



# VIT<sup>®</sup>

**Vellore Institute of Technology**  
(Deemed to be University under section 3 of UGC Act, 1956)

## SDG-14 Annual Report 2019-20

# 14

**LIFE BELOW  
WATER**



Conserve and sustainably use the oceans, sea and marine resources for sustainable development



**Vellore Institute of Technology**

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## Report of VIT-Vellore Campus

### Report of VIT-Vellore Campus GOAL 14: Life Below Water...

The ecosystem of our planet Earth majorly depends on the oceans. The oceans provide and regulate our rainwater, the Oxygen we breathe, drinking water, weather, and climate. Saving our ocean must remain a priority. Marine biodiversity is critical to the health of people and our planet. Marine protected areas need to be effectively managed and well-resourced. Regulations need to be put in place to reduce overfishing, marine pollution and ocean acidification.

Vellore Institute of Technology (VIT) is working hard to prepare the student community and to make them understand and appreciate the importance of marine diversity. The faculty community is also being continuously encouraged to work in areas that contribute to the uplift of marine biodiversity. VIT also periodically conducts technical conferences, workshops and seminars on water conservation and management techniques. VIT encourages faculty and student to reduce the usage of plastics which often gets dumped into the aquatic systems affecting biodiversity. As a part of this initiative and to set an example to society, VIT has declared the campus as a plastic-free campus and prohibits the usage of plastics inside the campus. Vellore Institute of Technology is also maintaining a big lake inside the campus where the rainwater collected from various parts of the campus are filtered and channelised into the lake. VIT is maintaining a lake of 1,28,811 cubic metres and different types of fish types like Jilabi, Kendai, Katla and other water species are living in the lake

Vellore Institute of Technology as a part of its outreach activities has conducted a Public awareness rally on Afforestation and Conservation of Native Plants & Water Bodies through the students of the National Service Scheme (NSS). NSS is a Central Sector Scheme of the Government of India, Ministry of Youth Affairs & Sports. VIT has taken a great initiative in cleaning the River Palar, which is one the primary river flowing through Vellore, has a part of its social responsibility in preserving the water bodies.

The faculty of VIT has involved itself in various sponsored research projects related to marine diversity over the previous years. Some of the projects are:

- Image processing techniques for extracting ocean features from satellite imagery, a project sanctioned by DRDO, Government of India
- Bye-carbonate: Engineering Prochlorococcus to tackle ocean Acidification, a project sanctioned under DBT, Government of India

Prediction of extremely severe cyclonic storms over North Indian Ocean using high-resolution numerical modelling system for disaster preparedness, a project sanctioned under DST, Government of India

- Formulation, Characterisation of Biobased Oil Nanoemulsion Towards Controlling Bacterial Infection in Aquaculture (Special Reference to Fish and Shrimp), a project sanctioned under DST, Government of India
- Antioxidant and antibacterial activity of seaweeds against fish bacterial pathogens, a project sanctioned under DST, Government of India.
- In vitro and in vivo Antimicrobial efficacy of polymer and semiconductor nanoparticles and its based nanocomposites against and fish pathogens, a project sanctioned under DST, Government of India
- A marine analogue and its membrane damage mechanism on fish pathogens-design and Chemical transformations of penipanoid C and Luotonin F, a project sanctioned by Vellore Institute of Technology.
- Probiotics as a feed for enhancing growth and diseases resistance in freshwater prawns *Macrobrachium rosenbergii*, a project sanctioned by Vellore Institute of Technology.
- Destruction of Recalcitrant Amoxicillin by an Integrated Clean Chemical and Biological Treatment of Wastewater, a project sanctioned by Vellore Institute of Technology.
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- Synthesis of Novel Graphitic Carbon Nitride Nanostructures for Degradation of Pharmaceuticals in Water and Waste Water, a project sanctioned by Vellore Institute of Technology.
- Impounding of River floodwaters along Dakshina Kannada Coast A sustainable strategy for water resource development, a project sanctioned under DST, Government of India
- Spatial distribution of water quantity parameter in Dakshina Kannada, Hassan and Tumkuru region, a project sanctioned under BRNS, Government of India.
- Feasibility of riverbank filtration for rural water supply around check dam in non-perennial rivers, a project sanctioned under DST, Government of India.
- Preparation of biogenic bimetallic core-shell PdFe nanoparticles for wastewater bioremediation applications, a project sanctioned under DST, Government of India.
- Marine Nutraceuticals for controlling bacterial infection in aquaculture, a project sanctioned by Vellore Institute of Technology.

Construction of Polyketide Synthase, Non-Ribosomal synthetase gene library and natural product library from cultivable and uncultivable marine actinomycetes for Bioprospecting, a project sanctioned under DBT, Government of India.

- VIT has committed itself and has always encouraged faculty, student and other stakeholders in protecting the biodiversity of the water bodies in all possible ways.

VIT faculty, research scholars, students and their collaborators are pursuing research in sustainable use of the oceans, sea and marine resources. As a result, during 2019 – 2020 there are 105 publications. Some of the notable collaborative publications are:

1. Antibacterial potential of neem nanoemulsion against *Vibrio anguillarum* infection in sea bass (*Lates calcarifer*). (In collaboration with Centre for Ocean Research, Sathyabama Institute of Science and Technology).  
<http://nopr.niscair.res.in/handle/123456789/49709>
2. Growth performance, intestinal histomorphology and growth-related gene expression in response to dietary *Ziziphus mauritiana* in Nile tilapia (*Oreochromis niloticus*). (In collaboration with Benha University, Egypt).  
<https://www.sciencedirect.com/science/article/abs/pii/S0044848619308142>
3. A simple filter paper-based method for transporting and storing *Enterocytozoon hepatopenaei* DNA from infected *Litopenaeus vannamei* tissues. (In collaboration with Prof. Toshiaki ITAMI, Fukuyama University, Japan).  
<https://www.sciencedirect.com/science/article/abs/pii/S0022201119301995>
4. Effect of a peptide complex on the defense mechanism of shrimp, *Marsupenaeus japonicus* against pathogens and changes in environmental parameters. (In collaboration with Dr. Nguyen TH Linh, Vietnam).  
<https://onlinelibrary.wiley.com/doi/epdf/10.1111/jwas.12658>
5. Biosynthesis of silver nanoparticles using red algae *Portieria hornemannii* and its antibacterial activity against fish pathogens.  
<https://www.sciencedirect.com/science/article/abs/pii/S0882401018315821>
6. Efficacy studies on commercially available probiotics to induce immune response and resistance in tilapia fish (*Oreochromis mossambicus*), against *Vibrio* infection. (In collaboration with Organica Biotech, Mumbai).  
<http://nopr.niscair.res.in/handle/123456789/55101>

Received Rs.522,885.00 as a second-year grant from the Department of Biotechnology, Govt of India for the project titled “Development of electrochemical immuno sensor based detection method for white spot syndrome virus (WSSV) of penaeid shrimp”.

MSc Integrated students, Ms Vernita Priya (15MSI0070) and Ms Pratyasha Dash (15MSI0074) went to the Interdisciplinary Centre of Marine and Environmental Research (CIIMAR), Porto for pursuing their Semester abroad project on Cyanobacteria isolated from Marine ecosystems. (CIIMAR, University of Porto is MOU partner Institute of VIT).



## Report of VIT-Chennai Campus

### PREAMBLE

Oceans play a crucial role in making Earth habitable. The Ocean provides sustainable life on Earth by providing billions of people with food for their livelihoods, more than half of the oxygen that humans need to breathe, and it regulates our planet's climate and weather. Yet Oceans' health is deteriorating due to increasing levels of garbage. This affects the marine biodiversity and has a huge impact on the environment and economy. Much needs to be done to preserve this crucial resource for a sustainable future.

### BIO-DIVERSITY EDUCATION AND ECOLOGICAL ACTIVITIES

When pollution contaminates and kills aquatic plant and animal life, it also destroys feeding habitats for sea turtles. To spread awareness on the effect of water pollution caused by humans which affects sea turtles in India and more specifically in Chennai, a bio-diversity talk was delivered by Ms. Shalini Kumar of TREE (Trust for Environment Education, Conservation and Community development) Foundation who emphasized the importance of sea turtles in our eco system. During turtle walk? observation, students were made aware of turtle hatching, identifying and protecting nesting turtle. This programme was organized as a conservational measure for biodiversity loss. Inspired by the talk on Bio-diversity, NSS club in collaboration with TREE foundation has developed a pond ecosystem on our campus.



Talk by Ms.ShaliniKumar – Tree Foundation

## COURSES ORIENTED TOWARDS SUSTAINABILITY

University offers various programme specific courses focusing on water conservation such as, Soil and Water Conservation Engineering, Ground water Engineering, Design of Water and Wastewater Treatment Systems etc.

## RESEARCH PUBLICATIONS

- Dinagarapandi. P, Saravanan. K and Mohan. K, “Delineation of potential groundwater zones based on multicriteria decision making”, Journal of Groundwater Science and Engineering, June 2020, ISSN/ISBN: 2305-7068.
- Kalimuthu M, Ponraj A S, and Christy Jackson, “Water management and metering system for smart cities “, International Journal of Scientific and Technology Research, June 2020, ISSN 2277-8616.

## COASTAL CLEAN-UP

As an initiative towards sustainable development, the “Plucking while jogging” was organised by National Service Scheme, VIT Chennai in association with Indian Coast Guard. The student volunteers of NSS cleaned the Eliot’s beach and segregated the material collected as biodegradable and non-biodegradable. This clean-up process is a step towards mitigating pollutants especially non-biodegradable materials such as plastic which pollute Ocean / Sea and affects marine life. The event also aimed at creating awareness for maintaining clean environment in public places and to follow the principles of Swachh Bharat Abhyaan.



Coastal Clean-Up



Indian Coast Guard- Ship Visit

## OUTREACH ACTIVITY

In order to create awareness among students on environmental pollution and the role of Indian Coast guard towards pollution control measures, a visit to Indian Coast Guard ship was arranged by NSS in collaboration with Indian Coastal Guard. Officials of ICG explained the functioning of the ship and their response to emergency situations like oil spill and demonstrated them as well.

