

Goa University

School of Earth, Ocean and Atmospheric Sciences

Discipline of Marine Sciences

Report on lecture-cum-bioinformatic analysis session

1. Title of the Event/Activity/program	Deciphering the culturable bacterial diversity from polar regions
2. Date and Time	14 th Aug 2024; 1030-1230 h
3. Mode of conduct (Physical/Online)	Physical
4. School/ Directorate/ Section	School of Earth, Ocean and Atmospheric Sciences
5. Collaborating Agency/School/Directorate	-
6. Detail of the Resource Person (Brief biodata)	See Annexure I
7. Number of Faculty attended/participated	3
8. Number of Student attended / participated	25
9. No. of external students/faculty/other participants	-
10. The objectives of the Program/activity/event	To provide an understanding on taxonomic identification of culturable bacteria and bioinformatic analysis of sequences.

	sequence analysis was also demonstrated.
12. Benefit/Key outcomes of the Program/activity/event	The students gained insights on isolation of bacteria from sediments/seawater, DNA extraction, its visualization, purification of target genes, next-generation sequencing platforms, Sanger sequencing method and use of the EzBioCloud platform.
13. Enclosures with report	<ol style="list-style-type: none"> 1. Programme flyer 2. Geo-tagged photos 3. Attendance of students/faculty/external participants 4. Bio Data of resource person

Signature:

Name of coordinator: *Sheryl O. Fernandes*

Designation: *Assistant Professor*

Date: *14/08/2024*

Signature

Dean/Director/Head

Seal of the School/Directorate/University



Goa University
School of Earth, Ocean and Atmospheric Sciences (SEOAS)



is organizing

A lecture-cum-bioinformatic analysis session



Resource person:

Dr. Siddharthan Venkatachalam,
Arctic Ecology and Biogeochemistry Division,
National Centre for Polar and Ocean Research,
Vasco-Da-Gama, Goa.

Topic


**Deciphering the culturable bacterial
diversity from polar regions**

14th August 2024; 1030-1230 h

Location: CF-20, SEOAS.

Programme Co-ordinator: Dr. Sheryl O. Fernandes



 GPS Map Camera



Taleigao, Goa, India
FR6M+P2F, Goa University, Taleigao, Santa Cruz, Goa 403206, India
Lat 15.461296°
Long 73.832777°
14/08/24 10:45 AM GMT +05:30



Taleigao, Goa, India
FR6M+P2F, Goa University, Taleigao, Santa Cruz, Goa 403206, India
Lat 15.461309°
Long 73.832761°
14/08/24 10:48 AM GMT +05:30

GPS Map Camera



2024/8/14 12:13



2024/8/14 12:13

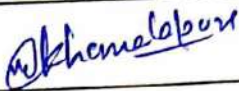
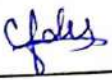









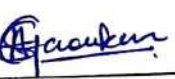


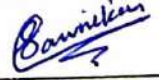
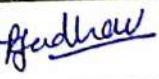
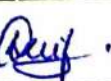


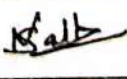


Attendance (Lecture cum bioinformatic analysis session)

Date: 14.08.2024, 1030 hrs. - 1230 hrs.

Title: "Deciphering the culturable bacterial diversity from polar regions".

Resource Person: Dr. Siddhart Venkatachalam, NCPOR - Goa

Sr. No.	Name	Part I/II	Signature
1.	Madhavananda S K	Part II	
2.	Ceara Vally Fernando	Part II	
3.	Varada S. Damare	Faculty	
4.	Priya D'Costa	Faculty	
5.	Bena Rodrigues	Part II	
6.	Diksha Shenvikar	Part II	
7.	Dikanksha Kamble	Part II	
8.	Kevin J. D'Silva	PhD. Student	
9.	Vishakha Naik	Part II	
10.	Achal Gaonkar	Part II	
11.	Blanche D'souza	Part II	
12.	Akanksha Gaonkar	Part II	
13.	Franzil Fernandes	Part II Marine Microbiology	
14.	Agnelo Silveira	Part II "	
15.	Swed Gaonkar	Part II	
16.	Ravine Ravine Jaithav	Part II Marine Microbiology	
17.	Pallavi Veip	Part II	
18.	Shruti Verma	Part II	
19.	Lakshada Naik	Part II Marine Microbiology	
20.	Samruddhi Naik	Part II Marine Microbiology	

Short Resume of S. Venkatachalam

EMPLOYMENT STATUS

Project Scientist – II, National Centre for Polar and Ocean Research (NCPOR), Ministry of Earth Science, Goa, India- 403804 Tel: +91- 9952240259; E-mail: venkatachalam@ncpor.res.in, venkateshbiotech@gmail.com

SUMMARY OF MAIN ACHIEVEMENTS

DST-SERB National Post-Doctoral Fellowship Award - April 2019 - September 2021 (2 year+6 months) (Postdoc Salary + ₹ 4 Lakhs Grant) (To work on- Impact of glacier retreat on Arctic glacier foreland microbial dynamics)

Rhodes University Post-Doctoral fellowship, Award- January 2017-December 2018 (2 years) **Postdoc, Salary + ~ ₹ 5 Lakhs Grant** (To undertake research work on the profiling of Southern Ocean & Sub-Antarctic microbial communities and their ecological functions).

NRF-SARChi Post-Doctoral fellowship Award- January 2015-December 2016 (**Postdoc, Salary + ~ ₹5 Lakhs Grant**) (To undertake research work on the role of ocean eddies and different ocean fronts in shaping microbial community structure and functions in the Southern Ocean).

Honorary Research Associateship at the South African Institute for Aquatic Biodiversity January 2017-December 2018 (2 years) (To undertake research work on Harmful Algal bloom dynamics and Marine spatial planning programme in Algoa Bay).

DST- Junior Research Fellowship award October 2009 - March 2014. (To undertake research work in the Alpine Microbial ecology across different habits in the Himalayas).

Three travel grants (DBT, NRF-SAIB, WRC, SA) to international conferences.

Played a crucial role in the establishment of the Next-generation Sequencing facility at the NCPOR. Working as a lead data scientist and established a comprehensive bioinformatics analytical platform to undertake critical microbial data-driven research at the NCPOR. Trained several fellow colleagues on microbial data science at NCPOR and Rhodes University.

CURRENT RESEARCH INTERESTS (BUT NOT LIMITED TO-)

- Microbial ecology and genomics research from Alpine to Polar ecosystems, including deep ocean.
- Screening of bioactive compounds from Polar microbial metagenomic datasets
- NGS instrumentation and microbial data science

AWARDS, HONOURS and MEMBERSHIPS

- 2019 **National Post-Doctoral Fellowship Award**, Science and Engineering Research Board, Govt of India.
- 2017 **Rhodes Post-Doctoral fellowship**, Rhodes University, South Africa.
- 2017 **Travel grants to attend the conference at Croatia**, SAIAB-Water research commission Travel grant.
- 2017 **Rhodes Research Council grant** – ZAR 30000
- 2017 **Honorary Research Associate** at The South African Institute for Aquatic Biodiversity, Grahamstown, South Africa.
- 2016 **Travel grants to attend the conference**, National Research Foundation travel grant, South Africa.
- 2016 **Rhodes Research Council grant** – ZAR 30000
- 2015 **NRF-SARChi Post-Doctoral fellowship**, National Research Foundation, South Africa.
- 2015 **Travel grants to attend the conference in Johannesburg**, Rhodes University, South Africa.
- 2010 **Travel grants to attend the conference in Germany**, Department of Biotechnology, Govt. Of. India.

SCIENTIFIC EXPEDITIONS

- 2023 **Canadian Arctic Expedition** (August 11th – September 12th) at The Canadian High Arctic Research Station (CHARS), Canada.
- 2022 **Central Arctic Ocean-North Pole Cruise** (July 19th - August 23rd) onboard Kronprins Haakon, Norway.
- 2021 **Arctic Svalbard Coastal Cruise** (July 2-14th), onboard RV CLIONE (**Team Leader and Project Coordinator**).
- 2016 **Agulhas System Climate Array Expedition** (July 1st -18th) On board RV SA Agulhas II.
- 2010 **Himalayan Expedition** (1.8 million euros) (Role: **Co-coordinator**)

LEADERSHIP ROLES

- 2019 **Team Leader: Arctic Svalbard Coastal Cruise**; Responsible for cruise planning, organization, and project implementation (NCPOR).
- 2016 **Team Leader: Sub-Antarctic research group**, Marine Natural Products Research Lab at Rhodes University (2016-2018), South Africa. Responsible for planning and implementation of research projects.
- 2015 **Chair: Post-doctoral Liaison sub-committee**, Rhodes University (2015-2017).

PUBLICATIONS

	First author	Co-authors	Total
SCI Journals	10	20	30
Book Chapters	1	2	3

Total papers	33
H index	13
Total citations	669
2023 Mean impact factor	>3.2

PUBLICATIONS

Firth Author/Corresponding author

1. **S. Venkatachalam**, P.V. Vipindas, T. Jabir, A. Jain, K.P. Krishnan (2024). Metagenomic insights into novel microbial lineages with distinct ecological functions in the Arctic glacier foreland ecosystems. *Environmental Research*. 241:117726. (IF: 8.30).
2. **S. Venkatachalam**, T. Jabir, P.V. Vipindas, K.P. Krishnan (2024). Ecological significance of Candidatus ARS69 and Gemmatimonadota in the Arctic glacier foreland ecosystems. *Applied Microbiology and Biotechnology*. 108:128. (IF : 5.0).
3. **S. Venkatachalam**, A. Gopinath and K.P. Krishnan (2023). Fjords of the western and northern regions of Svalbard harbour distinct bacterioplankton community structures. *World Journal of Microbiology and Biotechnology*. 39(57):1-13. (IF: 4.1)
4. **S. Venkatachalam**, V.M. Kannan, V.N.Saritha, D.S. Loganathachetti, M. Mohan, K.P. Krishnan. (2021). Bacterial diversity and community structure along the glacier foreland of Midtre Lovénbreen, Svalbard, Arctic. *Ecological Indicators*.126: 107704. (IF:6.90).
5. **S. Venkatachalam**, G.F. Matcher, T. Lamont, M.V. Berg, I.J. Ansorge, R.A. Dorrington (2019). Influence of oceanographic variability on nearshore microbial communities of the sub-Antarctic Prince Edward Islands. *Limnology and Oceanography* 64:258-271. (Doi: 10.1002/lno.11035; IF : 4.50).
6. **S. Venkatachalam**, I.J. Ansorge, A. Mendes, L.I. Melato, G.F. Matcher, R.A. Dorrington (2017). A pivotal role for ocean eddies in the distribution of microbial communities across the Antarctic Circumpolar Current. *PLoS one*. 12 (8): e0183400. (IF : 3.752).
7. **S. Venkatachalam**, K. Ranjan, R. Prasanna, B. Ramakrishnan, S. Thapa, A. Kanchan (2016). Diversity and functional traits of culturable microbiome members, including cyanobacteria in the rice phyllosphere. *Plant Biology*. 18 (4), 627-637. (IF : 3.9)
8. **S. Venkatachalam**, V. Gowdaman, S.R. Prabakaran (2015). Culturable and culture-independent bacterial diversity and the prevalence of cold-adapted enzymes from the Himalayan Mountain ranges of India and Nepal. *Microbial Ecology* 69 (3): 472-491. (IF : 3.6)
9. **S. Venkatachalam** and S.R. Prabakaran (2015) Comparative assessment of bacterial communities from Himalayan Mountains of Nepal and India. *ENVIS bulletin* 23:9-14.
10. **S. Venkatachalam**, M. Sivaprakash, V. Gowdaman and S.R. Prabakaran (2014). Bioprospecting of Cellulase Producing Extremophilic Bacterial Isolates from India. *Microbiology Research Journal* 4(2): 138-150.

Selective Co-Author Publications

11. P.V. Vipindas, **S. Venkatachalam**, T. Jabir, E.J. Yang, J Jung , A. Jain, K.P. Krishnan (2023). Salinity-controlled distribution of prokaryotic communities in the Arctic sea-ice melt ponds. *World Journal of Microbiology and Biotechnology*. 40 (1): 25. (IF: 4.1)
12. P.V. Vipindas, T. Jabir, **S. Venkatachalam**, E.J. Yang, A. Jain, K.P. Krishnan (2023). Vertical segregation and phylogenetic characterization of archaea and archaeal ammonia monooxygenase gene in the water column of the western Arctic Ocean. *Extremophiles*. 27: 24. (IF: 2.9)
13. P.V. Vipindas, **S. Venkatachalam**, T. Jabir, E.J. Yang, K Cho, J Jung, Y Lee, K.P. Krishnan. (2022). Water mass controlled vertical stratification of prokaryotic communities in the Western Arctic Ocean during summer sea-ice melting. *Microbial Ecology*. <https://doi.org/10.1007/s00248-022-01992-z> (IF: 3.6).
14. S.L. Dinesh, **S. Venkatachalam**, T. Jabir, P.V. Vipindas. K.P. Krishnan (2022). Total nitrogen influence bacterial community structure of active layer permafrost across summer and winter seasons in Ny-Ålesund, Svalbard. *World Journal of Microbiology and Biotechnology*. 38(2):1-13. (IF: 4.1)
15. M. Rathore, R. K. Sinha†, **S. Venkatachalam**†, K.P. Krishnan (2022). Microbial diversity and associated metabolic potential in the supraglacial habitat of a fast-retreating glacier: A case study of Patsio glacier, North-western Himalaya. *Environmental Microbiology Reports*. 14(3):443-452. (IF: 3.3). Equally contributed to this work†
16. T. Sibanda, R. Selvarajan, T. Msagati, **S. Venkatachalam**, S. Meddows-Taylor (2019). Defunct gold mine tailings are natural reservoir for unique bacterial communities revealed by high-throughput sequencing analysis. *Science of the Total Environment*. 650 (2), 2199-2209. (IF: 9.8)
17. R. Selvarajan, T. Sibanda, **S. Venkatachalam**, H. Ogola, C. Obieze, T. A. Msagati (2019). Distribution, interaction and Functional Profiles of Epiphytic Bacterial Communities from the Rocky Intertidal Seaweeds, South Africa. *Scientific Reports* 9(1): 1-13 (IF 4.6)
18. K. Ranjan, H. Priya, B. Ramakrishnan, R. Prasanna, **S. Venkatachalam**, S. Thapa, R. Tiwari, L. Nain, R. Singh and Y.S. Shivay (2016). Cyanobacterial inoculation modifies the rhizosphere microbiome of rice planted to a tropical alluvial soil. *Applied Soil Ecology* 108:195-203 (IF : 4.8)
19. M. Manjunath, A. Kanchan, K. Ranjan, **S. Venkatachalam**, R. Prasanna, B. Ramakrishnan, F. Hossain, L. Nain, Y.S. Shivay, A.B. Rai, B. Singh (2016). Beneficial cyanobacteria and eubacteria synergistically enhance bioavailability of soil nutrients and yield of okra. *Heliyon*. <http://dx.doi.org/10.1016/j.heliyon.2016.e00066> (IF: 4).

INVITED PRESENTATIONS (International and National)

	Oral presentations	Posters	Oral/Posters by collaborators	Total
International	4	3	4	11
National	7	3	4	14

Selective NCPOR - OUTREACH ACTIVITIES

1. Tutor for an Advanced Skill-Enhancement Program for Teachers on ‘**Advanced Instrumentation and Its Application in Science**’, which was held from 23rd – 24th January 2024 at NCPOR.
2. Participated in the **India International Science Festival**, which was held from January 17th – 20th, 2024, at the Translational Health Science and Technology Institute (THSTI), Faridabad, to disseminate ongoing research activities of NCPOR. The NCPOR pavilion at IISF-2024 received the best interactive pavilion award.
3. Delivered a seminar about “**India’s scientific endeavors in the Arctic region**” to the Cambridge Bay community in Canada on 28th August 2023. The lecture was organized by Polar Knowledge Canada.
6. Delivered a seminar about “**Microbial colonization in the rapidly retreating glaciers and its forelands**” at St Xavier's College, Mapusa, Goa, on 17th October 2022. Invited talk.
7. Delivered a seminar about “**Ecology of extremophilic microorganisms and their role in the functioning of ecosystems**” on 18th April 2022 at the Indian Institute of Science and Education Research, Thiruvananthapuram (Online mode).

SUPERVISION AND MENTORING ACTIVITIES (PhD and Master Students)

PhD student

- 2017 **Mr. Eric W. Isemonger** (Rhodes University, South Africa) Supervisor: Prof. R.A. Dorrington, (My role- Co-Supervisor); Title: Integration of multiple metabolic pathways supports unprecedented rates of carbon sequestration in living microbialites. (*Thesis awarded- Rhodes University*)

Masters students

- 2024 **Ms. Shreya Bagkar** (Goa University); Supervisor; Project: Culturable bacterial diversity of Arctic Sea cores.
- 2023 **Mr. Mohd Sufiyan** (Vivekanand Education College of Arts Science and Commerce); Supervisor; Project: Influence of freshwater runoff on fjord microbial community structure.
- 2020 **Ms. Harshita Shanbog** (DY Patil University); Supervisor; Project: “Cultivable Bacterial Diversity Across Three Arctic Fjords of Svalbard Archipelago”.
- 2019 **Ms. Nasipi Mtsi** (Rhodes University, South Africa); Co-supervisor; Project: “Critical role of island mass effect on microbial diversity and its functions in the Sub-Antarctic ecosystems”.
- 2015 **Mr. Eric Isemonger** (Rhodes University, South Africa); Co-supervisor; Project: “Molecular identification of microbial communities associated with South African Tufa Stromatolites”.

EXTRACURRICULAR EXPERIENCE

Scientific responsibilities

- 2022-24 **Arctic Operations:** Planning and execution of import of samples (cold shipment) from Himadri research station, Ny-Ålesund, Norway, to India for the Indian Arctic programme expedition members.
- 2022-24 Raising chemical indents and procurement of instruments for the Polar Biology laboratory, NCPOR.
- 2016-18 Research ethics committee & Senate research council member, Rhodes University, South Africa.

EXPERTISE IN NGS INSTRUMENTATION & BIOINFORMATICS

- Sample library preparations and handling of Illumina MiSeq platform, Ion-torrent GeneStudio™ S5 platform and MinION Oxford nanopore platform.
- **Bioinformatics:** Genome assembly, annotation, Reconstruction of metagenome-assembled genomes (MAGs) by using semi-supervised, manual binning and machine learning approaches, Metabolic pathway analysis.
- Metabarcoding sequence data analysis via HPC clusters and downstream data processing in R. Programming

NATIONAL-INTERNATIONAL COLLABORATIONS

Prof. Rosemary A Dorrington, Rhodes University, South Africa [*Southern Ocean Microbial Ecology*]
Dr. Mats Granskog, Norwegian Polar Institute, Norway [*Carbon isotope chemistry*]
Dr. Dmitry Divine, Norwegian Polar Institute, Norway [*Arctic Sea ice*]
Dr. Rafael Gonçalves-Araujo, Technical University of Denmark [*DOM Measurements*]
Prof. M.M. Hatha, CUSAT, [*Collaborator in Microbial Ecology Research*]

REFEREES

- **Dr. Manish Tiwari, Scientist F**, Arctic Ecology and Biogeochemistry, NCPOR, Goa, India - 403804. Tel: +91-832-2525694; Email: manish@ncpor.res.in.
- **Dr. S.R. Prabakaran**, Professor, Department of Biotechnology, Bharathiar University, Coimbatore. Email: prabakaran@buc.edu.in
- **Prof. Rosemary Dorrington**, Department of Biochemistry and Microbiology, Rhodes University, PO Box 94, Makhanda, South Africa 6140; email: r.dorrington@ru.ac.za