Sambit Ghosh, PhD

Stable Isotope & Organic Geochemist
Department of Geology and Geophysics,
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EDUCATION

PhD: Earth Sciences, Department of Earth Sciences, IISER Kolkata, WB, India. 2019
MSc: Applied Geology, Department of Geological Sciences, Jadavpur University, WB, India. 2010
BSc: Geological Sciences, Department of Geological Sciences, Jadavpur University, WB, India. 2008

EMPLOYMENT

Assistant Professor: Department of Geology and Geophysics, IIT KGP, WB, India 2026-
Postdoctoral Fellow: INE, University of Alaska Fairbanks, Alaska, USA. 2023-2026
Postdoctoral Fellow: IAB, University of Alaska Fairbanks, Alaska, USA. 2021-2023
Postdoctoral Fellow: SEES, Seoul National University, Seoul, South Korea. 2019-2021
Research Associate: IISER Kolkata, WB, India. 2018-2019

EXPERTISE

Method development: Biomarker, Stable Isotope & Greenhouse Gas Research

- Molecular characterization of organic matter.
- Compound specific stable isotope ratio of organic molecules.
- Stable isotope ratio measurements in natural substance & greenhouse gas species.
- Stable isotopic ratio analysis of greenhouse gas species.
- Inter-laboratory calibration of secondary standards to ensure cross-laboratory consistency.

Instrument Handling

- Stable Isotope Ratio Mass Spectrometer (Thermo MAT 253, DELTA V PLUS, DELTA Q) with peripherals (Gas Chromatograph) GC IsoLink, Elemental Analyzer (EA), Gas Bench, Kiel IV Carbonate and PreCon
- GC connected to Flame Ionize Detector (FID), MS and MS-MS
- Thermal Ionization Mass Spectrometer (Thermo Triton)
- Accelerated Solvent Extractor (Dionex ASE, EXTREVA)
- Multi Sensor Core Logger (GEOTEK)
- Developing expertise in LC-MS/MS (Thermo Orbitrap)

Analytical Chemistry

- Collagen extraction from geological samples.
- Extracted organic molecules (e.g., lipids, amino acids) from modern and geological samples.
- Separated greenhouse gas species from modern atmosphere and firn..

Field Sedimentology Experiences

Interior Alaska | Alaska, USA 2024- 2025
Arctic Expedition | Kotzebue, Alaska, USA 2024

Bering Sea Expedition (R/V Sikuliaq) | Alaska, USA	2023
Eastern Himalaya, Tista Valley, WB, India	2018-2019
Central Himalaya, Nepal	2016
NW Himalaya, HP, India	2012-2015
Deccan Basalt, Rajahmundry, AP, India	2015
NW Himalaya, J&K, India	2011-2012
Eastern Himalaya, AR, India	2010-2011

PUBLICATIONS

Peer Reviewed Articles

1. Eckelmann, R. I., Arppe, L., Schulting, R. J., Ghosh, S., Trubač, J., Kuchařová, A., ... & Mannermaa, K. (2026). Investigating human paleodiet at Mesolithic Yuzhniy Oleniy Ostrov, Karelia using a multi-proxy stable isotope approach. *PLoS One*, *21*(1).
2. Wooller, M. J., Drukenmiller, P., Oteo-García, G., Di Paolo, F., Dalén, L., Baker, N., ... & Wygal, B. T. (2025). Adopted "mammoths" from Alaska turn out to be a whale's tale. *Journal of Quaternary Science*.
3. Johnson, J. J., **Ghosh, S**., Shaw, P. A., Neuhouser, M. L., Lampe, J. W., Tinker, L. F., ... & O'Brien, D. M. (2025). The carbon isotope ratio of alanine is a biomarker of added sugar and sugar-sweetened beverage intakes: a pooled analysis of four studies. *The American journal of clinical nutrition*.
4. Vesala, R., **Ghosh, S**., Murphy, R., Poulsen, M., Schmidt, S., Mwangala, L., ... & Arppe, L. (2025). Nutritional dynamics in fungus-growing termites: Integration of biological nitrogen fixation and microbial amino acids. *Functional Ecology*, *39*(9), 2481-2495.
5. **Ghosh, S**., Roy, B., & Sanyal, P. (2025). The late Neogene distribution of C3–C4 plants in the Himalayan Foreland Basin: insight from the δ13C values and sedimentological architecture of the Siwaliks. *Geological Society, London, Special Publications*, *549*(1), 179-203.
6. Rowe, A. G., Bataille, C. P., Baleka, S., Combs, E. A., Crass, B. A., Fisher, D. C., ... & Wooller, M. J. (2024). A female woolly mammoth's lifetime movements end in an ancient Alaskan hunter-gatherer camp. *Science advances*, *10*(3), eadk0818.
7. Jha, D. K., Hirave, P., **Ghosh, S**., Dasgupta, B., & Sanyal, P. (2024). Does leaf wax isotopic characterisation of gymnosperms and angiosperms capture environmental gradients in Himalayas?. *Organic Geochemistry*, *187*, 104720.
8. **Ghosh, S**., Toyoda, S., Buizert, C., Etheridge, D. M., Langenfelds, R. L., Yoshida, N., ... & Ahn, J. (2023). Concentration and isotopic composition of atmospheric N2O over the last century. *Journal of Geophysical Research: Atmospheres*, *128*(12), e2022JD038281.
9. Lee, G., Ahn, J., Ju, H., Ritterbusch, F., Oyabu, I., Buizert, C., ... & Yang, G. M. (2022). Chronostratigraphy of the Larsen blue-ice area in northern Victoria Land, East Antarctica, and its implications for paleoclimate. *The Cryosphere*, *16*(6), 2301-2324.
10. Roy, S., **Ghosh, S**., & Sanyal, P. (2022). Carbon reservoir perturbations induced by Deccan volcanism: Stable isotope and biomolecular perspectives from shallow marine environment in Eastern India. *Geobiology*, *20*(1), 22-40.
11. Basu, S., **Ghosh, S**., & Chattopadhyay, D. (2021). Disentangling the abiotic versus biotic controls on C3 plant leaf carbon isotopes: inferences from a global review. *Earth-Science Reviews*, *222*, 103839.

12. Roy, B., Roy, S., Goyal, K., **Ghosh, S**., & Sanyal, P. (2021). Biomarker and carbon isotopic evidence of marine incursions in the Himalayan foreland basin during its overfilled stage. *Paleoceanography and Paleoclimatology*, *36*(5), e2020PA004083.
13. **Ghosh, S**., Bera, M. K., Roy, B., & Sanyal, P. (2021). Revisiting the diachronous transition of C3 to C4 plants in the Himalayan foreland and other parts of the globe: a sedimentological perspective. *Sedimentology*, *68*(6), 2473-2499.
14. Roy, B., **Ghosh, S**., & Sanyal, P. (2020). Impact of monsoon, vegetation, and landscape on pedogenesis: A case study using organic and inorganic tracers from the Himalayan foreland sediments. *Palaeogeography, Palaeoclimatology, Palaeoecology*, *556*, 109854.
15. **Ghosh, S**., Sanyal, P., Roy, S., Bhushan, R., Sati, S. P., Philippe, A., & Juyal, N. (2020). Early Holocene Indian summer monsoon and its impact on vegetation in the Central Himalaya: insight from δD and δ13C values of leaf wax lipid. *The Holocene*, *30*(7), 1063-1074.
16. Roy, B., **Ghosh, S**., & Sanyal, P. (2020). Morpho-tectonic control on the distribution of C3-C4 plants in the central Himalayan Siwaliks during Late Plio-Pleistocene. *Earth and Planetary Science Letters*, *535*, 116119.
17. Basu, S., **Ghosh, S**., & Sanyal, P. (2019). Spatial heterogeneity in the relationship between precipitation and carbon isotopic discrimination in C3 plants: inferences from a global compilation. *Global and Planetary Change*, *176*, 123-131.
18. **Ghosh, S**., Sanyal, P., Sangode, S. J., & Nanda, A. C. (2018). Substrate control of C4 plant abundance in the Himalayan foreland: a study based on inter-basinal records from Plio-Pleistocene Siwalik Group sediments. *Palaeogeography, Palaeoclimatology, Palaeoecology*, *511*, 341-351.
19. **Ghosh, S**., Sanyal, P., & Kumar, R. (2017). Evolution of C4 plants and controlling factors: Insight from n-alkane isotopic values of NW Indian Siwalik paleosols. *Organic Geochemistry*, *110*, 110-121.

Conference Proceedings

1. Wanket, C., de Sanctis, B., Wooller, M.J., Caissie, B., Fowell, S.J., Bigelow, N.H., Hill, J.C., Scholl, D.W., Maio, C., **Ghosh, S**. and Barna, J., 2024. Characterizing Biological Communities of the Late Pleistocene Bering Land Bridge Using sedaDNA. *AGU24*.
2. Caissie, B., Fowell, S.J., Hill, J.C., Wooller, M.J., Bigelow, N.H., Scholl, D.W., Maio, C., **Ghosh, S**., Oeste, R., Barna, J. and Datson, S., 2024. Marine and Terrestrial Sedimentation of the Pacific/Arctic Ocean Gateway and Bering Land Bridge. *AGU24.*
3. Barna, J., Fowell, S.J., Bigelow, N.H., Wooller, M.J., **Ghosh, S**., Caissie, B., Hill, J.C., Scholl, D.W., Maio, C., Wanket, C. and Oeste, R., 2024. Late Pleistocene Palynomorph Assemblages Provide Clues to Faunal Filtering on The Bering Land Bridge. *AGU24.*
4. Oeste, R., Caissie, B., Fowell, S.J., Wooller, M.J., Bigelow, N.H., Hill, J.C., Scholl, D.W., Maio, C., **Ghosh, S**., Datson, S. and Wanket, C., 2024. Primary Productivity Along the Central Beringian Coast. *AGU24*.
5. Datson, S., Maio, C., Fowell, S.J., Bigelow, N.H., Caissie, B., Hill, J.C., Wooller, M.J., Scholl, D.W., **Ghosh, S**., Barna, J. and Oeste, R., 2024. Potential for Paleo-storm Reconstruction and Timing of Marine Transgression of the Bering Land Bridge Through Sediment Core Analysis in Norton Sound, Alaska. *AGU24*.

6. Fowell, S.J., Caissie, B., Hill, J.C., Scholl, D.W., Wooller, M.J., Bigelow, N.H., Maio, C., Barna, J., **Ghosh, S.**, Wanket, C. and Oeste, R., 2024. The Bering Land Bridge During the Last Glacial Stage: Great Grazing or Buggy Bogs?. *AGU24*.
7. Hill, J.C., Fowell, S.J., Caissie, B., Bigelow, N.H., Maio, C., Scholl, D.W., Wooller, M.J., **Ghosh, S.**, Barna, J., Oeste, R. and Datson, S., 2024. Paleodrainage patterns on the Bering Shelf: Evidence for extensive wetlands and anastomosing rivers across the Bering Land Bridge. *AGU24*.
8. Kim, J., Ahn, J., and **Ghosh, S.**, Greenhouse gas emission from vehicles in Seoul megacity, South Korea: Molar ratios (N2O: CO2, CH4: CO2) and stable isotopic compositions of N2O (δ15N, δ18O). *EGU General Assembly 2023.*
9. Kim, J., Ahn, J., and **Ghosh, S.**, Mixing ratio and Stable isotope based characterization of CO2 and N2O emitted from vehicles by a tunnel study in Seoul, South Korea. *AGU21*.
10. **Ghosh, S.**, Toyoda, S., Ahn, J., Jang, Y., and Yoshida, N., Understanding the evolution of atmospheric nitrous oxide over the last century from the stable isotopes of the firn air at Styx Glacier, East Antarctica. *EGU General Assembly 2021.*
11. Roy, B., Roy, S., Sanyal, P., and **Ghosh, S.**, Exploring the use of Biomarkers to Understand the Paradox of the Depository Settings in Eastern Siwaliks of the Himalayan Foreland Basin. *Goldschmidt Conference 2020.*
12. **Ghosh, S.**, Toyoda, S., Ahn, J., Jang, Y., and Yoshida, N., Evolution of atmospheric nitrous oxide for the last 100 years: Insights from the stable isotope values of firn air at Styx Glacier, East Antarctica. *Annual meeting GSK 2020*.
13. **Ghosh, S.**, Sanyal, P., Bhushan, R., Philippe, A., and Jyual, N., Early Holocene Indian summer monsoon and its impact on vegetation: Insight from n-alkane isotope values of the Central Himalaya relict lake sediments. *EGU General Assembly 2019.*
14. Sanyal, P., **Ghosh, S.**, Bhushan, R., and Jyual, N., Early-Holocene intensified Indian summer monsoon and its impact on vegetation: study based on hydrogen and carbon isotope values in long chain alkane from relict lake sediments in the Central Himalaya. *AGU17*.
15. **Ghosh, S.**, and Sanyal, P., 2016. Role of climate and fluvial architecture on temporal and spatial variation in C4 abundance: A compound specific isotopic evidences from the late Miocene Siwalik deposit of NW India. 937, *Goldschmidt Conference 2016.*
16. **Ghosh, S.**, Sanyal, P., and Kumar, R., 2016. The early (pre-11 Ma) existence and disparate response of C4 plant in the Indian sub-continent: Evidences from n-alkane isotopic ratios of NW Indian Siwalik paleosol. Vol. 18, EGU2016-7323, 2016, *EGU General Assembly 2016.*
17. Rakshit, S., **Ghosh, S.**, Sanyal, P., and Ambili, A., 2015. Sedimentary profile from oxbow lake as an archive for past productivity and vegetation changes: a case study from Ganges basin, West Bengal, India. Vol. 17, EGU2015-3666, 2015, *EGU General Assembly 2015.*
18. **Ghosh, S.**, Sanyal, P., and Bera, M. K., 2015. Response of Fluvial Architecture and Vegetation with change in rainfall amount during the late Miocene time: Compound specific isotopic evidence from the NW Siwalik, India. *30th Himalayan-Karakoram-Tibet Workshop*

AWARDS

- CEM faculty travel award (UAF, Alaska, USA). 2024
- SERB International Travel Support to attend EGU 2019 (SERB, India). 2019

- National Postdoctoral Fellowship (SERB, India). 2019
- Senior Research Fellowship (CSIR, India). 2014
- Junior Research Fellowship (CSIR, India). 2012

LANGUAGES

English – Bilingual Proficiency; Hindi – Working Proficiency; Bengali – Native speaker