Nirmalya Chatterjee

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- Teaching Experience

  2017–present *Fellow Level 1 (equiv. to **Assistant Professor – Graduate Faculty**)* at **Ashoka Trust for Research in Ecology and the Environment**, Bengaluru, based at the Eastern Himalayas / North-East India Regional Office, Gangtok, SK, India

  Recent courses:

  – Remote Sensing / Geographical Information Systems and Landscape Ecology using R/QGIS/GEE (E003), Fall 2020. 2-credit doctoral elective course (Coordinator & Co-instructor)
  – Fundamentals of Environmental Science (C1B), Fall 2019. 3-credit doctoral core course (Coordinator & Co-Instructor)
  – Critical Zone Soil Processes (E014), Fall 2018. 2-credit doctoral elective course (Coordinator & Instructor)

  2016–2017 *Undergraduate Teaching Faculty* at **University of Engineering and Management**, Newtown, Kolkata, WB, India

  – Designed and taught three semester length courses on "Environmental Chemistry", "General Chemistry" and "Thermodynamics and Kinetics" to freshmen and sophomore students of Engineering and Biology

  2005–2008 *Graduate Teaching Assistant* at **Dept. of Chemistry, University of Connecticut**, Storrs, CT

  – Taught discussion and laboratory sections in freshman general chemistry, physical chemistry and analytical chemistry (2 semesters each)

  2001–2002, 2005 *High School Science Instructor* in Chemistry and Physics, **Bharatiya Vidya Bhavan**, Kolkata, India

  – Taught physical sciences to secondary school grades 6–10.
  – Performed regular administration and invigilator assignments.

- Research Experience

  2017–present *Fellow Level 1* at **Ashoka Trust for Research in Ecology and the Environment (ATREE)**, Bengaluru, based at the Eastern Himalayas-NE India Regional Office, Gangtok, SK, India

  2019–present ***Adjunct Graduate Faculty*** at **University of Louisiana at Monroe**, Monroe, LA, USA

  – Upscaling bioclimatic, soil and community necessity parameter-driven appropriate restoration regimes in sub-humid regions and drylands
  – Testing efficacy of landscape restoration activities with a focus on soil health and carbon benefits of land interventions
  – Using ecological monitoring methods to ascertain ecosystem provisioning by soil and water resources in small catchments
  – Designing interventions for climate adaptation and mitigation for sustainable livelihoods in marginal farming communities
  – Monitoring land degradation, vegetation changes and long-term carbon budgeting in reforested tracts (peninsular S. India) and mosaicked forest-grasslands (Terai-Duars, E. India) ecosystems

  2015–2016 *Postdoctoral Fellow* at **Ashoka Trust for Research in Ecology and the Environment**, Eastern Himalayas–NE India Regional Office, Gangtok, SK, India

  – Modeled soil erosion in uplands with change in land cover/ land use
  – Researched climate change adaptation and dynamics of soils ecosystem service provisioning
  – Performed outreach and training among marginal upland farmers for popularizing maintenance of cover crops, crop residues and reduced tillage practices for mitigating soil erosion and stream water quality degradation

2009–2013 *Graduate Research Assistant* at **Dept. of Crop & Soil Sciences, Washington State University**, Pullman, WA, USA

- Studied millimeter-scale soil sediment/air–water interface interactions
- Quantified capillary force scaling in meso- and micro-scale sediment transport
- Researched transport processes under unsaturated flow conditions in soils.

2005–2009 *Graduate Research Assistant* at **Dept. of Chemistry, University of Connecticut**, Storrs, CT

- Developed protein-pigment complex and pigment (carotenoid) separation, purification and identification protocols for spectral analyses using HPLC and Ultra-centrifugation methods
- Performed and analyzed flourescence and 2-photon pump-probe (IR/Vis) dynamics of protein-photosynthetic pigments complexes at room- and cryogenic (77K, 4K) temperatures to determine spectral lability and kinetics
- Elucidated energy transfer pathways between carotenoid-chlorophyll molecules to determine energy transfer efficiencies
- Quantified pigment energy levels, and spectral contributions of constituent molecules in algal light harvesting complexes using kinetic modeling, mathematical deconvolution and electronic structure optimization methods

- Education

2009–2013 Ph.D. Soil Science (Soil Physics/Hydrology emphasis), Washington State University, Pullman, WA, USA.
Thesis title: *Capillary Forces on Sediment Particles: Experimental Measurements and Theoretical Estimates*

2005–2009 M.S. (Biophysical Chemistry), University of Connecticut, Storrs, CT, USA

2002–2004 M.Sc. (Analytical Chemistry), Maharaja Sayajirao University, Vadodara, India

1998–2001 B.Sc. (Chemistry (Honors)), University of Calcutta, Kolkata, India

- Research and Outreach Interests

– soil remediation, vegetating of marginal soils, native plant afforestation, soil erosion, soil carbon monitoring
– upscaling sustainable farming practices, permaculture and alternative farming adoption in marginal farms
– vadose zone hydrology, contaminant hydrology, storm-water run-off, soil/water biogeochemistry, climate change effects on soil carbon and pollutant dynamics, soil GHG emissions, soil nutrient availability

- Grants & Awards

2021–22 Co-PI to the $2,500 grant for "Sustainable management of *Lantana camara* and enhancing livelihood opportunities", funded by SwissNEX India Knowledge to Action Grant Program (2021) (PI: Mr. Durgesh Agrahari, SayTrees, Bengaluru, India)

2020–22 Co-PI to the ≈$8,560 grant for "Estimation of current and prediction of long-term C sequestration in biomass and soil carbon in reforested tracts around Bangalore", funded by SayTrees, Bengaluru, India (PI: Mr. Anirban Roy, ATREE, Bengaluru, India)

2012–2013 Contributor to the $10,000 grant for a literature survey and a review on compost leachates, awarded by the Washington State Dept. of Transportation, through Task Order No. T4120-36. Submitted report published as Technical Report WA-RD 819.1, August 2013

2009–2013 Full tuition waiver with 0.5 FTE assistantship, Dept. of Crop and Soil Sciences, Washington State University, USA

2005–2009 Full tuition waiver with 0.5 FTE assistantship, Dept. of Chemistry, University of Connecticut, USA

1996–1999 *National Science Talent Scholarship*, NCERT, New Delhi, India

- Memberships

2013– Soil Science Society of America

2013– American Geophysical Union

- Peer-Reviewed Publications
  published
  - Fields, A., Bhattacharjee, J. & **Nirmalya Chatterjee**. Reservoir bathymetry and riparian corridor assessment in two dammed sections of the Teesta River in Eastern Himalaya. *Environmental Monitoring and Assessment* **193**(10), 1–18 (2021)
  - **Nirmalya Chatterjee**. Soil erosion assessment in a humid, Eastern Himalayan watershed undergoing rapid land use changes, using RUSLE, GIS and high-resolution satellite imagery. *Modeling Earth Systems and Environment* **6**(1), 533–543 (2020)
  - **Nirmalya Chatterjee** & Flury, M. Effect of particle shape on capillary forces at an air-water interface. *Langmuir* **29**(25), 7903–7911 (2013)
  - **Nirmalya Chatterjee**, Lapin, S. & Flury, M. Capillary forces between sediment particles and an air–water interface. *Environmental Science & Technology* **46**(8), 4411–4418 (2012)
  - Niedzwiedzki, D. M., **Nirmalya Chatterjee**, Enriquez, M. M., Kajikawa, T., Hasegawa, S., Katsumura, S. & Frank, H. A. Spectroscopic investigation of peridinin analogues having different π-electron conjugated chain lengths: Exploring the nature of the intramolecular charge transfer state. *Journal of Physical Chemistry B* **113**(41), 13604–13612 (2009)
  - **Nirmalya Chatterjee**, Niedzwiedzki, D. M., Aoki, K., Kajikawa, T., Katsumura, S., Hashimoto, H. & Frank, H. A. Effect of structural modifications on the spectroscopic properties and dynamics of the excited states of peridinin. *Archives of Biochemistry and Biophysics* **483**(2), 146–155 (2009)
  - **Nirmalya Chatterjee**, Niedzwiedzki, D. M., Kajikawa, T., Hasegawa, S., Katsumura, S. & Frank, H. A. Effect of π-electron conjugation length on the solvent-dependent S_1 lifetime of peridinin. *Chemical Physics Letters* **463**(1-3), 219–224 (2008)
- Other Publications
  - **Nirmalya Chatterjee**. *Capillary Forces on Sediment Particles: Experimental Measurements and Theoretical Estimates*. PhD thesis, Washington State University, August (2013). `http://goo.gl/MSOkZw`
  - **Nirmalya Chatterjee**, Flury, M., Hinman, C. & Cogger, C. G. Chemical and physical characteristics of compost leachate – a review (WA-RD 819.1). Technical report, Washington Department of Transportation, Olympia, WA, August (2013). `http://www.wsdot.wa.gov/research/reports/fullreports/819.1.pdf`
- Conferences, Posters
  - **Nirmalya Chatterjee**, Lapin, S. & Flury, M. Capillary forces on millimeter-scale sediment particles: Experimental measurements and theoretical estimations. In *""* (Oregon Society of Soil Scientists, Winter Meeting, Troutdale, OR, 2013)
  - **Nirmalya Chatterjee**, Niedzwiedzki, D. M., Aoki, K., Schulte, T., Katsumura, S., Hofmann, E. & Frank, H. A. Optical spectroscopic studies of peridinin and peridinin-chlorophyll-protein (pcp) complexes. In *""* (25th Eastern Regional Photosynthesis Conference, Woods Hole, MA, 2008)
  - **Nirmalya Chatterjee**, Ilagan, R. P., Aoki, K., Katsumura, S. & Frank, H. A. Steady-state and femtosecond time-resolved optical spectroscopic studies of peridinin derivatives. In *""* (24th Eastern Regional Photosynthesis Conference, Woods Hole, MA, 2007)
  - **Nirmalya Chatterjee**, Ilagan, R. P., Aoki, K., Katsumura, S. & Frank, H. A. Steady-state and femtosecond time-resolved optical spectroscopic studies of peridinin derivatives. In *""* (23rd Eastern Regional Photosynthesis Conference, Woods Hole, MA, 2006)
- Professional Development

  09/2019 3-day workshop on **"Carbon Benefits Project (CBP) and the World Overview of Conservation Approaches and Technologies (WOCAT) tools"** for land management interventions, organized by the Colorado State University (CSU) and Environmental Defense Fund (EDF), New Delhi, India

03/2016 10-day workshop on **"GIS Methods in Soil-Water Conservation"**, Center for Water Resources, Anna University, Chennai, India

12/2015 5-day workshop on **"Heirarchical Modeling in Ecology using Bayesian Methods in R"**, National Center for Biological Science, Bengaluru, India

- Professional Activities

10/2019 1-day Thematic Consultation Meeting ("Biodiversity and Ecosystem Services" and "Biodiversity, Climate Change and Disaster Risk Mitigation") of the *National Mission on Biodiversity and Human Well-being (NBM)*, organized by the Secretariat of the Mission, at NCBS, Bangalore, Oct. 30, 2019, **Invited Soil Expert**

06/2019 1-day National Workshop on *India LDN-TSP Final Workshop*, organized by the MoEFCC-Govt. of India, New Delhi, June. 17, 2019, **Invited Soil Expert from CSO/NGO sector** – attended over-the-air due scheduling conflicts

02/2019 2-day outreach workshop on the *Indian Himalayan Timberline Project Findings and Prospects of Conservation & Development in the Sikkim Himalaya*, organized by the GBPNIHESD, MoEFCC, Govt. of India, Feb. 18-19, 2019, Gangtok, Sikkim. **Invited panelist - Technical session I:** Findings of the IHTP project and ramifications for natural resource management in Sikkim.

12/2018 2-day National Workshop on *India: Land Degradation Neutrality – Target Setting Program (LDN-TSP)*, organized by UNCCD and the MoEFCC-Govt. of India, New Delhi, Dec. 4-5, 2018, **Invited Soil Expert from CSO/NGO sector, Session Rapporteur, and Working Group 1 Panelist**

10/2018 2-week workshop on *Adapting to Climate Change: A focus on biodiversity and habitat conservation*, organized by ATREE under the SPLICE program, Dept. of Science and Technology (Govt. of India), at Rajiv Gandhi University, Doimukh, Arunachal Pradesh, Oct. 21–Nov. 4, 2018. **Invited Instructor and Soil Expert**

05/2018 2-day Regional Workshop on *Mainstreaming Climate Change in Disaster Risk Management*, Sikkim State Disaster Management Authority, Gangtok, Sikkim, May 8-9, 2018. **Invited Soil Expert and discussion session panelist**

03/2018 2-day workshop on Environmental Science and Management Development, organized by NERIWALM Tezpur, CAEPHT, Ranipool, Sikkim, Mar. 27-28, 2018. **Invited Soil Expert, Workshop Rapporteur**

02/2018 International Conference on *State of the Cryosphere in the Himalaya*, organized by the Divecha Center - IISc / IMI Sikkim, Gangtok, Sikkim, Feb. 19-20, 2018. **Invited Panelist - Soils in the Cryosphere**

11/2017 2-day workshop, Eastern Himalayan Naturenomics Forum, organized by Balipara Foundation, Guwahati, Assam, Nov. 2-3, 2017. **Poster Presentation and invited panelist**

- Institutional Service

10/2019– Member, ATREE Committee Against Sexual Harassment

06/2020– Member, ATREE Academic Committee

08/2021– Registered Doctoral Research Advisor, Manipal Academy of Higher Education

- References – *On request*