# Dr. Jnan Bikash Bhandari



**Designation:** Associate Professor

Qualification: M.Sc., B.Ed., Ph.D.

(*University of Burdwan*)

# **Experience:**

# Teaching:

Undergraduate Level: 11 Years

Postgraduate Level: 04 Years

**Contacts** 

#### **Address:**

Department of Botany, University of North Bengal,

P.O. - NBU, Dist. - Darjeeling,

West Bengal, Pin -734013, India.

#### Contact No.

98321 38394 & 9474689236

Email: jnanbikashbhandari@nbu.ac.in

### **Institutions Served:**

• University of North Bengal Department of Botany

Associate Professor (Sep 14, 2018 to till date)

- Siliguri College, Siliguri
  Assistant Professor of Botany (April 12, 2007 to Sep 13, 2018)
- Ilsora S.N. High School, Burdwan
  Assistant Teacher
  (Jan 16, 2001 to April 11, 2007)

- Vivekananda Mahavidyalaya Guest Lecturer (May 04 to Dec 31, 2000)
- Guskara Mahavidyalaya
   Part Time Lecturer
   (Aug 02, 1999 to Dec 12, 2000)
- Bankura Christian College Part Time Lecturer (Aug 5,1999 to May 1, 2000)

## **Academic Qualification:**

B.Sc. Honours in Botany: 1989, University of Burdwan
M.Sc. in Botany: 1991, University of Burdwan
B.Ed. in Life Science: 1993, University of Burdwan

GATE: 1992

Fellowship: UGC- Junior Research Fellow – 3 Years (1994-1997)

UGC- Senior Research Fellow – 2 Years (1997-1999)

### Title of Ph.D. Thesis:

Morpho-Taxonomical Studies on Indian Vittarioid ferns

**Year of Award:** 1999, University of Burdwan

# **Subject of Specialization:**

Pteridology (Morpho-anatomy and Taxonomy), Palaeobotany

### **Research Interest:**

Classical and molecular Pteridology, Bio-diversity conservation, Stress Physiology, Bio-remediation

### **Research Publications:**

Research Publications in International and National Journals: 33 (Thirty-three)

Books Published: 3 (Three)

Book Chapters: 5 (Five)

Conference Proceedings: 5 (Five)

# **Research Guidance:**

Ph.D. Awarded: 1

Ph.D. (Ongoing Supervision): 5 (Five)

Ph.D. (Presently Registered): 4 (Four)

M.Sc. Dissertations: 14 (Fourteen)

# Ph.D. Awarded:

Sl. No.	Name of Scholar	Status	Title of Ph.D. Work
1.	Mr. Sujay Kumar	Ph.D. awarded - 2023	Seedling Invigoration of Mung Bean Sprouts
	Sen		through matrix bound selected Elicitors including
	- 711		Nano-Chitosan under Salinity Stress.

# Ph.D. Students:

Sl. No.	Name of Scholar	Status	Title of Ph.D. Work
1.	Mr. Prashan Kumar Chhetri	Registered – 2020 [Work progressing]	Heavy Metal stress responses of some selected ferns of Darjeeling District and Kalimpong District of West Bengal.
2.	Ms. Puja Singh	Registered under JRF- UGC –2022 [Work progressing]	Morpho-anatomical studies and Phytochemical evaluation of selected Indian Asplenoid ferns.
3.	Ms. Maitri Saha	Registered under University fellowship- 2022 [Work progressing]	Studies on endophytic bacteria from selected ferns of Darjeeling District and their role in phytoremediation and PGPR activity.
4.	Mr. Subhas Kumar Gupta	Registered – 2023 [Work progressing]	Efficacy of plant extract from <i>Drynaria quercifolia</i> (L.) J. Smith and their application against selected phytopathogens.
5.	Ms. Lagnojita Pal	Registered in Course Work- 2023 [Work progressing]	Molecular Insight of Heavy Metal stress response in selected Terrestrial ferns in Industrial Belt, West Bengal, India.

# **Dissertations:**

Sl. No.	Name of students	Year	Title of Work
1.	Ms. Sudipta Saha	2023	Studies on Pteridophytic Flora of Dalkajhar Forest,
			West Bengal.
2.	Ms. Anamika	2023	Comparative Morpho-Anatomical Studies and
	Roy		Phytochemical Evaluation of Three <i>Pyrrosia</i> sp. From
	,		Darjeeling District.

3.	Ms. Dolly Biswas	2023	Palynological studies of Fern Flora from selective parts of Darjeeling District.
4.	Ms. Shreyasi Banerjee	2023	Studies of Antibacterial Efficiency and phytoconstituents of two Epiphytic Ferns.
5.	Mr. Seath Lepcha	2023	Evaluation of Ni <sup>2+</sup> and Pb <sup>2+</sup> induced stress responses in <i>Asplenium nidus</i> L. & <i>Davallia griffithiana</i> Hook. Of Kalimpong District.
6.	Ms. Samiksha Bagdas	2022	Physiological and Biochemical Response of Tropical Wild fern <i>Diplazium esculentum</i> (Retz.) Sw. in Nickel, Cadmium and Chromium Stress under hydroponic condition.
7.	Ms. Joyti Kumari	2022	Phytoremediation potential of <i>Salvinia natans</i> (L.) Allioni.
8.	Ms. Lagnojita Pal	2022	Cadmium, Cobalt and Chromium induced changes in Growth, Biochemical and Anti-oxidative Enzymes activities in <i>Thelypteris dentata</i> (Forssk.) E.P.St. John
9.	Ms. Ritika Mishra	2022	Effect of Cobalt, Lead and Mercury induced stress on morphological and biochemical parameters of <i>Diplazium esculentum</i> (Retz.) Sw. under hydroponic system.
10.	Mr. Raju Roy	2022	Effect of heavy metals (Nickel and Cadmium) in <i>Thelypteris triphyllum</i> (Sw.) K. Iwats.
11.	Ms. Puja Singh	2020	Phytochemical and Biochemical analysis along with Antioxidant properties of three species of <i>Pteris</i> from Darjeeling District, West Bengal.
12.	Ms. Maitri Saha	2019	Antagonistic potential of different plant parts of Davallia griffithiana Hook., Blechnum orientale L., and Phymatosorus cuspidatus D. Don on some Rhizospheric and Non-Rhizospheric Bacteria.
13.	Mr. Dipak Roy	2019	Evaluation of antibacterial activity from leaf extracts and characterization of soil micro-flora of ferns <i>Angiopteris evecta</i> (G. Frost) Hoffin., <i>Nephrolepis cordifolia</i> (L.) K. Presl. and <i>Tectaria coadunata</i> (Wall. Ex Halines).
14.	Mr. Pratim Saha	2019	Determination of Antimicrobial potential and Survey of Rhizospheric Microflora of selected ferns from Darjeeling District.

### **Research Projects:**

- Studies on reproductive biology, antimicrobial properties and conservation strategies of some endangered epiphytic medicinal pteridophytes of Darjeeling District of West Bengal, India (F.PSW-128/09-10 (ERO) dated 8th October, 2009). Sanctioned by UGC (Rs. 67,000/-)
- Evaluation of the different hydroponic culture techniques as an alternative to conventional farming for sustainability. (F. PSW- 81/12-13 (ERO) dated 05.02.2013). Sanctioned by UGC (Rs. 1,68,500/-)
- Heavy Metal stress response of some selected Pteridophytes and characterization of associated Rhizospheric microbes of Darjeeling district. (1511/R-2020 dated 01.06.2020). From NBU as assistance for research by UGC (Rs. - 1,50,000/-)

#### **Research Publications:**

- Sen S K, Mandal P and Bhandari J B., 2023: Study of Mung Bean Isoflavones
   Associated with enhanced Antioxidant Activity having Therapeutic Implications.
   Plant Archeives. 23(1): 1-10. ISSN 0972-5210.
- Sen S K, Mandal P and **Bhandari J B., 2022:** Study of major isoflavones in mung bean seedlings with special emphasis on its enhanced antioxidant activity after solid matrix priming with selected elicitors including nano-chitosan under salinity stress. *NBUJPS.* **14:** 8-20. ISSN 0974-6927.
- Saha M and Bhandari J. B., 2022: Comparative preliminary Screening of Heavy Metal Tolerant Rhizobacteria Isolated from the two ferns *Tectaria coadunata* (J. Sm.) C. Chr. And *Phymatosorus cuspidatus* (D. Don) Pic. Serm. Of Darjeeling District. *Indian Fern J.* 39(2): 217-221. ISSN 0970-2741.
- Singh P and **Bhandari J. B., 2022:** Phytochemical evaluation and antioxidant properties of two species of *Pteris* L. from Darjeeling District of West Bengal, India. Pleione **16(2):**166-174. ISSN 0973

- Dey M. and Bhandari J. B. 2022: Diversity and Ethnomedicinal Pteridophytes of Jalpaiguri District West Bengal, India. *Indian Fern J.* 39(1): 100-114. ISSN 0970-2741.
- Saha M. and Bhandari J. B., 2021: Antibacterial activities of the plant extracts and biochemical characterization of associated microbes of *Angiopteris evecta* (G. Forst.) Hoffm. and *Tectaria coadunata* (J. SM.) C. CHR. *Indian Fern J.* 38: 101-114. ISSN 0970-2741.
- Singh P. and Bhandari J. B., 2021: Phytochemical evaluation and antioxidant activity
  of *Pteris biaurita* L. of Darjeeling district, West Bengal. *Indian Fern J.* 38: 161-170.
  ISSN 0970-2741.
- Saha M. and Bhandari J. B., 2020: Morphological & Biochemical Characterization of Rhizospheric Bacteria of some Ferns of Darjeeling District. *Indian Fern J.* 37: 212-223. ISSN 0970-2741.
- Dey M. and Bhandari J. B., 2020: Study of spore morphology of some Pteridophytes occurringin Jalpaiguri district, West Bengal (India). *Indian Fern J.* 37: 195 – 211. ISSN 0970- 2741.
- Mondal S, Roy B and Bhandari J B., 2020: Taxonomic Investigation of Some Members of Fabaceae (Subfamily- Caesalpinioidae) with Special Reference to Pollen Morphology.
   NBUJPS. 12: 1-14. ISSN 0974-6927.
- Saha M., Mathur P. and Bhandari J. B., 2019. Antibacterial potential of different plant parts of *Davallia griffithiana* Hook., *Blechnum orientale* L. and *Phymatosorus cuspidatus* D. Don on somepathogenic bacteria. *Indian Fern J*, 36: 241-252. ISSN 0970-2741.
- Dey M., Barman U. R. and Bhandari J. B., 2019. Thelypteris triphylla (Swartz) K. Iwatsuki [Thelypteridaceae]- a new record for the fern flora of Jalpaiguri district, West-Bengal, India. Indian Fern J, 36: 283-286. ISSN 0970-2741.
- Bhandari, S. and Bhandari, J. B., 2017. Impacts of Global Climate Change on Medicinal and Aromatic Plants held on Indian Perspectives- A Review. *Climate Change* and Adaptations. Edited by Anirudra Gurung. Bishen Singh Mahendra Pal Singh,

- Cultivation and Ex situ Conservation of a Threatened Evergreen Shrub Ruscus hypoglossum L. under Greenhouse Conditions. Authors: Cyaria Gurung, Jnan Bikash Bhandari and Anirudra Gurung. J. Botan. Soc. Bengal 70(2), 2016. Pp153-156. ISSN 0971-2976.
- Morpho-Anatomical and Biochemical Characterization of *Davallia griffithiana* Hook.
   Authors: Ishani Lahiri, Cyaria Gurung, **Jnan B. Bhandari** and Smitha Hegde *Indian Fern Journal*, **2016**. 33: Pp. (212-221). ISSN 0970- 2741.
- Impacts of Global Climate Change on Medicinal and Aromatic Plants held on Indian Perspectives- A Review. S. Bhandari and J.B. Bhandari. Climate Change and Adaptations. Edited by Anirudra Gurung. Bishen Singh Mahendra Pal Singh, Dehradun, 2017. Pp 131-136. ISBN-978-81-211-0964-2.
- Bhandari, J. B. 2013. Evaluation of morpho-anatomical and Pharmacognosical properties of amedicinal Fern *Drynaria quercifolia* (L.) J. Sm. Biotechnology for People, Levant Books, Kolkata.
- **Bhandari, J.B.** 2013. Evaluation of Phyto-chemical Properties of four Different Species of Epiphytic Ferns of Darjeeling District. Eco- Conservation and Sustainable Living, Narosa Publishing House, New Delhi. Pp. 176-182.
- Ganguly, G., **Bhandari, J. B.** and Mukhopadhyay, R. 2005. Studies in the Morpho-Anatomy of some Indian Species of *Loxogramme* (Loxogrammaceae). *Geophytology*, **35 (1 & 2):** 19-24.
- **Bhandari J. B.**, Choudhury, S. and Mukhopadhyay, R., 2004. Morphoanatomy and affinity of members of Antrophyums in India. *Indian Fern J.*, **21:** 26-44.
- Bhandari, J.B. and Mukhopadhyay, R, 2003. Studies on the Morpho Taxonomy of Indian Vittarioid Ferns. In: Pteridology in the New Millennium, 205- 215 (EDS), Chandra, S. & Srivastava, M., Kluwer Academic Publishers, Netherlands.
- **Bhandari, J. B.** and Mukhopadhyay, R, 2001. Morphological, anatomical and phytochemical observations on two species of *Vittaria* Smith. *J. Econ. & Tax. Bot.* Additional Series No., (Recent Researchers in Plant Anatomy and Morphology) 19

- **Bhandari, J. B.** and Mukhopadhyay, R, 2001. Studies in the spore morphology of the genus *Loxogramme* (BL.) Presl. *Phytomorphology*, **51 (1):** 11-15.
- Dixit, R.D., **Bhandari, J. B.** and Mukhopadyay, R, 2001. A new species of *Lygodium* (Lygodiaceae) form North Andamans, India, *Nod. J. Bot* **21 (4)**: 427-430.
- **Bhandari, J.B.** and Mukhopadhyay, R, 1999 Observation of the morphology of scales of the Indian Vittarioid ferns. *Sci & cult*. 65.
- **Bhandari**, **J.B**. and Mukhopadhyay, R, 1998 Morphological and anatomical observations on *Vittaria linearifolia* Ching *Indian fern J.*, **15**: 44-48.
- Mukhopadhyay, R. and Bhandari, J. B., 1998. Occurrence of Microspore polyads in Selaginella intermedia (BI) Spring Phytomorphology, 49(1): 75-78.
- **Bhandari, J.B.** and Mukhopadhyay, R, 1997 Morphological and anatomical studies on *Antrophyum callifolium* BL. *Phytomorphology*, **47(2):** 155-160.
- **Bhandari, J. B.** and Mukhopadhyay, R, 1996 Observation on the spore morphology of IndianVittarioid ferns. *Flora and Fauna*, **2(1)**: 69-73.
- **Bhandari, J. B.** and Mukhopadhyay, R, 1996 Morphological and anatomical studies on *Antrophyun coriaceum* (D.Don) Wall, *Indian fern J.*, **13:**62-66.
- **Bhandari**, **J.B**. and Mukhopadhyay, R, 1996 Morphological and anatomical observations on *Vittaria amboinensis* Fee *Indian Fern J.*, **13:**40-45:
- **Bhandari, J.B.** and Mukhopadhyay, R, 1996 Studies in the reproductive structures and sporeoutput on the genus *Vittaria* Smith. J. *Nat Bot Soc.* **50:** 79-87
- **Bhandari, J.B.** and Mukhopadhyay, R, 1995. Studies in the morphology and anatomy of *Antrophyum reticulatum* (Frost) Kaulf, *Indian fern J*, **12:** 24-28.
- **Bhandari**, **J.B**. and Mukhopadhyay, R, 1995. Studies in the spore morphology to some Vittarioid ferns. *Indian Fern J*, **12**: 110-115.

### Conference/Seminar/Webinar/Symposium/Workshop Organized/Attended:

 Attended 1<sup>st</sup> Botanical Congress on "Plant Science and Society" Organized by Botanical Society of Bengal collaboration with Department of Botany, University of Calcutta on 23-25 March, 2023.

- Attended International Conference on "Advances in Plants, Microbes and Agricultural Sciences" Organised by Department of Botany, University of North Bengal on 2-4 March, 2023.
- Attended International Symposium on "Plant Taxonomy, Ethnobotany and Botanic Gardens" Organized by Botanical Survey of India, Kolkata on 13-14 February, 2023.
- Attended the XVII Annual conference of the "Indian Fern Society and National symposium on advancesin Pteridology Research: present status and future strategies" held at Mansarovar Global University, Bhopal, on 25-27 November, 2022.
- Participated XLV All India Botanical Conference on Climate Change: Biodiversity, Adaptation and Mitigation Organized by The Indian Botanical Society and Department of Botany, University of Lucknow held from 14-16 October, 2022.
- Attended the Two days National Seminar on Advancement of Plant Sciences for food diversity and nutritional security organized by University of North Bengal held on 30<sup>th</sup> September-1<sup>st</sup> October, 2021.
- Attended the One-day National Webiner on "Think Green, Live Green" organized by IQAC and Durgapur Government College, held on 7<sup>th</sup> July, 2021.
- Attended the One Day Webinar on "Biodiversity of Bengal: Least Trodden Trails" organized by IQAC and Durgapur Government College, held on 22<sup>nd</sup> May, 2021.
- Participated and presented a paper titled Antibacterial activity.... Ferns of Darjeeling... in the national seminar on "Sustainable Utilization of Plants and Microbes" held on the Department of Botany, Visva-Bharati, Santiniketan, on March 28, 2019.
- Attended the International Conference during March 8-10, 2019 and presented a paper entitled Newreport of an endangered fern... held on Jalpaiguri District.
- Participated and presented a paper in a National seminar on "Local Biodiversity" sponsored by WestBengal Biodiversity Board and organised by Department of Botany Raja Rammohun Roy Mahavidyalaya, Hooghly held on 13<sup>th</sup> January, 2018.
- Participated in the workshop of Subject Botany held on the conference Hall.
   University of NorthBengal, organised by Council for Undergraduate Studies in Science, on 13th November 2017.
- Helped in enriching the knowledge of students especially the students held on backward class bytaking successfully all the allotted UGC sponsored remedial classes in the session 2016-2017.
- Participated and presented a paper in UGC-Assisted International Interdisciplinary

- Seminar entitled "Hydrophonies: The Ultimate Answer to Sustainability and Global Food Crisis", organised by SuryaSen Mahavidyalya held on March 28-29, 2017.
- Participated in a Special Lecture on "Indian Rural Society: Sociological Perspectives & Muslim in India: A Sociological Enquiry" organized by the Department of Sociology on 31 March, 2017 at Siliguri College.
- Participated in the Seminar on "A Gentle Introduction to The Application of Mathematics, Mathematical Ligic, and Computer Programming and Statistics" organised by Department of Mathematics and Statistics, Siliguri College, Siliguri held on 10 March, 2017.
- Participated in the National Seminar held at Sonamukhi College and presented paper (oral/poster)entitled "Some Medicinally important Ferns and Fern Allies in Darjeeling District" held on 4-5 October, 2016.
- Participated in National Workshop on "Exploitation of Plant and Microbial Resources of North Bengal" organised by Department of Botany, University of North Bengal held on 14-16 December, 2015.
- Participated in DST Sponsored One-Day Seminar on "Environment and Human Health" sponsoredby Department of Science and Technology Govt. of West Bengal and organised by Naxalbari College, Darjeeling held on 20th November, 2015.
- Participated in UGC Sponsored National Seminar on "Global Climate Change and it's Impacts on Floral, Faunal and Microbial Biodiversity" organised by Department of Botany, St. Joseph's College, Darjeeling held on 26-28 June, 2015
- Participated and presented a paper in UGC Sponsored National Workshop on "Aspects and Prospects of Biofertilizer and Biomanure" organised by Raja Rammohun Roy Mahavidyalaya, Hooghly held on 5-6 December, 2014.
- Attended the 11" Orientation Program on NSS at Ramakrishna Mission Ashrama organised byRamkrishna Misston, Narendrapur, Kolkata held on 9 15 November 2014.
- Organised an UGC sponsored National Level Workshop on "Recent Trends in Application of Modern Scientific... Researches" at Siliguri College, Siliguri held on 20-22 December, 2013.
- Presented a paper in National Seminar at P.D. Women's College, Jalpaiguri held on 4-5 December, 2012.
- Participated in a three days National Conference on Biology and Bioinformatics of Economically Important Plants and Microbes and also presented a paper on "Phyto Economica Chemical Studies and..." in Darjeeling District, organised by

Department of Botany and Bioinformatics, NBU held on 17-19 February, 2012.

- Participated in a three-day National Seminar on Diversity Conservation and Sustainable Utilization Plants and Traditional Knowledge in Eastern Himalaya and also presented a paper on "Comparative Morpho-Anatomical... Antibacterial Properties" organised by Department of Botany, NBU held on 14-16 December, 2010.
- Participated in the International Symposium on "Ferns and Fern Allies: Diversity, Bioprospection and Conservation" organized by the Institute of Himalayan Bioresource Chandie CSIR Palampur. Himachal Pradesh, India and The Indian Fern Society. Organised by The Institute of Himalayan Bioresource Technology, CSIR Palampur, Himachalpradesh, India held on November 10-12, 2010.
- Participated and presented a paper entitled "Evaluation of the antibacterial occurring bacteria" In the above symposium organised by Department of Botany, NBU held on February 28 March 1, 2009.
- Participated in the International Symposium on "Perspectives in Pteridophytes" organized by The Indian Fern Society and National Botanical Research Institute, Lucknow, during November 27-29,2008.
- Participated and presented a paper in oral session entitled Occurrence and distribution of some medicinal Pteridophytes of Kurseon Sub division of West Bengal in the above symposium organised by Department of Botany, NBU held on January 24-25, 2008.
- Participated the seminar and presented the paper entitled "Perspectives and Quality Control Standardization in Homeopathic Medicinal Plant" organised by Department of Botany, University of Burdwan held on March 15-16, 2008.
- Participated in the conference and presented a paper entitled "Studies in the spore morphology of Indian Tectarioid Fern" organised by Department of Botany, University of Burdwan held on March20-21. 2004.
- Participated in the National Seminar on "Pteridophytes-The Vanishing Plants belon Department ofBotany, Panjab University, Chandigarh and also presented a paper entitled "MorphoAnatomy and Affinity of the Antrophyums of India" organised by Department of Botany, Panjab University, Chandigarh held on November 25-26. 2002.
- Participated in the National Symposium held a Jivaji University held on November 12 to 14, 1999, and act as Reporteur.
- Participated and delivered a lecture Third West Bengal State Science Congress on Spore morphology of some Indian Vittariod Ferns organised by University of

- Burdwan, 28th February- 1st March, 1996.
- Participated and contributed a paper in the National Symposium on Researches in Pteridology heldon the Department of Botany, J.N. Vyas University, Jodhpur held on October 5-7, 1995.
- Participated and delivered a lecture in National Symposium on Researches in Pteridophytes on Morphoptaxonomy of *Antrophyumon* organised by Department of Botany, J. N. Vyas University, Jodhpur 5-7th October 1995.

### **Books Published:**

- The Vittarioid ferns of India. Bhandari, J.B. and Mukhopadhyay, R. 2009.
   Bishen Singh and Mahendra Pal Singh, Dehradun.
- Eco-Conservation and Sustainable Living. Edited by C. Gurung and J.B. Bhandari (NarosaPublishing House, New Delhi, 2013).
- Manual on Instrumentation in Biology. Edited by Bhandari, J.B. and Gurung, C. (NarosaPublishing House, New Delhi, 2021)

## Membership:

- Life Member of Indian Fern Society since 1995
- Natural Member of Eastern Himalayan since 2000 Society for Spermatophyte Taxonomysince 2011
- Life Member of Botanical Society of Bengal since 2021
- Life Member of The Indian Botanical Society Since 2022

#### Awards:

- Awarded with Certificate of Merit for the year 2000.
- Awarded with Professor S.S. Bir Medal in Pteridology for the year 2009.

# **Administrative Experience:**

- Head- Department of Botany, University of North Bengal 12. 07. 2023- Onwards.
- Member of Postgraduate Board of Studies since.
- Member of Undergraduate Board of Studies in 2011-12, and 2108-19.
- Member of Postgraduate Board of Studies since 2018.
- Head- Department of Botany, Siliguri College for 1.6 years (approx.).
- Working as NSS coordinator of Siliguri College from 2008-2011.