

Shaily Rahman, Ph.D.

Education

- 2016 Ph.D., Chemical Oceanography**, Stony Brook University (Stony Brook, NY, U.S.A.)
Thesis: Cosmogenic Silicon-32 reveals extensive authigenic clay formation in deltaic systems and constrains the marine silica budget
Advisors: Robert C. Aller and J. Kirk Cochran
- 2003 M.Sc., Earth and Planetary Sciences**, McGill University (Montreal, QC, Canada)
Thesis: Oxidation of arsenite by dissolved oxygen, manganese and iron oxyhydroxides in aqueous solutions
Advisors: Alfonso Mucci and Bjorn Sundby
- 2000 B.Sc., Chemistry with minor in Mathematics**, McGill University (Montreal, QC, Canada)

Professional Experience

- 2021 – Present INSTAAR Fellow and Assistant Professor**
Institute of Arctic and Alpine Research and Department of Geological Sciences, University of Colorado Boulder
- 2019 – 2021 Postdoctoral Research Associate**
Division of Marine Science, University of Southern Mississippi
- 2016–2019 Postdoctoral Research Associate**
Department of Geological Sciences, University of Florida
- 2004–2007 Environmental Scientist & Consultant**
Radioactive Waste Management Associates (RWMA), New York, NY
- 2002–2003 Education Design Consultant/Tomlinson Science Teaching Fellow**
McGill University, Montreal, Quebec
- 2001–2002 Education Design Consultant**
Lucent Technologies, Montreal, Quebec

Grants

- July 2022- Dec 2023 PI, University of Colorado RIO Seed Grant** (amount - \$49, 631)
Transformation of reactive Si across terrestrial analog environments: Implications for interpreting the weathering history of Mars
- Dec 2021- Dec 2022 PI, NSF OCE RAPID** (amount - \$123, 303)
Extreme disturbances/perturbations to coastal deposition systems

Awards and Distinctions

- 2016 DISCO XXV** (Dissertation in Chemical Oceanography Symposium) selected participant (Sponsored by NSF&NOAA)
- 2003 Tomlinson Science Teaching Fellow** (amount – \$10 000 CD), McGill University
- 2002 John B. Lynch Scholarship** (amount – \$10 000 CD), McGill University

Publications

Book Chapters

- [1] **Rahman, S.** (2019) Reverse weathering in marine sediments. Encyclopedia of Ocean Sciences, third ed. Elsevier, Oxford. [Link to chapter](#)

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Publications in Preparation

- [15] **Rahman, S.** and Trower, E.J. (*in preparation*) Secondary mineral formation and the balance of the stable Si isotope budget on the surface Earth.
- [14] Frings, P.J. and **Rahman, S.** (*in preparation*) Perspectives on an evolving ocean Si cycle
- [13] **Rahman, S.**, Shiller, A., Anderson, R., Hayes, C.T., Lam, P.J., Ohnemus, D., Pavia, F., Twining, B., and Vivancos, S. (*in preparation*) Particulate excess Ba as a proxy for biological productivity along the North Atlantic and South Pacific GEOTRACES transects.

Peer-Reviewed Publications

- [12] **Rahman, S.**, Shiller, A., Anderson, R.F., Charette, M.A., Hayes, C.T., Gilbert, M., Grissom, K.R., Lam, P.J., Ohnemus, D.C., Pavia, F.J., Twining, B.S., and Vivancos, S.M. (2022) Dissolved and particulate barium distributions along the US GEOTRACES North Atlantic and East Pacific Zonal Transects (GA03 and GP16): Global implications for the marine barium cycle. *Global Biogeochemical Cycles*, 36, e2022GB007330. [Link to article](#)
- [11] Hayes, C.T., Costa, K.M., Calvo, E., Chase, Z., Demina, L.L., Dutay, J.-C., German, C.R., Heimbürger-Boavida, L.-E., Jaccard, S.L., Jacobel, A., Kohfeld, K.E., Kravchishina, M.D., Lippold, J., Mekik, F., Missiaen, L., Pavia, F.J., Paytan, A., Pedrosa Pamies, R., Petrova, M.V., **Rahman, S.**, Robinson, L., Roy-Barman, M., Sanchez-Vidal, A., Shiller, A., Tagliabue, A., Tessin, A.C., van Hulst, M., and Zhang, J. (2021) The composition and flux of seafloor sediments in the global ocean. *Global Biogeochemical Cycles*, 35, e2020GB006769 [Link to article](#)
- [10] Pain, A. J., Martin, J. B., Martin, E.E., and **Rahman, S.** (2021) Heterogeneous CO₂ and CH₄ content of glacial meltwater of the Greenland Ice Sheet and implications for subglacial carbon processes. *The Cryosphere Discussions*, 1-33. [Link to article](#)
- [9] Tréguer, P.J., Sutton, J.N., Brzezinski, M., Charette, M.A., Devries, T., Dutkiewicz, S., Ehlert, C., Hawkings, J., Leynaert, A., Liu, S.M., Llopis Monferrer, N., López-Acosta, M., Maldonado, M., **Rahman, S.**, Ran, L., and Rouxel, O. (2021) Reviews and syntheses: The biogeochemical cycle of silicon in the modern ocean. *Biogeosciences*, 18, 1269-1289. [Link to article](#)
- [8] Martin, J. B., Pain, A. J., Martin, E.E., **Rahman, S.**, and Ackermann, P. (2020) Comparisons of nutrients exported from Greenlandic glacial and deglaciated watersheds. *Global Biogeochemical Cycles*, 34(12), p.e2020GB006661. [Link to article](#)
- [7] Pain, A. J., Martin, J. B., Martin, E.E., **Rahman, S.**, and Ackermann, P. (2020) Differences in the quantity and quality of organic matter exported from Greenlandic glacial and deglaciated watersheds. *Global Biogeochemical Cycles*, 34 (10), p.e2020GB006614. [Link to article](#)
- [6] Oehler, T., Tamborski, J., **Rahman, S.**, Moosdorf, N., Ahrens, J., Mori, C., Neuholz, R., Schnetger, B., and Beck, M. (2019) DSi as a tracer for submarine groundwater discharge. *Frontiers in Marine Science*, 6, 563. [Link to article](#)
- [5] **Rahman, S.**, Tamborski, J., Charette, M., and Cochran, J.K. (2019) Dissolved silica in the subterranean estuary and the impact of submarine groundwater discharge on the global marine silica budget. *Marine Chemistry*, 208, 29–42. [Link to article](#)
- [4] Fassbender, A.J., Palevsky, H.I., Martz, T.R., Ingalls, A.E., Gledhill, M., Fawcett, S.E., Brandes, J.A., Aluwihare, L.I., the participants of COME ABOARD, DISCO XXV (2017) Perspectives on Chemical Oceanography in the 21st century: Participants of the COME ABOARD Meeting

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- examine aspects of the field in the context of 40 years of DISCO. *Marine Chemistry*, 196, 181-190. [Link to article](#)
- [3] **Rahman, S.**, Aller, R.C., and Cochran, J.K. (2017) The missing silica sink: revisiting the marine sedimentary Si cycle using cosmogenic ^{32}Si . *Global Biogeochemical Cycles*, 31(10), 1559-1578. [Link to article](#) [Link to EOS Highlight](#)
- [2] **Rahman, S.**, Aller, R.C., and Cochran, J.K. (2016) Cosmogenic ^{32}Si as a tracer of biogenic silica burial and diagenesis: Major deltaic sinks in the silica cycle. *Geophysical Research Letters*, 43(13), 7124 – 7132. [Link to article](#)
- [1] Wurtzel J., Black, D.E., Peterson, L.C., Tappa, E.J., and **Rahman, S.** (2013) Mechanisms of southern Caribbean SST variability over the last two millennia. *Geophysical Research Letters*, 40: 5954–5958. [Link to article](#)

Non-peer-reviewed Publications

- [7] Harris, R., **Rahman, S.**, Seth, D., and Resnikoff, M. (2008) Assessment of the Radiation Exposure of Joseph LeFort to Oilfield Equipment Scale. Radioactive Waste Management Associates, NY, NY, USA.
- [6] **Rahman, S.** (2006) Gary June, et al., v. Union Carbide Corporation, et al. Collection and evaluation of sampling data at Uravan, Colorado and calculation of initial dose exposures. Radioactive Waste Management Associates, New York, USA.
- [5] Schneider, A., Rahman, S., and Resnikoff, M. (2005) Residential Risk: Harvey Yard pipe cleaning operation occupational exposure of A. Bulot et al. to radioactive scale during oil pipe cleaning operations, Supplemental Report. Technical report, RWMA, New York, USA.
- [4] **Rahman, S.**, Seth, D., and Resnikoff, M. (2005) Preliminary Assessment of the Radiation Exposure of Joseph LeFort to Oilfield Equipment Scale. Radioactive Waste Management Associates, NY, NY, USA.
- [3] **Rahman, S.** and Resnikoff, M. (2005) Dose, Risk, and Error Calculations for Z. Finestone and A.Blake, September 2005. Radioactive Waste Management Associates, NY, NY, USA.
- [2] **Rahman, S.** and Resnikoff, M. (2005) Radioactivity in Water and Mussels at the Outflow of the Seabrook Nuclear Reactor 2nd Report. Radioactive Waste Management Associates, NY, NY, USA.
- [1] **Rahman, S.** and Resnikoff, M. (2004) Peer Review of RACER Report Los Alamos National Laboratory, Radiological Assessment Corporation. Radioactive Waste Management Associates, NY, NY, USA

Teaching Experience

- Spring 2022** **Instructor, GEOL 4380/5380 – Stable Isotope Geochemistry**
Department of Geological Sciences, University of Colorado Boulder, Boulder, CO
- Fall 2021** **Instructor, GEOL 1010 – Exploring Earth**
Department of Geological Sciences, University of Colorado Boulder, Boulder, CO

Invited Talks and Seminars

- 2021** **Caltech**, Division Seminar, Div. of Geological&Planetary Science, November
- 2021** **Goldschmidt Conference 2021**, Invited Speaker, Session 13a-Marine biogeochemistry:Particle fluxes and dissolved trace element cycling from source to sink
- 2020** **University of Southern Mississippi**, Department Seminar, Div. of Marine Science, October

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- 2020 **Old Dominion University**, Department Seminar, Dept. of Ocean, Earth, & Atmospheric Sciences, September
- 2020 **Geobiology Gordon Research Conference**, Invited Conference Speaker, January
- 2019 **Princeton University**, Department Seminar, Department of Geosciences, March
- 2019 **Woods Hole Oceanographic Institute**, Department Seminar, Dept. of Marine Chemistry and Geochemistry, February
- 2017 **University of Florida**, Department Seminar, Dept. of Geological Sciences, January
- 2016 **University of Southern California**, Seminar, Dept. of Earth Science, April

Selected Conference Proceedings

Talks

- Rahman, S.**, Shiller, A., Anderson, R., Hayes, C.T., Lam, P.J., Ohnemus, D., Pavia, F., Twining, B., and Vivancos, S. (2021) Particulate excess Ba as a proxy for biological productivity along the North Atlantic and South Pacific GEOTRACES transects. Goldschmidt Conference, virtual, 4 – 9 July. (*invited*)
- Rahman, S.**, Tamborski, J.J., Charette, M., and Cochran, J.K. (2019) Global inputs of dissolved silica from submarine groundwater discharge. Goldschmidt Conference, Barcelona, Spain, 18 – 23 Aug.
- Pain, A., Martin, J., Martin, E., and **Rahman, S.** (2019) Shifts in riverine phosphorus fluxes and storage with ice sheet retreat. Goldschmidt Conference, Barcelona, Spain 18 – 23 Aug.
- Rahman, S.**, Aller, R.C., and Cochran, J.K. (2018) Reverse weathering reactions and the marine silica cycle. 2018 Goldschmidt Conference, Boston, 12 – 17 Aug.
- Aller, R.C., **Rahman, S.**, and Cochran, J.K. (2018) Elemental fluxes and reactions during sediment transit: concepts of local and 3–D system diagenesis. 2018 Goldschmidt Conference, Boston, 12 – 17 Aug.
- Rahman, S.**, Martin, J. B., Martin, E. E., and Pain, A. (2018) Dissolved and reactive Si fluxes from deglaciated and proglacial watersheds in West and South Greenland. Abstract BN33A-05, 2018 Ocean Sciences Meeting, Portland, Oregon, 11–16 Feb.
- Charette, M., Tamborski, J., **Rahman, S.**, and Cochran, J.K. (2018) Global inputs of dissolved silica from submarine groundwater discharge—implications for the global silica budget, Abstract BN31A-01, presented at 2018 Ocean Sciences Meeting, Portland, Oregon, 11–16 Feb.

Posters

- Shiller, A., **Rahman, S.**, Anderson, R., Charette, M.A., Hayes, C.T., Gilbert, M., Grissom, K., Lam, P.J., Ohnemus, D., Pavia, F., Twining B., and Vivancos, S. (2021) Biogeochemical processes controlling the marine Ba cycle: dissolved and particulate barium distributions along the US GEOTRACES North Atlantic and South Pacific Zonal Transects (GA03 and GP16). Goldschmidt Conference, virtual, 4 – 9 July.
- Trower, E. and **Rahman, S.** (2021) Is the modern silica cycle in isotopic mass balance? Goldschmidt Conference, virtual, 4 – 9 July.
- Rahman, S.** and Martin, J.B. (2020) Geochemical behavior of Si and Li in a siliciclastic subterranean estuary. Abstract OB24B-0459, 2020 Ocean Sciences Meeting, San Diego, CA, 16 – 21 Feb.
- Rahman, S.**, Martin, J.B., Martin, E.E., and Pain, A. (2019) Nutrient fluxes from deglaciated versus proglacial Greenlandic watersheds. Abstract C13D-1344, 2019 AGU Fall Meeting, San Francisco, CA, 9 – 13 Dec.
- Rahman, S.**, Aller, R.C., and Cochran, J.K. (2018) Li diagenesis in tropical sediments. 2018 Goldschmidt Conference, Boston, 12 – 17 Aug.

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Rahman, S., Aller, R.C., and Cochran, J.K. (2014), Cosmogenic ^{32}Si reveals extent of reverse weathering in tropical deltas. *Goldschmidt Abstracts*, 2014, 2022.

Rahman, S. and Aller, R.C. (2012) Early diagenesis of As and P in tropical deltaic systems, *Mineralogical Magazine*, 76, 2263.

Service

Committee Membership

2022 Organic Carbon and Biogeochemistry Scientific Steering Committee member

Session convener

2021 Co-convenor, Goldschmidt Conference 2021, Session 13e: Dynamics of the global silica cycle across Earth's history with Wei-Li Hong, Xiaole Sun, and Elizabeth Trower

2020 Co-Convenor, Ocean Sciences Meeting 2020, Session OB24B: Benthic controls on the marine silica cycle: continental margins to open ocean with Jeffrey Krause and Claudia Ehlert

2018 Co-Convenor, Ocean Sciences Meeting 2018, Session BN31A&BN33A: Advances in the Marine Silicon Cycle I&II with Paul Tréguer, Jeffrey Krause, and Manuel Maldonado

Reviewer

Reviewer for AGU Fall 2020 Meeting Travel Grant Applications

Peer reviewer for *Geophysical Research Letters*, *Continental Shelf Research*, *Limnology and Oceanography Methods*, *Geochimica et Cosmochimica Acta*, *Earth and Planetary Science Letters*, *Marine Chemistry*

Ad hoc reviewer for National Geographic Society, Graduate Women in Science

Ad hoc reviewer for NSF Chemical Oceanography and NSF Marine Geology and Geophysics

Seminar and talk organization

2017 Presenter and program developer for WiGS (Women in Geosciences), University of Florida

Fieldwork

2021-2022 **Mississippi Delta, LUMCON, Mississippi** (Chief Scientist, 4 seasons of sampling in 2021-2022): Impacts of extreme stochastic events (hurricanes) on sedimentary reactive silica cycling

2017 **Western and Southern Greenland** (6weeks): hydrological, geochemical & greenhouse gas study in 6 streams; application of stable Li isotopes to track silicate mineral weathering and secondary mineral formation

2016 **Indian River Lagoon, Florida** (5 days): Hydrogeochemical groundwater study of nutrient, greenhouse gas, and trace metal fluxes from a subterranean estuary to a coastal lagoon

2014 **Mississippi Delta, LUMCON, Mississippi** (1 week): Developing and applying ^{32}Si as a tracer of reverse weathering and authigenic clay formation processes

2013 **Sinnamary, French Guiana** (3 weeks): Developing and applying ^{32}Si as a tracer of reverse weathering and authigenic clay formation processes

2013 **Shinnecock Bay, Southampton, NY**: trawl & plankton tows

2009 **Cariaco Basin, Venezuela** (1 week): Water column sulfur speciation ($\text{S}_2\text{O}_3^{2-}$, SO_3^{2-} , S_0 , H_2S) study

2003 **Saguenay Fjord, Quebec, Canada** (2 weeks): Developing and applying microelectrodes to track trace metal (As, Fe, Mn) & sulfur diagenesis in fjord sediments *in situ*

2002 **Saguenay Fjord, Quebec, Canada** (1 week): Sediment diagenesis study