



# Abeer Banerjee

abeer.ceeri20a@acsir.res.in

🌐 Website: [abeerbanerjee.github.io](https://abeerbanerjee.github.io)  
📄 Google Scholar: Abeer Banerjee  
🌐 LinkedIn: [abeer-banerjee](https://www.linkedin.com/in/abeer-banerjee)  
📍 NH-24, Vigyan Path,  
CSIR-CEERI Colony,  
Pilani - 333031, India

## About

*I am an Integrated PhD in computational imaging. I was born and raised in Durgapur, India. Beyond my scholarly endeavors, I have deep interests in the fields of philosophy and photography.*

## EDUCATION

---

### Academy of Scientific and Innovative Research (AcSIR)

*Integrated Dual-Degree Ph.D.; CGPA: 9.13/10*

*Lab: CSIR-CEERI — Topic: Computational Imaging — Advisor: Dr. Sanjay Singh*

*Master's Thesis (2022): Generative Colorization of Grayscale Images [Report]*

Pilani, India

2020 – Present

### Institute of Radio Physics and Electronics (IRPE), University of Calcutta

*B.Tech in Electronics and Communications Engineering; CGPA: 8.64/10*

*Advisor: Dr. Ashik Paul, Professor, IRPE, University of Calcutta*

*Thesis: Portable multi-constellation satellite navigation module [Synopsis]*

Kolkata, India

2016 – 2020

## RESEARCH EXPERIENCE

---

### Senior Research Fellow

Sep 2022 – Present

*Advanced Information Technologies Group, CSIR-CEERI*

- Current research focus is on robust learning-based image reconstruction in the low-data regime.
- Scientific writing and review of research papers.
- Mentoring junior lab members in the area of deep learning for image processing.

### Junior Research Fellow

Sep 2020 - Sep 2022

*Intelligent Systems Group, CSIR-CEERI*

- Restoration of historical images using state-of-the-art generative adversarial networks.
- Few-shot defect detection of power-line infrastructure using aerial images.
- Neuromorphic image processing for fall-detection, eye-gaze estimation, etc.
- Face anti-spoofing in uncontrolled environments for high-security scenarios.

### Research Intern

Jun 2018 - Aug 2018

*DRDO-Instruments Research and Development Establishment*

- Advised by Dr. Himanshu Singh, Scientist F, Vision Instrumentation Lab.
- Edge-preserved smoothing of infrared thermal images using various classical image filtering algorithms.

## PEER-REVIEWED PUBLICATIONS

---

1. **Abeer Banerjee**, Naval Mehta, Shyam Sunder Prasad, Himanshu Kumar, Sumeet Saurav, and Sanjay Singh, Generalized Gaze-Vector Estimation in Low-light with Encoded Event-driven Neural Network, In *41st International Joint Conference on Neural Networks*. IEEE Proceedings. **IJCNN 2024** [h5-index: 60](#) (Accepted).
2. **Abeer Banerjee**, Himanshu Kumar, Sumeet Saurav, and Sanjay Singh, Reconstructing Synthetic Lensless Images in the Low-Data Regime, In *34th British Machine Vision Conference*. BMVC Proceedings. **BMVC 2023** [h5-index: 77](#). [Link]
3. **Abeer Banerjee**, Sumeet Saurav, and Sanjay Singh, Physics-informed Deep-Deblurring: Under-parameterized vs. Over-parameterized, In *30th International Conference on Image Processing*. IEEE Proceedings. **ICIP 2023** [h5-index: 61](#). [Link]

4. **Abeer Banerjee**, Himanshu Kumar, Sumeet Saurav, and Sanjay Singh, Lensless Image Reconstruction with Untrained Neural Network, In *37th International Conference on Image and Vision Computing New Zealand (pp. 430-441)*. Cham: Springer Nature Switzerland. **IVCNZ 2022** h5-index: 16. [Link]
5. Himanshu Kumar\*, **Abeer Banerjee\***, Sumeet Saurav, and Sanjay Singh, ParaColorizer: Realistic Image Colorization using Parallel Generative Networks. \*Equal Contribution. **The Visual Computer Journal**, Springer 2023, pp.1-16. SCI Impact Factor: 3.5. [Link]
6. **Abeer Banerjee**, Shyam Sunder Prasad, Naval Mehta, Himanshu Kumar, Sumeet Saurav, and Sanjay Singh, *Gaze Detection using Encoded Retinomorphic Events*, Gaze Detection Using Encoded Retinomorphic Events. In *14th International Conference on Intelligent Human Computer Interaction (pp. 442-453)*. Cham: Springer Nature Switzerland. **IHCI 2022**. [Link]
7. Soumyajit Karmakar, **Abeer Banerjee**, Prashant Sadashiv Gidde, Sumeet Saurav, and Sanjay Singh, Convolutional Ensembling-based Few-Shot Defect Detection Technique, In *Proceedings of the 13th Indian Conference on Computer Vision, Graphics and Image Processing (pp. 1-7)*. **ICVGIP 2022**. [Link]
8. Shyam Sunder Prasad, Naval Mehta, **Abeer Banerjee**, Sumeet Saurav, and Sanjay Singh, JS-SpoofNet: A Jointly Supervised Parallel Branched Neural Network for Spoof Detection. **Neurocomputing Journal**, Elsevier 2023, 554, p.126610. SCI Impact Factor: 6.0. [Link]
9. Shyam Sunder Prasad, Naval Mehta, **Abeer Banerjee**, Himanshu Kumar, Sumeet Saurav, and Sanjay Singh, Real-Time Privacy-Preserving Fall Detection using Dynamic Vision Sensors, In *IEEE 19th India Council International Conference (pp. 1-6)*. **IEEE. IEEE-INDICON 2022**. [Link]
10. Shyam Sunder Prasad, Naval Mehta, Himanshu Kumar, **Abeer Banerjee**, Sumeet Saurav, and Sanjay Singh, Hybrid SNN-based Privacy-Preserving Fall Detection using Neuromorphic Sensors, In *Proceedings of the 14th Indian Conference on Computer Vision, Graphics and Image Processing*. **ICVGIP 2023** (Accepted).

---

## COPYRIGHTS

1. **Abeer Banerjee**, Himanshu Kumar, Sumeet Saurav, and Sanjay Singh, AI-enabled Software Module for Realistic Colorization of Grayscale Images, Copyright Registered, CR Diary/Application No. 15782/2023-CO/SW, Date of Filing: 08/06/2023, Registration No. SW-17058/2023, Date of Registration: 08/08/2023.
2. Shyam Sunder Prasad, Naval Kishore Mehta, **Abeer Banerjee**, Sumeet Saurav, Ravi Saini, and Sanjay Singh, AI-based Software Package for Real-time Face Anti-spoofing Detection in Unconstrained Natural Environment, Copyright Registered, CR Diary/Application No. 15783/2023-CO/SW, Date of Filing: 08/06/2023, Registration No. SW-16929/2023, Date of Registration: 20/07/2023.

---

## RELEVANT RESEARCH PROJECTS

### **Retinomorphic Vision with AI** | Funded by CSIR-CEERI

- We estimated human saccadic eye motion using data from retinomorphic sensors. The resulting research paper was selected as an oral presentation at the peer-reviewed International Conference on Intelligent Human-Computer Interaction, in 2022.
- We detected human falling actions using retinomorphic sensors and were able to achieve real-time performance at the edge-device using a lightweight 3D-CNN framework. The resulting research paper was presented at the India Council International Conference, in 2022.

### **Historical Image Restoration with AI** | Funded by CSIR-CEERI

- For most of the historical images being grayscale, the task was to colorize them while restoring their quality. This ill-posed inverse problem was solved using parallel generative adversarial networks. The resulting research paper has been published in *The Visual Computer Journal*, Springer.

### **Arduino-based Flight Controller** | Funded by TEQUIP-III

- Instead of using commercially available Flight controllers like APM 2.8, the complete PID logic was implemented on Arduino UNO. We participated at the Quadrone@Cognizance-2018, IIT Roorkee with our custom-made quadcopter.

## SKILLS

---

- **Programming:** Python, MATLAB, L<sup>A</sup>T<sub>E</sub>X
- **Libraries:** PyTorch (preferred), Tensorflow, OpenCV
- **Languages:** English (TOEFL 2020: 96/120), Bengali (Native), Hindi (Professional)

## VOLUNTARY SERVICES

---

- **Session Chair at IJCNN 2024:** Virtual session "Neural Networks for Image Processing 17" at the IEEE International Joint Conference on Neural Networks (IJCNN) organized by IEEE World Congress on Computational Intelligence 2024.
- **Reviewer:** SCI Journals - Neurocomputing, The Visual Computer, Computers and Electrical Engineering, Expert Systems with Applications. Ranked conferences - ICVGIP 2022 and 2023.
- **Science communication and technology demonstration:** Participant in CSIR outreach programs regularly organized by CSIR-CEERI through various events such as "Jigyasa", "One Week One Lab (OWOL)", "National Science Day", "National Technology Day", etc.

## RELEVANT COURSEWORK

---

- **Integrated Ph.D. Coursework:** Research Methodology; Research Publications and Ethics, Advanced Engineering Mathematics; Signal Processing and Machine Learning; Image Processing and Computer Vision; Real-Time Autonomous Systems; Modelling and Simulation
- **Bachelor's Coursework:** Engineering Mathematics; Physics; Signals and Systems; Control Theory and Systems; Digital Signal Processing; Data Structures and Algorithms; Microprocessors and Microcontrollers; Mobile and Satellite Communications

## AWARDS & ACHIEVEMENTS

---

1. **DAAD Bi-nationally Supervised PhD Fellowship 2024:** Awarded fellowship for bi-national sandwich PhD at the TUM under the joint supervision of Prof. Vasilis Ntziachristos.
2. **SRF-GATE 2022:** A three-member expert assessment committee recommended the upgradation of my fellowship status to Senior Research Fellow (GATE), given my performance and publications during my tenure as a junior research fellow.
3. **JRF-GATE 2020:** Awarded Junior Research Fellowship (GATE) for qualifying the Graduate Aptitude Test in Engineering (GATE) and securing a seat in the Integrated Dual Degree Program at CSIR-CEERI. Recommended by the selection committee duly approved by the Director, CSIR-CEERI.
4. **WBJEE 2016:** Secured a rank of 1883 out of ~1,30,000 students appearing in the West Bengal Joint Entrance Examination. Admitted to the Institute of Radio Physics and Electronics, University of Calcutta, based on my rank.
5. **Felicitation for Academic Excellence 2016:** Awarded by Hem-Sheela Model School, Durgapur, West Bengal, India, for scoring **94.0%** in the Senior Secondary Examination (AISSCE-CBSE).
6. **Felicitation for Academic Excellence 2014:** Awarded by Pranavananda Vidya Mandir, Durgapur, West Bengal, India, for scoring **90.4%** in the Secondary Examination (CISCE-ICSE).
7. **Sreshtha Manab Award 2014:** Awarded by Pranavananda Vidya Mandir, Durgapur, West Bengal, India, considering my academic performance, discipline, and punctuality.
8. **Ankan Bivakar 2013:** Awarded a 5th-year degree in fine arts (painting) conferred by the esteemed Bangiya Sahitya Parishad, affiliated to the Rabindra Bharati University, where I achieved distinction in both theory and practical.