

VIGNESH GOKULADAS MENON

Graduate Student (MS) | Dartmouth College

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Address: 19 Fayerweather Hill Rd, 216 Fairchild Hall, Hanover, 03755, NH, USA

EDUCATION

Dartmouth College

Master of Science in Earth Sciences

Advisor: Prof. Dr. Mukul Sharma

Scholarships: Graduate Student fellowship [2022-2024]

Thesis: Understanding the interaction between Clay minerals, and Bacteria in the Biological Carbon Pump towards its impact on particle aggregation and carbon sequestration [in preparation]

Hanover, NH, USA
Sep 2022 - Jun 2024 (Expected)

Jacobs (Constructor) University Bremen

Bachelor of Science in Earth and Environmental Sciences

Advisor: Prof. Dr. Andrea Koschinsky-Fritsche

Scholarships: Jacobs Merit Scholarship[2019-2022]

Thesis: Determination of distribution and size fractionation of Nickel in Rainbow hydrothermal plume by Adsorptive cathodic stripping voltammetry

Bremen, Germany
Sep 2019 - Jun 2022
1.20 [German scale]

Indian School Muscat

All India Senior Secondary Certificate Examination

Stream: Physics, Chemistry, Math, Biology

Muscat, Oman
June 2019
93.2%

RESEARCH AND PROJECTS

Interaction between bacteria, EPS, and Clay minerals towards carbon flux in the oceans

Sep 2022 - Present

- Understand the interaction between heterotrophic bacteria, transparent exopolymer particles and clay minerals towards the carbon flux in the upper ocean.
- Understand the characteristics and dynamics of organic clay floc formation in the oceans.
- Study the contribution of Trace metals (specifically iron and aluminium) to the seawater upon clay treatment and understand its implications on the stability of the marine aggregates and carbon sequestration potential.

PI : Prof. Dr. Mukul Sharma

Ni Concentrations in Rainbow Hydrothermal Plume - Undergraduate Thesis

Jan 2022 - May 2022

- Determination of dissolved Nickel concentration in the Rainbow hydrothermal plume using Voltammetric methods (Hanging mercury drop electrode Adsorptive Cathodic stripping voltammetry)

PI : Prof. Dr. Andrea Koschinsky-Fritsche | Supervisor: Dr. Lukas Benjamin Klose

Measurement of dissolved Pt using Voltammetry

Dec 2021 - Feb 2022

- Method testing and validation for measurement of dissolved platinum concentrations in seawater using AdCS Voltammetry

PI : Prof. Dr. Andrea Koschinsky-Fritsche | Supervisor: Dr. Lukas Benjamin Klose

Enhanced Silicate weathering

Jun 2021 - Jun 2022

- Pilot experiment to understand the potential of basalt rock powder and biochar in sequestering carbon dioxide in agricultural fields.
- Preliminary experiment on understanding the critical shear velocity required for dissolution of Olivine powder.

PI : Prof. Dr. Jelle Bijma

Impact of Deep Sea Mining

Aug 2020 - Jun 2022

- Understanding the particle characteristics of the anthropogenic sediment plume generated from deep sea mining trial experiments.

PI : Prof. Dr. Laurenz Thomsen | Supervisor: Dr. Benjamin Gillard

Bremen Air Pollution Management

- Modelling the level and dynamics of ozone based on the existing database for ozone concentration, nitrogen oxides, UV radiation, etc in association with Umwelt Bremen using EO browser and Sentinel HUB.

WORK EXPERIENCE

Graduate Research Assistant

Sep 2022 – Present

Dartmouth College

Hanover, NH, USA

- Conceptualize and execute laboratory microcosm (roller tanks, and ship-board microcosm) and large-scale field mesocosm experiments aimed at understanding the effect of lithogenic minerals deposition on particle aggregation and export in the surface oceans
- Establish and method test protocols for in-situ settling velocity analysis in roller tanks, quantify TEP spectrophotometrically, imaging macro- and micro-aggregate formation.
- Involved in designing and building lab set-up such as the roller tanks, and custom clay-spreader for mesocosm experiment.

Research Assistant

Sep 2021 – Jun 2022

Alfred Wegener Institute for Polar and Marine Research (AWI)

Bremerhaven, HB, Germany

- Weekly collection of pore water samples from an agricultural test field.
- On-field analysis of pH, conductivity and temperature.
- Field setup and preparation of rhizons and lysimeters for weekly sample collection.

Undergraduate Scientist

Aug 2021 - Oct 2021

RV Meteor - M176/2

Middle Atlantic Ridge

- Onboard sequential filtration and ultra-filtration of seawater and hydrothermal plume samples for Trace elements and Isotopes.
- Assist with preparation and setup of CTD-rosette, Multicorers, Sediment grab, in-situ pumps and tow fishes for deployment and handling Trace metal clean Niskin bottles in the clean lab and subsequent sample handling abiding GEOTRACES protocols.
- Cataloguing the samples collected, acidification for storage and preparation of freight lists.

Research Intern

Jun 2021 - Aug 2021

Carbon Drawdown Initiative — AWI

Bremerhaven, HB, Germany

- Carry out field sampling for soil pore water and lysimeter samples, and prepare nutrient, cations, isotope, DIC and Alkalinity samples for measurement on a weekly basis.
- Experiment on estimating the critical shear velocity of Olivine sample by the implementation of a Gust chamber for simulating boundary layer shear stress conditions to determine the regimes to carry out Enhanced weathering project.

Undergraduate Research Assistant

Aug 2020 – Jun 2022

OceanLab — Jacobs University Bremen (JUB)

Bremen, HB, Germany

- Sediment characteristics and dynamics analysis with the aid of instruments such as LISST-100X, Settling column, Aqualogger, and Water-column simulator.
- Analysis of datasets for particle size distribution and settling velocity using Python, MATLAB and Image analysis using ImageJ Fiji software.

Student Assistant

Jun 2020 - Aug 2020

Geochemistry Lab — Jacobs University Bremen

Bremen, HB, Germany

- Preparation of bottles for sample handling and processing, following certain acid-bath/wash and GEOTRACES protocol as needed.
- Setting up ICP-MS and ICP-OES and sample preparation.
- Troubleshoot the potential sources of contamination and optimise the blank by iterative blank measurements to establish a protocol for measuring Pt concentrations in picomolar range.

TEACHING EXPERIENCE

Dartmouth College

Carbon Sequestration: Opportunities and Challenges [Grad TA]

Sep 2023 – Nov 2023

Mentored 1 Undergraduate: Use CARD-FISH or CLSM to image the marine aggregates.

Summer 2023

Jacobs University Bremen

Marine Geophysics and Physical Oceanography [Undergrad TA]

Mar 2022 - May 2022

Surface and subsurface systems: Data, Models, and Processes [Undergrad TA]

Oct 2021 - Dec 2021

Oceanography FieldLab: HE597 Educational cruise [Student Instructor]

April 2022

Structural Geology [Undergrad TA]

Mar 2021 - May 2021

Structure and dynamics of Earth's atmosphere and oceans [Undergrad TA]

Winter 2020 and Winter 2021

Mentored 1 Undergraduate: Train on using the water-column simulator and imaging marine particles

Summer 2021

PUBLICATIONS AND CONFERENCE PRESENTATIONS

Conference abstracts:

- **Menon, V.G;** O'Toole, G.A; Zinser, E.; Sharma, M. (2024) *Role of heterotrophic bacteria in organoclay flocculation in the surface oceans.* (Poster) Northeast Geobiology, New Haven, CT, USA, 12-13 April 2024
- **Menon, V.G;** Sharma, D.; O'Toole, G.A; Zinser, E.; Sharma, M. (2023) *Investigating the interplay between bacteria, clay minerals, transparent exopolymer particles, and bacteria in the ocean.* (Presentation #7161) Aquatic Sciences Meeting 2023, Palma de Mallorca, Spain, 4-9 June 2023
- Sharma, D.; Desai, M.; **Menon, V.G;** Fields, D.; O'Toole, G.; Zinser, E.; Sharma, M. (Presentation#7164) *Understanding the interactions among clay minerals, phytoplankton, and zooplankton; impacts on productivity and carbon sequestration.* Aquatic Sciences Meeting 2023, Palma de Mallorca, Spain, 4-9 June 2023 - Presentation
- Sharma, D.; **Menon, V.G;** O'Toole, G.; Zinser, E.; Sharma, M. (Poster #1489009) *Enhancing the Biological Pump: Clay-induced TEP production in a stagnant diatom bloom.* Ocean Sciences Meeting 2024, New Orleans, Louisiana, USA, February 18-23, 2024
- Unnithan, V. and the **VulcanoTeam2022:** Vulcano Summer School 2022: Overview of the field-based terrestrial, marine and planetary analogue studies campaign, Europlanet Science Congress 2022, Granada, Spain, 18–23 Sep 2022, EPSC2022-1109, <https://doi.org/10.5194/epsc2022-1109>, 2022.

Publications:

- Sharma, D; **Menon, V.G;** Desai, M.; Niu, D.; Bates, E.; Kandel, A.; Zinser, E.; Fields, D.; O'Toole, G.; Sharma, M. (Submitted) *Organoclay floc formation drives carbon export from the sea surface*
- **Menon, V.G;** Sharma, D.; Zinser, E.; O'Toole, G.; Sharma, M. (in preparation) *Role of heterotrophic bacteria in organoclay flocculation in the surface ocean*

FIELD EXPERIENCE

Research Cruises:

EN 710 - Penobscot Bay Hg	Nov 2023 [11 Days]
RV Endeavor - Chief Scientist: Dr. Vivien Taylor	Gulf of Maine
EN 699 - Clay minerals and Phytoplankton bloom: microcosm study	Apr 2023 [11 Days]
RV Endeavor - Chief Scientist: Dr. Vivien Taylor	Gulf of Maine
HE 597 - JUB & POLMAR Graduate school educational cruise	Apr 2022 [7 Days]
RV Heincke - Chief Scientist: Dr. Gernot Nehrke	North Sea — Heligoland
M176/2 - Rainbow nonboyant hydrothermal plume GEOTRACES study	Sep 2021 [36 Days]
RV Meteor - Chief Scientist: Prof. Dr. Eric Achterberg	Rainbow hydrothermal vent field
HE 575 - Oceanography Field Lab	Apr 2021 [4 Days]
RV Heincke - Chief Scientist: Prof. Dr. Jelle Bijma	German Bight

Field work:

Kiel Mesocosm experiment	Mar 2024 - Apr 2024
The effect of clay minerals on Carbon flux in the upper ocean	Kiel, Germany
Cyprus Geological field trip	Summer 2023
Ophiolite complex and geological formations that make up Cyprus	Republic of Cyprus
Vulcano Summer School	Summer 2022
Submarine fumeroles in Vulcano	Vulcano, Sicily, Italy
Eifel geological excursion	Winter 2020
Critical resources and geology of the Eifel region	Nordrhein westfalen, Germany
Harz geological excursion	Spring 2020
Volcanology and formation of the Harz mountains	Harz region, Germany

SKILLS

Programming Languages: Python, R, MATLAB

Software: ArcGIS, ImageJ Fiji, Ocean Data View, Adobe Creative Cloud, MS office, CorelDRAW, LaTeX, JMP, Blender

Analytical instruments and techniques: ICP-MS, AdCS-Voltammetry, TIMS, ICP-OES, Spectrophotometry, Microscopy (Epifluorescence, Light, and Scanning electron), Solid Phase Extraction, Microbiome analysis, Particle characterisation using cameras, LISST-100X, Aqualogger turbidity sensor, Trace Metal Clean laboratory training.

Certification: 3D printing, Laser cutting, Wilderness First Responder (valid until 2025)

Languages: English(Bilingual), Malayalam(Native), Tamil(Bilingual), German(Working), Hindi(Limited Working), Sanskrit(Elementary)

VOLUNTARY POSITIONS

Graduate representative at Diversity, Equity, and Inclusivity (DEI) departmental community [Dartmouth College]

Earth sciences major area representative, Peer counsellor & Student Intercultural trainer [Jacobs University Bremen]