

VIGNESH GOKULADAS MENON

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EDUCATION

University of Gothenburg

Doctoral Candidate

Advisor: Prof. Dr. Laurenz Thomsen

Projects: [REDRESS](#) and [Digi4Eco](#)

Göteborg, Sweden

Sep 2024 - Present

Dartmouth College

Master of Science in Earth Sciences

Advisor: Prof. Dr. Mukul Sharma

Scholarships: Graduate Student fellowship [2022-2024]

Thesis: DUST-DRIVEN MECHANISM FOR MARINE PARTICLE AGGREGATION: Interactions between clay minerals, heterotrophic bacteria and organic matter influences aggregation in marine systems

Hanover, NH, USA

Sep 2022 - Aug 2024

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 (2022)

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%

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.; **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
- 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
- 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.

* participated in the conference [†] presenting author

Publications:

- Sharma, D; **Menon, V.G**; Desai, M.; Niu, D.; Bates, E.; Kandel, A.; Zinser, E.; Fields, D.; O'Toole, G.; Sharma, M. (In review) *Organoclay Flocculation as a Pathway to Export Carbon from the Sea Surface*
- **Menon, V.G**; Zinser, E.; O'Toole, G.; Sharma, M. (in preparation) *Organoclay aggregation: a dust driven mechanism for marine particle flux aided by heterotrophic bacteria*

RESEARCH PROJECTS

Marine monitoring and restoration

Sep 2024 - Present

- *PI : Prof. Dr. Laurenz Thomsen*

Impact of Organo-clay flocculation on carbon export from the surface 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 organoclay 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

Impact of Deep Sea Mining

Aug 2020 - Jun 2022

- Understand the particle and aggregation characteristics of the anthropogenic sediment plume generated from deep sea mining through lab experiments..

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

Ni Concentrations in Rainbow Hydrothermal Plume - Undergraduate Thesis

Mar 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.
- Experiment on understanding the critical shear velocity required for transport of Olivine sand.

PI : Prof. Dr. Jelle Bijma

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.

TEACHING EXPERIENCE

Dartmouth College

Earth Materials: Structural geology and Optical Mineralogy [Grad TA]

Summer 2024

Carbon Sequestration: Opportunities and Challenges [Grad TA]

Fall 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]

Spring 2022

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

Fall 2021

Oceanography FieldLab: HE597 Educational cruise [Student Instructor]

Spring 2022

Structural Geology [Undergrad TA]

Spring 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

WORK EXPERIENCE

Graduate Researcher

University of Gothenburg | Kristineber Center

Sep 2024 – Present

Västra Götaland County, Sweden

Graduate Research Assistant

Dartmouth College

Sep 2022 – Aug 2024

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 set-up such as roller tanks, cameras for particle imaging and protocols such as aggregate size and settling velocity analysis and spectrophotometric quantification of TEP.
- Involved in designing and building lab set-up such as the roller tanks, and custom clay-spreader for mesocosm experiment.

Undergraduate Research Assistant

OceanLab | Jacobs University Bremen (JUB)

Aug 2020 – Jun 2022

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.

Research Assistant

Alfred Wegener Institute for Polar and Marine Research (AWI)

Sep 2021 – Jun 2022

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

RV Meteor - M176/2

Aug 2021 - Oct 2021

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

Carbon Drawdown Initiative | AWI

Jun 2021 - Aug 2021

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.

Student Assistant

Geochemistry Lab | Jacobs University Bremen

Jun 2020 - Aug 2020

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.

FIELD EXPERIENCE

Research Cruises:

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

Field work:

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

SUMMER SCHOOLS

Marine restoration and digital twin <i>Kristineber Center for Marine Research and Innovation</i>	June 2024 <i>Fiskebäckskil, Sweden</i>
Vulcano summer school <i>Jacobs University Bremen</i>	June 2022 <i>Sicily, Italy</i>

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: Particle characterisation using cameras, LISST-100X, Aqualogger turbidity sensor, CTD, Spectrophotometry, Microscopy (Epifluorescence, Light, and Scanning electron), Solid Phase Extraction, Microbiome sequencing, Trace Metal Clean handling and processing (ICP-MS, AdCS-Voltammetry, TIMS, ICP-OES)
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 committee [Dartmouth College]
Earth sciences major area representative, Peer counsellor & Student Intercultural trainer [Jacobs University Bremen]