Curriculum Vitae

Name: Barun Raychaudhuri

Present Position: Professor, Department of Physics, Presidency University, Kolkata

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About Myself:

I am a physics teacher by profession and have been delivering full-time class lectures since 1996. I am also engaged actively in research. Being with Presidency College since 2002 and with Presidency University since inception as faculty member, I always try to keep a balance between teaching and research. The subject of my teaching specialization is Electronics and the subject of my research interest is the physics of remote sensing including hyperspectral techniques, greenhouse gases and climate change. During the last two decades, I have executed several academic and administrative responsibilities, such as developing laboratory and curriculum and acting as paper setter, examiner, head examiner and departmental head. Also I have written text books and popular science articles.

Qualifications:

BSc Physics (University of Calcutta, 1987)

MSc Electronic Science with gold medal (University of Calcutta, 1989)

PhD Electronic Science (University of Calcutta, 1997) Thesis Title: Some studies on the electrical characteristics of metal semiconductor contacts with thin interfacial insulating layer (http://hdl.handle.net/10603/159929)

Biographical Note:

I spent my school life in Bihar and started schooling at Gouranga Pathshala, Jamalpur. Subsequent institutions were Railway High School and Sahibganj College. In those days, ISc used to be taught in colleges. I completed graduation from Gurudas College under the University of Calcutta and obtained MSc and PhD degrees from Science College, Rajabazar, University of Calcutta. I was recipient of National scholarship on the basis of BSc result and CSIR-UGC research fellowship on the basis of NET.

I started professional career as lecturer in Government college under West Bengal Educational Service. The first posting was at the College of Textile Technology, Berhampore. Then I was transferred to Presidency College. During my service, the institution got upgraded to University status and I applied for the interview to join there.

At present I am Professor in Physics (w.e.f. 1st Oct. 2012) at Presidency University. Along with regular academic & administrative workload, I am actively engaged with research and have conducted several research projects funded by the Government of India, delivered invited talk at international symposium and acted as resource person in teachers' training courses and UGC sponsored refresher courses.

Teaching/ Other Experiences:

The major portion, more than two decades of my teaching life has been spent in Presidency University (formerly Presidency College) with engagement of BSc and MSc classes covering a wide range of levels including Honours/Equivalent and Special/Advanced of both theoretical and practical papers. I believe, each one has its own importance and no one is less significant. Depending on the nature of the class, different pedagogical strategies are followed. Some of the students grow interest in higher studies and join research institutes for pursuing research work. Looking towards them, I interpret the scope for further studies and future prospects of the topics allotted. Discussion on model questions for competitive examinations and conducting project work are encouraged. A significant number of students go to teaching professions in schools and colleges. Thinking of such students, I raise in the classes the topics of basic concept, background knowledge and history of science.

Professional & Co-curricular Activities

- Held the post of Head, Department of Physics from 28 Aug.15 to 29 Jun.19.
- Active participant of curriculum development, laboratory setting, paper setting and examination processes all the way.
- Acted as Head Examiner of the University of Calcutta for consecutive 3 years (2009-11).
- Carried out a number of UG & PG-level projects with students.
- Conducted NSS (National Service Scheme) social welfare activities of Presidency University students as Programme Coordinator for more than four years (2014-18) starting from the very beginning of the independent NSS activities of the University.

Research Supervision:

- A research scholar has obtained PhD degree (2010) from the University of Calcutta under my supervision.
- A research scholar has obtained PhD degree (2022) from Presidency University under my supervision.
- A research associate has completed post-doctoral work (Oct. 2017-Oct.2019) with DST-SERB National Post-Doctoral Fellowship under my mentorship.

Research/Administrative Experience:

Remote sensing, my favourite subject of research is the science and technology of detecting the electromagnetic radiation emitted, absorbed, transmitted and reflected by earth surface and atmosphere from far distance, such as aircraft and artificial satellite and acquiring information on natural resources, environment and human activity. It is a wide field of work incorporating conventional and interdisciplinary subject areas.

I have initiated researches on the physics and methodology of remote sensing in my department almost two decades ago, conducted several Govt. funded research projects and have been able to publish several research papers in reputed journals with single/prime authorship. Utilizing

the project funds, I established a research laboratory where a PhD and a post-doctoral work have been completed. The existing research facilities comprise spectroscopic studies in ultraviolet-visible-infrared wavelength range and satellite image analysis. A good collection of books and study materials are available.

My present interest is on the remote sensing of atmospheric parameters, such as greenhouse gases and the related climate changes. I have got the opportunity to collaborate with Space Applications Centre, Indian Space Research Organization and by virtue of the collaboration have got access to their valuable remote sensing database procured by airborne sensor AVIRIS-NG flown for the first time in India.

Reviewer of journals:

- IEEE Transactions on Geoscience and Remote Sensing
- IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing
- IEEE Photonics Technology Letters
- IEEE Aerospace and Electronic Systems Magazine
- International Journal of Remote Sensing
- Remote Sensing Letters
- Journal of Applied Remote Sensing
- Advances in Space Research

Academic Memberships/ Affiliations

I am Senior Member of IEEE, Life member of Indian Society of Remote Sensing, Indian Statistical Institute and The Asiatic Society.

I held the post of Vice-Chairman of IEEE Geoscience and Remote Sensing Society, Kolkata Chapter for two years and am still an active member of the same.

PUBLICATIONS

Textbook

Barun Raychaudhuri, ***Electronics: Analog and Digital***, Cambridge University Press, 2022. ISBN 978-1-009-21423-0

Patent (Govt. Funded)

Title: Bidirectional Wave Length Division Multiplexing System and Method Thereof.

Patent No. 429162. Application No. 482/KOL/2013. Date of Filing 29/04/2013. Date of Grant: 18/04/2023.

Patentee: Presidency University. Inventor: Dr. Barun Raychaudhuri

Funding Agency: Technology Information, Forecasting & Assessment Council (TIFAC)

Journal Papers

- Raychaudhuri, B. (2026). A classroom experimental demonstration of AI water consumption. *Physis Education* 61(5), 055047. https://doi.org/10.1088/1361-6552/aeade4
- Raychaudhuri, B. (2026). Measuring mutual inductance with op-amp integrator: a hands-on undergraduate experiment. *Physics Education*, 61(3), 035024. https://doi.org/10.1088/1361-6552/ae56c9
- Raychaudhuri, B., Mandal, S., and Das, A. (2025). Climate forcing due to atmospheric water vapour over the tropical regions of India. *Advances in Space Research*, 76, 3275–3290. https://doi.org/10.1016/j.asr.2025.06.083
- Raychaudhuri, B., and Mandal, S. (2025). Combined effects of radiative forcing and feedback of atmospheric carbon dioxide and water vapour. Remote Sensing Letters, 16(12), 1376–1387. https://doi.org/10.1080/2150704X.2025.2578801
- Chakraborty, S., Raychaudhuri, B., Das, T. P., and Roy, M. (2025). Detection of lunar water, hydroxyl ion and their diurnal changes from CHACE-2 orbiter observation. *Icarus* 426, 116365. https://doi.org/10.1016/j.icarus.2024.116365
- Raychaudhuri, B. (2024). Spectroscopic techniques conceptualized with the remote sensing of atmospheric carbon dioxide and other greenhouse gases. *Applied Spectroscopy Reviews*, *59*(9), 1344–1372 https://doi.org/10.1080/05704928.2024.2326527
- Roy, S., and Raychaudhuri, B. (2024). Carbon dioxide and water vapour mapping over tropical Indian atmosphere retrieved from AVIRIS-NG hyperspectral images, *Advances in Space Research*, 73, 1224–1236. https://doi.org/10.1016/j.asr.2022.05.020
- Raychaudhuri, B. (2023). Orbiting Carbon Observatory approach for estimating the atmospheric water vapour feedback in tropical India. *Remote Sensing Letters*, 14(9), 901–911. https://doi.org/10.1080/2150704X.2023.2249594
- Raychaudhuri, B. (2023). Physical Computing with Arduino. *The Physics Teacher*, 61, 795–798. https://doi.org/10.1119/5.0108658
- Raychaudhuri, B., and Roy, S. (2022). A proof of concept for estimating the annual atmospheric carbon dioxide variation from Orbiting Carbon Observatory-3 vEarly data, *IEEE Geoscience and Remote Sensing Letters*, 19, 1003205. https://doi.org/10.1109/LGRS.2021.3099172
- Raychaudhuri, B., and Roy, S. (2021). Martian atmospheric spectral radiance used as model for water vapor correction of terrestrial carbon dioxide absorption profile around 2 μm, *IEEE Geoscience and Remote Sensing Letters* 18(10), 1693–1697. https://doi.org/10.1109/LGRS.2020.3007378
- Raychaudhuri, B., and Roy, S. (2020). Investigation of seasonal variability of atmospheric columnar CO_2 over India in relation to environmental parameters using OCO-2 observation and vertical redistribution model, *International Journal of Remote Sensing*, 42(4),1450–1473. https://doi.org/10.1080/01431161.2020.1832281

- Manna, S., and Raychaudhuri, B. (2020). Retrieval of Leaf area index and stress conditions for Sundarban mangroves using Sentinel-2 data, *International Journal of Remote Sensing*, 41(3), 1019–1039. https://doi.org/10.1080/01431161.2019.1655174
- Manna, S., and Raychaudhuri, B. (2020). Mapping distribution of Sundarban mangroves using Sentinel-2 data and new spectral metric for detecting their health condition, *Geocarto International* 35(4), 434–452. https://doi.org/10.1080/10106049.2018.1520923
- Raychaudhuri, B. (2017). Spatial distribution of atmospheric CO_2 absorption detected around 2 μm on the reflectance spectra derived from Hyperion images, *International Journal of Remote Sensing*, 38(11), 3415–3429. https://doi.org/10.1080/01431161.2017.1295483
- Raychaudhuri, B. (2016). Imaging Spectroscopy: Origin and future trends, *Applied Spectroscopy Reviews*, 51(1), 23–35. http://dx.doi.org/10.1080/05704928.2015.1087405
- Raychaudhuri, B. (2014). Solar-induced fluorescence of terrestrial chlorophyll derived from the O_2-A band of Hyperion hyperspectral images, *Remote Sensing Letters*, 5(11) 941–950. http://dx.doi.org/10.1080/2150704X.2014.976884
- Raychaudhuri, B. (2012). Remote sensing of solar induced chlorophyll fluorescence at atmospheric oxygen absorption band around 760 nm and simulation of that absorption in laboratory. *IEEE Transactions on Geoscience and Remote Sensing*, vol. 50(10), 3908–3914. https://doi.org/10.1109/TGRS.2012.2185503
- Raychaudhuri, B. (2012). Synthesis of mixed pixel hyperspectral signatures. *International Journal of Remote Sensing*, 33(6), 1954–1966. http://dx.doi.org/10.1080/01431161.2011.610378
- Raychaudhuri, B. (2011). On the determination of the emission wavelength of an infrared LED with common laboratory instruments. *European Journal of Physics*, 32, pp. 935–945. https://doi.org/10.1088/0143-0807/32/4/008
- Raychaudhuri, B. (2010). Prototype neural network hardware with analog electronic circuit. *Indian Journal of Physics*, 84, 1435–1440. https://doi.org/10.1007/s12648-010-0135-7
- Raychaudhuri, B., and Sen, C. (2009). Light emitting diode as sensor for miniature multispectral radiometer. *Applied Physics B*, 95, 141–144. https://doi.org/10.1007/s00340-009-3439-6
- Raychaudhuri, B., and Bhattacharyya(Bhaumik), S. (2008). Molecular level all-optical logic with chlorophyll absorption spectrum and polarization sensitivity. *Applied Physics B*, 91, 545–550. https://doi.org/10.1007/s00340-008-3002-x
- Raychaudhuri, B., Adhikari, J., and Bhaumik, S. (2008). Multispectral and hyperspectral analysis and Modeling of the absorbance characteristics of marine algal pigments. *International Journal of Remote Sensing*, 29, 787–799. https://doi.org/10.1080/01431160701311275
- Raychaudhuri, B., and Bhattacharyya, S. (2007). Temporal change of canopy reflectance at visible wavelength as a biophysical indicator of jute (Corchorus capsularis L.) growth. *International Journal of Remote Sensing*, 28, 5237–5253. https://doi.org/10.1080/01431160601075558

- Raychaudhuri, B., and Bhattacharyya, S. (2006). Fuzzy analysis of laboratory spectroscopy of vegetation for remote sensing applications. *International Journal of Remote Sensing*, 27, 191–201. https://doi.org/10.1080/01431160500192413
- Raychaudhuri, B. (2004). Study of Spectral Response of Plant Pigments for Remote Sensing Applications. *Indian Journal of Physics*, 78, pp. 677–680. http://arxiv.iacs.res.in:8080/jspui/handle/10821/7053
- Raychaudhuri, B., and Chattopadhyay, P. (1994). Energy distribution of interface state charge density in Cu-nSi Schottky diode with thin interfacial oxide layer. *Applied Surface Science*, 78(3), 233–238. https://doi.org/10.1016/0169-4332(94)90010-8
- Raychaudhuri, B., and Chattopadhyay, P. (1994). Effect of Energy Distribution of Interface States on the Capacitance and Conductance of Schottky Barrier and MIS Tunnel Contacts. *physica status solidi* (*a*) 141, K71–K75. https://doi.org/10.1002/pssa.2211410141
- Chattopadhyay, P., and Raychaudhuri, B. (1993). Frequency Dependence of Forward Capacitance-Voltage Characteristics of Schottky Barrier Diodes. *Solid-State Electronics*, 36(4), pp. 605–610. https://doi.org/10.1016/0038-1101(93)90272-R
- Chattopadhyay, P., and Raychaudhuri, B. (1992). New Technique for the Determination of Series Resistance of Schottky Barrier Diodes. *Solid-State Electronics*, 35, 1023–1024. https://doi.org/10.1016/0038-1101(92)90337-C
- Chattopadhyay, P., and Raychaudhuri, B. (1992). Origin of the Anomalous Peak in the Forward Capacitance-Voltage Plot of a Schottky Barrier Diode. *Solid-State Electronics*, 35(6), 875–878. https://doi.org/10.1016/0038-1101(92)90290-S
- Chattopadhyay, P., and Raychaudhuri, B. (1991). A Modified Conductance Technique for the Determination of Series Resistance of MIS Tunnel Diodes. *Solid-State Electronics*, 34(12), 1455–1456. https://doi.org/10.1016/0038-1101(91)90044-Y

International Conference Proceedings:

- Raychaudhuri, B., Chaurasia, S., and Roy, S. (2019). Spatial variation of atmospheric carbon dioxide concentration retrieved from AVIRIS-NG images including water vapor correction and spectroradiometric validation for two urban places of India, Proceedings of SPIE 11152, Remote Sensing of Clouds and the Atmosphere XXIV, 111520E (9 October 2019); https://doi.org/10.1117/12.2532027. International symposium held during 9–12 September 2019 at Strasbourg, France.
- Raychaudhuri, B. (2017). Solar-induced fluorescence retrieved from AVIRIS images of urban areas of Kolkata and Howrah in India, Proceedings of International Symposium on Remote Sensing 2017, pp. 305–308, held during 17–19 May, 2017 at Nagoya, Japan.
- Raychaudhuri, B. (2016). Use of IRS-P4 Ocean Color Monitor (OCM) images for tracing the red edge of the terrestrial vegetation reflectance spectrum, Proceedings of the IOP Conf. Series: Earth and Environmental Science 34 (2016). https://doi.org/10.1088/1755-1315/34/1/012029. International conference held during October 5–9, 2015 at Halifax, Canada.

Funded Research Projects completed as PI

Agency	Project Title and Sanction No	Duration	Amount Utilized (Rs)
SAC-ISRO	Assessment of atmospheric carbon dioxide from hyperspectral remote sensing (EPSA/4.20/2017, Date: 19.12.2017)	19/12/2017 to 30/09/2020	10,20,000
DST	Development of methodology for bathymetry of inland water using hyperspectral remote sensing technique (BDID/01/23/2014-HSRS dated 18.03.2016)	22/ 04/ 2016 to 30/09/2019	17,52,107
DST	Hyperspectral Remote Sensing of Natural and Man-Made Features Based on UV-Vis-NIR Spectral Measurements (NRDMS/11/1148/06 dated January 31st, 2008)	28/04/2008 to 32/03/2011	14,43,730
CSIR	Bioelectronic Modelling of Vegetative Spectral Response for Remote Sensing Applications (24(0281)/05/EMR II dated 31.1.05 and -- do -- dated 23.3.06)	01/04/2005 to 31/03/2008	6,02,000

Resource Person of UGC/Other Refresher/Teachers Training courses

- "Monitoring and modeling of greenhouse gases: Part I & II", Barun Raychaudhuri, lecture delivered as resource person at UGC refresher course (Oct. 23 – Nov. 13, 2017) on 'Disaster Management and Environment' at the School of Oceanographic Studies, Jadavpur University.
- "Physical principles of remote sensing", Barun Raychaudhuri, lecture delivered as resource person at UGC sponsored refresher course (June 18 – July 9, 2013) at the Department of Physics, University of Calcutta.
- "Physical principles of optical remote sensing: Part-I and Part-II", Barun Raychaudhuri, lectures delivered as resource person at Winter School on Remote Sensing of Earth's Atmosphere and Space Weather (March 4–22, 2013) under the UGC Networking Resource Centre in Physical Science, University of Calcutta.
- "Physics of remote sensing", Barun Raychaudhuri, lecture delivered as resource person at UGC sponsored refresher course (July 9–28, 2012) at the Department of Physics, University of Calcutta.
- "Application of image processing in remote sensing", Barun Raychaudhuri, lecture delivered as resource person at technical teachers' training programme at NITTTR, Kolkata during November 10–14, 2008.