothurkar, M. Rangarajan, Polyaniline nanocomposites: Effect of different carbon fillers and dopant acids on the electrical properties, Poster presented in Recent Advances in Polymer Science and Technology, The Society for Polymer Science India, Trivandrum Chapter, June 2012.
- 2012 S Ramakrishnan, E.J. Jelmy, A Baladandapani, Murali Rangarajan, Nikhil K Kothurkar, Synthesis of multiwalled carbon nanotubes using RF-CCVD and a bimetallic catalyst, Poster presented on 56th DAE Solid State Physics Symposium held during 19-23 December 2011, at Chennai, AIP Conference Proceedings, 1447, 275, 2012 (Proceedings with ISSN).

Book chapter publications

- 2024 Irthasa Aazem, Ryan Walden, E.J. Jelmy, Sithara Radhkrishnan, Honey John, Suresh C Pillai, Handbook of Emerging Materials for Sustainable Energy (Title of the book), "Materials for energy efficient systems and environmental remediation" (Chapter 30)
Elsevier, Netherlands
- 2022 E. J. Jelmy, Rinku Mariam Thomas, V. S. Nisha, John Gerson Vijay and Honey John, Water Purification: Processes, Applications and Health Effects (Title of the book), "Carbonaceous Adsorbents for the Removal of Water Pollutants (Chapter 4)
Nova Science Publishers, USA.
- 2024 M Sunil, EJ Jelmy, S Joseph, H John Recent Advances in Materials for Energy Harvesting and Storage (Title of the book) "Exploring the potential of 2D materials in energy harvesting via triboelectric nanogenerators" (Chapter 3)
IOP Science, UK
- 2024 E. J. Jelmy, Rinku Mariam Thomas, Sijila C.V., Anjali K.P "2D Semiconductors for Environmental Remediation" (Title of the book), "Commercialization of 2D semiconductors for environmental application" (Chapter 8)
CRC Press

Organizing Committee Member in International Conferences

- Programme Committee: Solar Energy International Conference on March 30, 2010 at Amrita Vishwa Vidyapeetham.
- Local Organizing committee member of national conference “Current Trends in Polymer Science” 2019, on March 18, at CUSAT, Kochi.
- Local Organizing committee member of International Conference on Advances in Polymer Technology, APT 2021, during 27-29 May, at CUSAT, Kochi.
- Local Organizing committee member International Conference NANOicon-2022, during 11-15 January, at CUSAT, Kochi.
- Local Organizing committee member International Conference IMEE-2024, during 11-13 December 2024, at CUSAT, Kochi.

References

Prof. Nikhil K. Kothurkar (Thesis Advisor), *Professor*,

Dept. of Chemical Engineering & Materials Science, Amrita School of Engineering, Amrita Vishwa Vidyapeetham, Amritanagar, Coimbatore
nikhil.kothurkar@gmail.com

Prof. Honey John (Mentor, Postdoctoral fellowship program), *Professor, FRSC*,

Department of Polymer Science and Rubber Technology, Cochin University of Science and Technology, CUSAT, Kerala
honey@cusat.ac.in

Declaration

I hereby declare that the information provided in this resume is true and correct to the best of my knowledge and belief. I take full responsibility for the accuracy of the details mentioned herein.

Jelmy E.J