

Neha Mehta, PhD

FNRS Research Fellow
Biogeochemistry and Earth System Modeling
Université libre de Bruxelles, Brussels, Belgium

ORCID: [0000-0002-7312-6398](https://orcid.org/0000-0002-7312-6398)
email: neha.mehta@ulb.be
Website: www.mneha.com

KEY TERMS

microbe-mineral interactions; spectroscopy; microscopy; biomineralization; bioremediation; radioactive contaminants; biogeochemistry; geomicrobiology

EDUCATION

2014–2019 **PhD in Environmental Sciences**, Massachusetts Institute of Technology, USA
Thesis: Radium cycling in groundwater: Implication for bioremediation and tracer studies

PI: Charles Harvey and Benjamin D. Kocar

Date of conferral: 20/02/2019

2012–2014 **MS in Technology and Policy**, Massachusetts Institute of Technology, USA
Thesis: Development of a spatial optimization platform for wastewater management in unconventional oil and gas process

PI: Francis O' Sullivan

2010–2011 **MS in Chemical Engineering**, University of California, Berkeley, USA

2006–2010 **BTech in Paper Chemistry**, Indian Institute of Technology, Roorkee, India

PROFESSIONAL EXPERIENCE

2023– **FNRS Research Fellow**, Université libre de Bruxelles, Brussels, Belgium

2019–2023 **Postdoctoral Researcher**, Sorbonne University, Paris, France

2014–2019 **Research Associate**, Massachusetts Institute of Technology, USA

2012–2012 **Research Chemist**, Porifera Inc., USA

PUBLICATIONS

PUBLISHED IN PEER-REVIEW JOURNALS

2024 [14] **Mehta N**, Bradbury HJ, Benzerara K, Calcium isotope fractionation by intracellular amorphous calcium carbonate (ACC) forming cyanobacteria *Geobiology*

2023 [13] **Mehta N**, Vantelon D, Gaëtan J, Martinez AF, Benzerara K, Calcium speciation and coordination environment in intracellular amorphous calcium carbonate (ACC) formed by cyanobacteria *Chemical Geology*

[12] **Mehta N**, Coutaud M, Bouchez J, Bradbury HJ, VanZuilen K, Moynier F, Gorge C, Skouri-Panet F, Benzerara K, Barium and strontium isotope fractionation by cyanobacteria forming intracellular carbonates *Geochimica et Cosmochimica Acta*

- [11] Gaëtan J, Halary S, Millet M, Bernard C, Duval C, Hanlaoui S, Amandine H, Gugger M, Marie B **Mehta N**, Moreira D, Skouri-Panet F, Travert C, Duprat E, Leloup J, Benzerara K, Widespread formation of intracellular calcium carbonates by the bloom-forming cyanobacterium *Microcystis* *Environmental Microbiology*
- [10] Bacchetta T, López-García P, Gutiérrez-Preciado A, **Mehta N**, Skouri-Panet F, Benzerara K, Ciobanu M, Yubuki N, Moreira D, Description of *Gloeomargarita ahousahtiae* sp. nov., a thermophilic member of the order Gloeomargaritales capable of intracellular carbonate biomineralization. *Just accepted European Journal of Phycology*
- [9] Benzerara K, Görgen S, Athar M, Chauvat F, March K, Menguy N, **Mehta N**, Skouri-Panet F, Swaraj S, Travert C, Cassier-Chauvat C, Duprat E, Quantitative mapping of calcium cell reservoirs in cyanobacterial mutants at the submicrometer scale. *Just accepted in Journal of Electron Spectroscopy and Related Phenomena*
- 2022 [8] **Mehta N**, Bougoure, J, Kocar B, Duprat E, Benzerara K. Cyanobacteria *G. lithophora* accumulate Radium within intracellular amorphous calcium carbonate inclusions. *ES&T Water* doi:[10.1021/acsestwater.1c00473](https://doi.org/10.1021/acsestwater.1c00473)
- [7] **Mehta N**, Gaëtan J, Giura P, Azaïs T, Benzerara K. Detection of biogenic amorphous calcium carbonate (ACC) formed by bacteria using FTIR spectroscopy *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*doi:[10.1016/j.saa.2022.121262](https://doi.org/10.1016/j.saa.2022.121262)
- [6] Chen M, **Mehta N**, Kocar B. Semiconducting hematite facilitates microbial and abiotic reduction of chromium *Scientific Reports* doi:[10.1038/s41598-022-12824-y](https://doi.org/10.1038/s41598-022-12824-y)
- [5] Wang, P, Shi, T, **Mehta N**, Yang, S, Wang, H, Liu, D, Zhu, Z Changes in magnetic properties of magnetite nanoparticles upon microbial iron reduction *G-cubed* doi:[10.1029/2021GC010212](https://doi.org/10.1029/2021GC010212)
- 2021 [4] Bai H, Liu D, Zheng W, Ma L, Yang S, Cao J, Lu X, Wang H, **Mehta N**. Microbially-induced calcium carbonate preprecipitation by a halophilic ureolytic bacterium and its potential for remediation of heavy metal-contaminated saline environments *Intern. Jou of Biodeteriora. and Biodegrad* doi:[10.1016/j.ibiod.2021.105311](https://doi.org/10.1016/j.ibiod.2021.105311)
- 2019 [3] **Mehta N**, Benzerara K, Kocar B, Chapon V. Sequestration of radionuclides Radium-226 and Strontium-90 by cyanobacteria forming intracellular calcium carbonates. *Environmental Science & Technology* doi:[10.1021/acs.est.9b03982](https://doi.org/10.1021/acs.est.9b03982).
- [2] **Mehta N**, Kocar B. Geochemical Controls on Trace Metals and Radium Mobilization from Marcellus Shale and its implication for in-situ produced water remediation, *Environmental Science: Processes & Impact*. doi:[10.1039/C9EM00244H](https://doi.org/10.1039/C9EM00244H).
- 2018 [1] **Mehta N**, Kocar B. Deciphering and Predicting Microscale Controls on Radon Production in soils, sediments and rocks *Soil Syst..* doi:[10.3390/soilsystems2020030](https://doi.org/10.3390/soilsystems2020030)

BOOK CHAPTERS

- 2014 **Mehta N**, Sullivan FO. Water management in unconventional oil and gas development – The issues and its optimization. *Book title: Food-Water Energy: The Nexus, Edi. Satinder Ahuja, Elsevier.*

AWARDS & FELLOWSHIPS

- 2022 **FNRS Postdoctoral fellowship** by the National Fund for Scientific Research, Belgium
- 2022 **Awarded 1st place in Poster Competition** at Magnetotactic Bacteria meeting, Bayreuth, Germany
- 2022 **Early Career Science Ambassador Award** by European Association of Geochemistry (EAG)
- 2020 Gordon Research Conference on Geobiology **Travel Award** to present at the Gordon Geobiology Conference, TX, USA
- 2019 **Awarded 3rd place in Student Oral Competition** at Soil Science Society of America (SSSA) Conference, San Diego
- 2019 Awarded **Seal of Excellence** by Marie Skłodowska-Curie Actions (MSCA)
- 2014 **MIT Energy Initiative Fellowship**, *Massachusetts Institute of Technology, USA*. More information: energy-fellows/2014-15.html
- 2010 Geological Society of America (GSA) **Student Travel Grant** to present at the GSA Annual Meeting, Denver, CO, USA
- 2010 Indian Institute of Technology Roorkee (India) **Best Undergraduate Thesis Award**
- 2010 Awarded Institute Silver Medal by Indian Institute of Technology Roorkee (IIT R) for **excellent academic performance** during undergraduate program

COMMUNICATIONS

INVITED RESEARCH SEMINARS

- 2023 [6] Earth Life Institute, Université catholique de Louvain, Belgium
- [5] Max Planck Institute of Colloids and Interface, Germany
- 2022 [4] Smithsonian National Museum of Natural History, Washington DC, USA
- [3] L'Institut de Systématique, Evolution, Biodiversité, Museum of Natural History, Paris, France
- 2021 [2] Department of Geoscience University of Copenhagen, Denmark
- [1] Biogeochemistry and Earth System Modeling group, Université libre de Bruxelles, Brussels, Belgium

CONFERENCE PRESENTATIONS (INVITED*)

- 2023 **Mehta N***. Isotope and trace element composition of biogenic amorphous calcium carbonate (ACC) formed by cyanobacteria *Goldschmidt Conference, Lyon*
- 2022 **Mehta N***, Georges T, Laurent G, Azaïs T, Gaëtan J, Giura P, Delphine V, Martinez AF, Benzerara K. Spectroscopy insights into intracellular amorphous calcium carbonate (iACC) formed by cyanobacteria *Gordon Research Conference Biomineralization, Spain*
- 2021 **Mehta N**, Gaëtan J, Delphine V, Martinez AF, Molecular insights into formation of bacterial intracellular amorphous calcium carbonate (ACC) by X-ray absorption spectroscopy *Goldschmidt Hybrid, Honolulu, Hawaii*

- 2021 **Mehta N**, Georges T, Azaïs T, Benzerara K, Laurent G, Diogo C, The use of NMR spectroscopy to probe chemical environment surrounding intracellular amorphous carbonates formed by cyanobacteria *Goldschmidt*, Lyon, France
- 2020 **Mehta N**, Skouri-Panet F, Benzerara K Biogeochemical significance of intracellular calcification by cyanobacteria, *EGU 2020, Virtual meeting*
- 2019 **Mehta N**, Harvey C, Variability in Porewater ²²⁴Ra-²²⁸Ra Ratio and its Implications for Groundwater Tracer Studies *Goldschmidt*, Barcelona, Spain
- Mehta N**, Benzerara K, Kocar B, Selective Sequestration of Radionuclide Contaminants in Intracellular Biominerals Precipitated by Cyanobacteria *SSSA*, San Diego, USA
- 2018 **Mehta N**, Benzerara K, Kocar B, Radium Retention by Cyanobacteria Forming Intracellular Carbonates *Goldschmidt*, Boston, Massachusetts
- 2017 **Mehta N**, Harvey C, Kocar B, Investigating Controls on Radium Isotopic Activities and Ratios in Natural Environments *Goldschmidt*, Paris, France.
- 2016 **Mehta N**, Harvey C, Kocar B, Experimental measurement of alpha recoil flux of radionuclides and its application in hydraulic fracturing *GSA Annual Meeting*, Denver, Colorado
- Mehta N**, Harvey C, Investigating radioactivity and trace element leaching from shale in unconventional oil and gas exploration *ACS Annual Meeting*, San Diego, USA.

POSTER COMMUNICATIONS

- 2022 **Mehta N**, Viollier Eric, Menguy Nicolas, Lefèvre Christopher, Monteil Caroline, Benzerara K, Mineralogical and geochemical controls on intracellular amorphous calcium carbonate formed by magnetotactic bacteria in Lake Pavin, France *7th International Meeting on Magnetotactic Bacteria*, Bayreuth, Germany
- 2020 **Mehta N**, Benzerara K Intracellular Calcification in Cyanobacteria presents a novel perspective on calcium homeostasis in cyanobacteria *Gordon Geobiology Conference*, Texas, USA
- 2016 **Mehta N**, Harvey C, Kocar B, Alpha Recoil Flux of Radon in Groundwater and its Experimental Measurement *AGU Annual Meeting*, California, USA

RELEVANT FUNDING (TO DATE 74,026 USD)

- 2022 **Role:** Co-PI/Collaborator
Subject: Biosolubilization of phosphatic minerals
Duration: 1 year
Funding agency: France-Berkeley Fund, UC Berkeley
Funding volume: 11,923 USD
- 2020 **Role:** Named postdoc on the proposal and assisted in writing the proposal
Subject: Use of amorphous carbonates produced by bacteria for the depollution of alkaline-earth radioisotopes
Duration: 1 year
Funding agency: Institute of Material Science of Alliance, Sorbonne University
Funding volume: 62,103 USD

SELECTED SYNCHROTRON PROPOSALS (*PI)

- 2023 [6] *Deciphering the role of magnetotactic bacteria in the geochemical cycle of Ca (proposal ID: 20220623), LUCIA beamline, SOLEIL Synchrotron, France
- [5] *Trace element composition of amorphous calcium carbonate (ACC) formed by microorganisms and its implications for biomineralization studies (proposal ID:20221048), NANOSCOPIUM beamline, SOLEIL Synchrotron, France
- [4] *Bacterial influence on extracellular precipitation of Phosphate minerals (proposal ID:20221458), HERMES beamline, SOLEIL Synchrotron, France
- 2022 [3] *Spectroscopy insights into intracellular amorphous calcium carbonate (ACC) formed by bacteria (proposal ID: 20221719), SMIS beamline, SOLEIL Synchrotron, France
- [2] Identifying the contribution of cyanobacteria forming intracellular amorphous Ca-carbonates to the Ca geochemical cycle (proposal ID:20210273), LUCIA beamline, SOLEIL Synchrotron, France
- [1] Micro-XRF mapping of transition metals in modern stromatolites: clues to their formation and use as paleobiological and paleoenvironmental records (proposal ID: 20210025), NANOSCOPIUM beamline, SOLEIL Synchrotron, France

FIELD RESEARCH

Lake Pavin, France: October 2021-2023: three field missions concluded to understand biogeochemistry of carbonate forming magnetotactic bacteria in the lake sediments.

TEACHING

TEACHING ASSISTANT FOR UNDERGRADUATE & GRADUATE

- 2019 Curriculum Development Workshop Massachusetts Institute of Technology, USA
- 2016 Groundwater Hydrology, Massachusetts Institute of Technology, USA
- 2010 Organic Chemistry, University of California, Berkeley, USA
- 2011 Intro to Physics, University of California, Berkeley, USA

STUDENT SUPERVISION

UNDERGRADUATE

- 2023 Alex Abhaya Wickramasinghe, University of Paris, Saclay, France
- 2020 Adonis Gourden, University of Paris, France
- 2016 Alexander Denmark, Massachusetts Institute of Technology, Cambridge, USA

OUTREACH

- 2020 As a volunteer for *SkypeaScientist*, gave a science talk to Jerome High School students on *Cyanobacteria and their importance*
- 2017 Volunteered at MIT Museum to teach high school students STEM science, Massachusetts Institute of Technology, USA

2016 Volunteered at Cambridge Science Festival as a Geoscience instructor, Massachusetts Institute of Technology, USA.

SCIENTIFIC SERVICE

EDITOR

2019–2020 Guest editor for the *Frontiers of Earth Science*

COMMITTEES

2021– Judge for poster competition at ASM World Microbe Conference

2021– Invited panelist on Career Panel organized at Dartmouth Geobiology Conference

2019–2020 EarthArXiv Advisory Council

2020–2023 Organizer of Departmental Geo(micro)biology Seminars, Biogeochemistry and Earth System Modeling.

2020 Discussion Leader, Gordon Geobiology Seminar, Texas, USA.

2015–2016 Co-President of MIT Water Club Massachusetts Institute of Technology

REVIEWER

Environmental Sciences: Process & Impact – Geochimica et Cosmochimica Acta – Science of Total Environment – Soil Systems – Biogeosciences

CONFERENCE CONVENER

2022 Session 7o: Biomineralization: mechanisms, functions and geochemical importance
Farfan, G Fang, Y **Mehta N**, Benzerara K
Goldschmidt 2022, Honolulu, Hawaii.

2021 Session: 10e - The microbe-mineral interface: new analytical techniques and roles in authigenesis
Mehta N, Cosmidis J, Bailey J Benzerara K, Picard A
Goldschmidt 2021, Lyon, France.

2019 Session 13i: Microbial Controls on Contaminant Transformations in Different Environments: Bio-Mineralization, Bioweathering and Bioremediation
Mehta N, Benzerara K, Dittrich M, Matschiavelli N, Rodriguez-E. P, Valhondo C.
Goldschmidt 2019, Barcelona, Spain.