



# INSTITUTE OF LIFE SCIENCES

Bhubaneswar



## In our fight against COVID 19

### Institute of Life Sciences, Bhubaneswar

#### Achieved the Milestone of conducting

# 1,50,000

tests with RT PCR

## February 2, 2021



### *ILS against Covid 19*

#### **Covid Vaccination**

**January 20 - 21, 2021**



### HIGHLIGHTS

- Covid testing.
- SAC 2020.
- Open Day & Science Festival.
- Flagship programme: Tribal Health and Nutrition.
- Bioincubator.
- Constitution Day.
- Republic Day.
- Jan andolan.
- Webinar series.

### Dr. Ajay Parida's Group



The rapidly changing environmental conditions coupled with exponentially growing world population pose an imminent food crisis in the near future. This can only be avoided with proper strategies for improving abiotic stress tolerance in popular food crops as well as using climate resilient marginal crops for identifying the key regulators of stress tolerance.

Our lab focuses on studying the effects of two of the most devastating abiotic stresses, i.e. drought and salinity, on plant growth and crop yield. The lab is currently working on *Panicum sumatrense* (Little millet), a nutritionally dense, hardy, drought tolerant

crop and *Phragmites karka*, which is an invasive plant species growing in Chilika lake of Odisha that displays improved salinity stress tolerance. We employ high-throughput sequencing platforms to sequence and analyse the transcriptome of these plants under conditions of drought and high salinity. We have also undertaken whole genome sequencing and assembly of little millet and *P. karka*. The tribal regions of Odisha are a rich source of traditional medicine which use locally grown medicinal plants. These resources could be utilised to identify potent nutritive and medicinal supplements for future food security.

### Dr. Punit Prasad's Group



Epigenetic factors (EFs) are the key regulators of cell fate decisions. Genetic aberrations, mutations in epigenetic factors, or aberrations in their normal gene expression can lead to a disease state. Drugs for different kinds of malignancies currently target many of the epigenetic factors and several of them are in clinical trials. Hence, a detailed analysis of these factors is essential to design new therapeutic targets. Our lab's primary focus is to understand the role of a class of EFs called chromatin remodeling complexes (CRCs) in myelopoiesis and acute myeloid leukemia (AML). CRCs, mostly multi-subunit complex, regulate various biological processes by modulating the chromatin architecture and its interactions with various co-factors. Therefore, we are interested to identify the functions of CRCs in normal and malignant myelopoiesis. Towards this, we are using a two-prong approach; 1. To identify differentially expressed CRCs/EFs by analyzing and understanding high-throughput sequencing data in normal and acute myeloid leukemia (AML) patient samples and 2. Selecting them for experimental validation and subsequently understanding their gene regulatory mechanisms. Using these approaches, we have identified an auxiliary subunit of the SWI/SNF complex essential for stem cell proliferation and maintaining repressed states for various immune-responsive genes. My group is further working on understanding in-depth epigenetic mechanisms regulating myeloid differentiation-specific and immune responsive genes.

## SAC 2020 July 17-24, 2020



The 19th Scientific Advisory Committee meeting 2020 of ILS was organised amid Covid19 pandemic in a virtual mode in four sessions;

Cancer Biology on 17th July, Infectious Disease Biology on 13th July and Plant and Environmental Biotechnology on 24th July. The SAC meet was concluded with a discussion amongst the SAC members and Director, ILS on 13th September. Poster sessions were held on 22nd and 23rd January 2021.

## Open Day & Science Festival

December 4-5, 2020

The event was jointly organized by ILS and RMRC at an online platform. The inaugural session was chaired by Shri Ashok Panda, Minister Science & Technology, Govt. of Odisha, Shri Santosh Kumar Sarangi, IAS, Principal secretary, Dept. of Science & Technology, Govt. of Odisha, Dr. Sanghamitra Pati, Director RMRC and Dr. Ajay Parida, Director ILS. Dr. Amulya Panda, Director NII, Dr. Saroj Barik, Director NBRI, Dr. Bedangadas Mohanty, Prof. NISER, and Dr. Jyotirmayee Dash, Prof. IACS were the esteemed speakers of the event.



## International webinar series October 15- November 6, 2020



ILS along with AIN (Autophagy India Network) conducted a webinar lecture series covering the topics “Autophagy, Lysosome, and membrane Trafficking” from 15th October to 6th November 2020. The series was sponsored by EMBO - excellence in life sciences

## External review committee meeting 2020

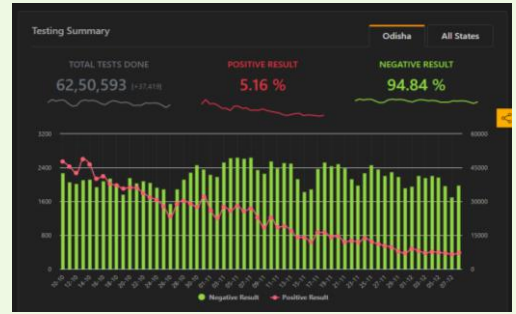
External review committee meeting of ILS for Infectious Disease Biology, Cancer Biology and Plant and Environmental Biotechnology was held on 4<sup>th</sup> September, 3<sup>rd</sup> November and 2<sup>nd</sup> December, respectively in virtual mode

# COVID 19

## Research initiatives in response to COVID-19 pandemic

### COVID 19 testing

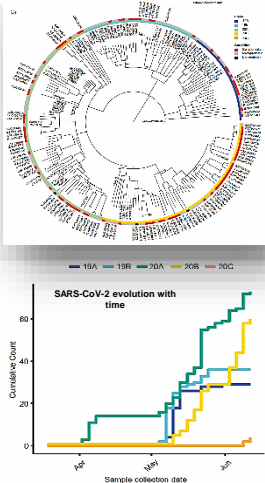
In the wake of COVID-19 pandemic, ILS contributed immensely by augmenting testing efforts in Odisha. The testing commenced from 14th April, 2020 with due approval from DBT and ICMR in the BSL3 facility. These samples were collected from 26 districts of Odisha. ILS achieved its milestone of testing 1.5 lakh samples through the dedicated efforts of scientists, scholars and staff led by the director Dr. Ajay Parida. The contribution of ILS is well recognized at the state and national level.



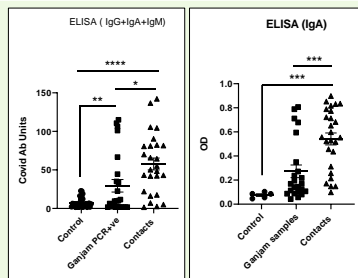
### Research

#### Genome sequencing

ILS undertook analysis of SARS-CoV-2 genome to identify the viral strains prevalent in Odisha and understand its evolution. Whole genome sequencing of 225 clinical strains was conducted using ARTIC protocol-based amplicon sequencing. Its phylogenetic analysis identified the presence of 5 reported clades 19A, 19B, 20A, 20B and 20C in the Odisha population. The analysis revealed two major routes for the introduction of disease in India i.e. Europe and South-East Asia followed by local transmission. The study set the ground for



characterization of genetic mutations in SARS-CoV-2 and found the prevalence of D614G mutation in all the recent clades. Protein modelling analysis was also conducted which identified the enhanced mutation of D614G resulting in interaction of TMPRSS2 protease with RBD domain of viral spike protein leading to enhanced infectivity.



Antibody profiling identified that individuals having high IgA titers demonstrated less disease severity. Cytokine profiling suggested that IP10 and MCP3 promote the disease whereas IL2-Ra, MIF, MIP-1a and IL-1Ra lessen the severity of the disease.

#### Immune profiling

ILS undertook immunological analysis of symptomatic, asymptomatic contact and control individuals to comprehend the immune response to COVID-19 infection.

#### Microbiome diversity

In order to understand the role of microbiome in COVID-19 disease pathophysiology, ILS is trying to understand the correlation between human microbiome and SARS-CoV-2 infection. In this regard, we have carried out 16s rRNA sequencing of 80 samples and our preliminary data demonstrates distinct clusters of OTUs in principal coordinate analysis.



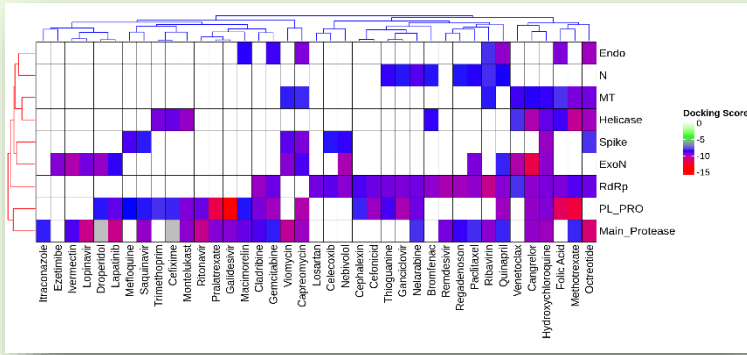
#### Isolation and culture of SARS-CoV-2 clinical strains

With the aim of screening, testing, and validation of potential anti-SARS-CoV-2 drugs and neutralizing antibodies, ILS has isolated 17 clinical strains of SARS-CoV-2 from the oropharyngeal swab samples from patients and have classified them into four major clades (19A, 19B, 20A and 20B)

We have isolated viruses from four clades

- Clade 19A: 5 isolates
- Clade 19B: 3 isolates
- Clade 20A: 5 isolates
- Clade 20B: 4 isolates

# COVID 19

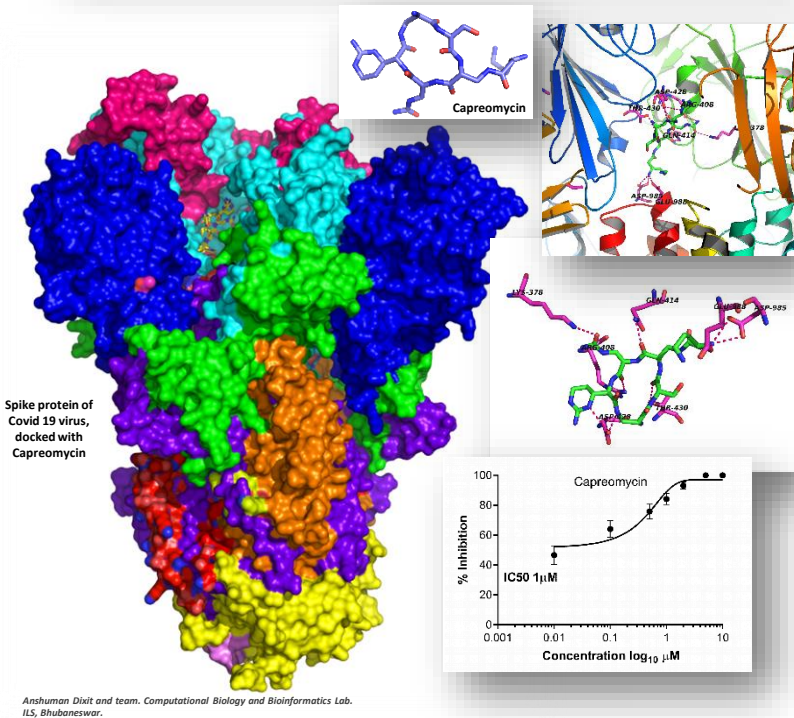


## Drug screening

ILS has initiated a research program focusing on drug screening and development. The approach being followed includes identification and validation of therapeutic compounds from medicinal plants. In this context, ILS has also collaborated with DBT-AYUSH network. Additionally, ILS has initiated the screening of FDA approved drug libraries using bioinformatics tools for the identification of potential drug candidates.

## Genome surveillance at ILS

The genome sequencing of the UK immigrated people was important as they were reported to be carrying the mutated COVID strains. ILS was selected as one of the five national institutions undertaking genome sequencing of UK returnees. The government of India initiated genomic surveillance activities under the Indian SARS-CoV-2 Genomics Consortium (INSACOG) where ILS has been recognized as a regional hub for genome sequencing of 5 % of the positive samples from Odisha, Chhattisgarh, Bihar and Jharkhand.



## National webinar on managing COVID-19

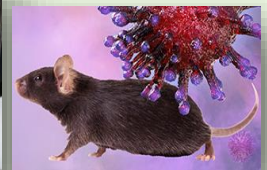
ILS along with NASI, India organized a webinar on COVID-19 – managing the Pandemic through Science and Technology Interventions on 13th January, 2021



## Resources for facilitating R & D

### Animal models for research and drug development

Studies using hamster model of COVID-19 have shown differential infectivity of various SARS-CoV-2 isolates indicating a possible role of viral factors in regulating the pathogenesis of this disease. Based on this, ILS is evaluating the rate of infectivity of various SARS-CoV-2 isolates in the Syrian Golden Hamster model. Additionally, DBT has supported to establish a national level animal biological safety level 3 (ABSL-3) platform for small animal breeding rearing and conducting COVID-19-related experiments. The facility will serve in carrying out pre-clinical evaluation of potential anti-viral drugs or vaccine candidates against SARS-CoV-2 infection.



### Biorepository

ILS has established a dedicated biorepository of well characterized clinical samples of COVID-19 patients. This will promote R&D towards indigenous diagnostics, therapeutics and vaccines in line with the “Make in India Initiative”.



### COVID-19 vaccination

With support of Health & Family Welfare Department, Government of Odisha, ILS had a two-day vaccination drive, between 20-21st January, 2021.



## Flagship programme: Tribal Health and Nutrition

The major goal of the ILS flagship program is to provide a comprehensive outcome through (i) understanding genomic diversity and differentiation, (ii) linking immune-metabolic variations to prevalent diseases and (iii) understanding gut microbiome diversity and their contribution to and/or influence on human nutrition and diseases, in ethnically distinct, well-differentiated and geographically distributed 62 tribal communities of the state of Odisha. In January 2021, 345 samples were collected from 7 ethnic tribal groups of Nabarangapur thereby making the total number of samples

collected from 22 tribal groups and control samples from the semiurban locations to 396. Complete blood count (CBC) and biochemical analysis of serum samples for lipid, liver, kidney, thyroid, and electrolyte profiles of these samples have been completed. Samples were tested for infectious diseases to evaluate their prevalence, identify hotspots, and address their influence on the immune profile and health. Exome sequencing and whole genome sequencing, immuno-phenotyping, and microbiome diversity analysis have been carried out with these samples.



## Bioincubator

DBT-ILS Bioincubator has been established with an aim to nurture early-stage innovations and develop them into technologies and products. The goal is to offer support for life science entrepreneurs and young biotech companies through all stages of early company development.

Entrepreneurship programs started under bioincubator:

- WEDP Programme: Women Entrepreneurship Development Programme (WEDP) aims at training the S&T graduates and diploma holders in the essentials of conceiving, planning, initiating and launching an economic activity or an enterprise successfully.
- FDP Programme: Faculty Development Programme (FDP) aims at equipping teachers/trainers with skills and knowledge that are essential for inculcating entrepreneurial values in students, guiding and monitoring their progress towards entrepreneurial career.



## Constitution Day

November 26<sup>th</sup>, 2020



Samvidhan diwas was celebrated at ILS,

where the director, scientists, students and Staff participated maintaining social distancing guidelines and in online platforms.



## Republic Day

January 26<sup>th</sup>, 2020

72nd Republic Day was celebrated in ILS with staff and students where we resolved to utilize science and technology for broader human welfare leading to country's development.

## Jan andolan



ILS participated in PMOIndia's Jan Andolan, where scientists, students and staff pledged to follow all the safety guidelines to fight against Covid-19.



## Inspirational talk by Dr. Subroto Bagchi

ILS commenced the New Year 2021 with an inspirational talk by Shri. Subroto Bachi, a well-known entrepreneur and

business leader and currently the chairman of skill development Authority of Odisha. He gave an invigorating talk on 10 rules of innovation emphasizing the need of creativity and existential thinking.

## Independence Day

74th Independence Day was celebrated at campus 1 and campus 2 of ILS in the presence of a limited number of ILS members.



## Ph.D Awarded

- **Dr. Shuchi Smita.** Role of Zinc Finger Transcription Factors in Dendritic Cells. (Supervisor -Dr. S. K. Raghav).
- **Dr. Abdul Ahad.** Dissecting the role of nuclear receptors NCoRI & SMRT in dendritic cells and its impact on T helper cell differentiation. (Supervisor - Dr. S. K. Raghav).
- **Dr. Rinchen T. Lepcha.** Studies on biofilm lifestyle and antibiofilm activity of marine bacteria isolated from Andaman sea. (Supervisor - Dr. S.K.Das).
- **Dr. Ajit Kumar Singh.** Structural and biophysical characterization of the multi-domain FK506-binding proteins AtFKBP43 and AtFKBP53. (Supervisor – Dr. D. Vasudevan).
- **Dr. Ashish Kumar.** Structural and biophysical characterization of Arabidopsis thaliana nucleosome and associated histone chaperones. (Supervisor – Dr. D. Vasudevan)
- **Dr. Ankita Shrestha.** Use of CRISPR-Cas9-sgRNA system coupled to unique caulimoviral Promotor/s for Targeted Metabolic Engineering in Plants. (Supervisor - Dr. N. Dey).
- **Dr. Ahamed Khan.** Molecular Characterization of Novel Promotor(s)from Para-Retroviruses and their interaction with Stress inducible Transcription Factors. (Supervisor - Dr. N. Dey).

## Awards



**Dr. Subash Mehto** received

1. DST SERB and ACS Merit Certificate for N-PDF online Poster Presentation-2020.
2. DST SERB Inspire Faculty-2020.
3. DST-DFG Young Scientist Award for Participation in Lindau Nobel Laureate Meeting-2020.



**Parej Nath** received esteemed Sunpharma Science Scholar Award 2020

**Kautilya Kumar Jena** received DST-DFG Young Scientist Award for Participation in Lindau Nobel Laureate Meeting-2020. He has also been awarded with INSA young Scientist Medal 2020 and NASI-Young Scientist Platinum Jubilee Award 2020.



## Scientists in focus



**Dr. Sanjeeb Sahoo and Dr. Amaresh Panda** were listed among the top 2% global scientists. This global list has been recently released by Stanford University which enlists the most-cited scientists across various disciplines involving 22 scientific fields and 176 sub-fields.

**Dr. Rupesh Dash:** Received the prestigious Science and Engineering Research Board (SERB)-STAR award-2020 for outstanding performance in SERB project.



**Dr. Santosh Chauhan:** was elected for NASI Fellowship 2020. He also received Merck Young Scientist Award (finalist) 2019. He was also awarded with S. Ramachandran-National Bioscience award for career development-2019

## Scholars in focus



**M CHANDANA SHETTY**, received 1st prize poster presentation under Infectious disease biology, for her work on the **Role of de novo heme of malaria parasite in cerebral malaria pathogenesis.**



**P. SUSHREE SHYAMLI**, received 1st prize poster presentation under plants and microbial biotechnology, for her work on **Deciphering correlation between nutritive value and abiotic stress factors of Moringa olifera.**



**PALLAVI**, received 1st prize poster presentation under cancer biology, for her work on **drives cisplatin resistance by regulating Wnt signaling through ENO-1/AKT/GSK3B axis**

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## Activities



### Editors



Shaheerah Khan



Priya Singh



Gargee Bhattacharya

जश्र-ए-रात के बाद, बड़े धुम-धाम के साथ  
शुरू हुआ था २०२० का संवरा  
उसी बिच कहीं टहल रहा था  
अद्भुत, अनोखा, अप्रतिम एक वाइरस न्यारा ।

बड़े चाह से खुद अतिथि बनकर  
तेय किया "उहान से यहाँ का सफर"  
३० जनवरी का टिकट कटाकर  
आ पहुंचा भारत के भितर ॥



गुंज उठी एक अवरिल आतंक  
छा गया अनिवार्य प्रकंप  
घुलने-मिलने के बिना, कठिन बनाया जिसने जिना  
है वह एक सुक्ष्मजिव, नाम उसका "कोरोना" ॥

ऐसी दुविधा के समय में बनकर हितैषी  
मिल खड़े हुए "जीव विज्ञान संस्थान के साथी"  
इकठ्ठा करके सामुहिक संगठित प्रसिक्षण  
आरंभ हुआ १४ अप्रैल को परिक्षण ॥

चंद्र महीनों की निरंतर निष्ठा  
साथ ही साथ निर्धारित दृढ़ प्रवेष्टा  
जहाँ अंजाम लाया १,००,००० से भी अधिक परिक्षण  
वहीं परिणाम फ़रमाया २२५ जीनोम अनुक्रमण ॥

पांच प्रमुख क्लेड का आविष्कार  
खोज निकाला भारत में कोरोना का प्रवेश द्वार  
जिसमें यूरोप खड़ा हुआ दक्षिण पूर्व एशिया के संग  
हमने पता लगाया २४७ एकल न्यूक्लियोटाइड परिवर्तन ॥

फिर तलाशा इसके परिवर्तित व्यवहार का कारण  
उजागर हुआ २०A, २०B क्लेड का प्रसारण  
नई वाइरस की ये हैं दो नये प्रकार  
आहिस्ता विकसित हो रहे हैं बार बार ॥

ना थकान हुई, ना हुई परेशानी  
मिटानी है बस अब कोरोना की निशानी  
बढ़े चले हम जनता के सेवा के पथ पर  
ठिक RT-PCR की सिग्माइड वक्र के प्रकार ॥

महामारी में हमारी कुछ ऐसी भूमिका रही  
प्रयत्न के फलस्वरूप प्रगती रंग लाई  
जारी रहेगा समाज के लिए सदा हमारा सर्म्पण  
आशा करते हैं खुब भायेगा आपको ये प्रस्तुतिकरण ॥

-Suchismita

I woke up to the soft breeze that carried the  
gift I prayed for few days back  
I covered myself with a blanket  
And laid there  
Lazy  
Infected with the texture of the moisture less  
air  
Winter scratched the walls  
Left a message gibberish  
Only for the one's having a heart to  
understand..

I couldn't.

Shaheerah.



## बादल

काश मै बादल होती..

जहां जी चाहता जा सकती,  
किसी पे गुस्से से बरस पड़ती,  
तो किसी पे प्यार की बारिश कर सकती।  
सूर्य के साथ भी खेला खेल सकती,  
जो वो मुझे परेशान करता, मै उसपे छा जाती।

काश मै बादल होती...

ना एक रंग, ना एक रूप होता,  
जो आकार चाहती, वो बन जाती  
मेरे मन पे ना किसी का काबू होता, ना किसी की बंदिश  
जिस देश, जिस शहर को संवारना चाहती, सवार देती।

काश मै बादल होती,

ये निरंकुश होने की ख्वाहिश है  
या धारा को सवार देने की चाहत,  
जो बार बार मेरा मन बादल की स्वच्छंदता को पाने को  
तरस पड़ता है,  
काश मै बादल होती ॥

प्रिया



## Dark: The mother of light

Depressing seems it's image in terms of vocab,  
suppressing in terms of emotions,  
"Darkness" is it's name

However all the wonderful things happen on it's lap.

Darkness of the womb nourishes the child.

Still we crave for the moon and stars.

Still we crave for that flicker of light amidst the dark night.

The dark night is in itself complete with its design.

For if the roots were not underneath the soil,

the saplings wouldn't proliferate and see the light of the day...

Yet we can't accept the moments of invisibility even for a second...

we are afraid that this may persist forever...

Yet all the light has its root in the dark... 🌱

The darkest hour of the night is followed by brightness.

If one has never experienced a dark phase, one can never feel the  
magic of brightness.

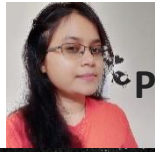
I always feel that until you undergo the change that extremes bring  
about in you, you may never taste the virtue of secrecy that life  
holds.

- Parinita Mishra





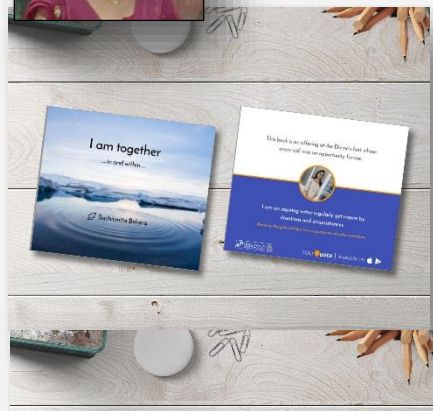
**Kirtal Hansdah**



**Pratikshya Sa**



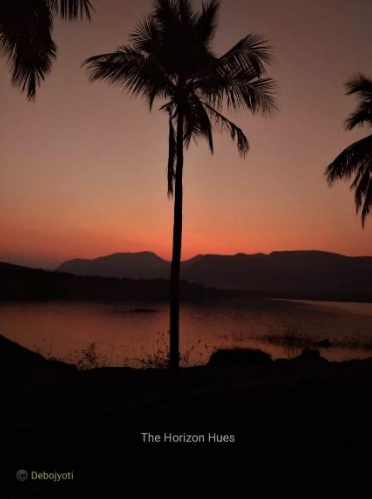
**Suchismita**  
published two  
books on quotes.



*Father and farmer.*



*Soulmates.*  
-Sibasish Mohanty



The Horizon Hues



The Drenched Chords  
Debojyoti



Reflections.  
-Shaheerah Khan



And which favours of your Lord will you deny?  
-Shaheerah Khan