

A short course on Ocean acidification and implications for global marine ecosystems

6 – 12 November 2016

OVERVIEW

The acidity of the world's oceans is increasing by absorbing atmospheric carbon dioxide (CO₂). There has been a significant rise in atmospheric CO₂ concentration due to continuous burning of fossil fuels and projected to rise reaching up to 970 ppm by the end of this century and 1900 ppm by the year 2300. It has been estimated that 50% of the anthropogenic CO₂ released in atmosphere has been absorbed by world's oceans over the last two centuries and approximately 30% of more recent emissions has been taken up by oceans. As a result the average pH of ocean surface have thought to declined by 0.1 unit from pre-industrial level and projected to decrease by 0.3 to 0.46 units by the end of this century, concurrent with the present CO₂ emission scenario. The resulting decline in ocean pH is referred to as ocean acidification (OA). The predictions are mainly focused on surface ocean waters but estuarine and coastal environments, in particular from tropical regions such as India are not well represented due to lack of reliable data, complexity of circulation processes in coastal environments and resulting unreliable models. Given the economic importance of coastal ecosystems which runs into trillions of US dollars globally as well as in India, it is extremely important to understand processes of OA and resulting implications for coastal and marine ecosystems.

Objectives and course details:

The primary aim of the proposed course is to introduce students to the basic concepts of ocean acidification and ultimately motivate them to undertake OA related research in India. The course will cover the following topics:

- Introduction to ocean acidification
- Practical studies on calculation of the marine carbonate system
- Measurement and projections of ocean acidification and Databases
- Tracking ocean acidification in Indian waters
- Practical exercises in database management
- An overview of marine ecosystem responses to ocean acidification
- Participating exercises in developing own ocean acidification related study

Every morning and afternoon there will be lectures of one-two hours duration on the topics outlined above. This will be followed by extensive discussions in the form of discussion groups and tutorials along with a visit to coastal Bay of Bengal. Most importantly, each participant will ultimately develop their own ocean acidification related study as part of this intensive course. The expert along with local coordinator will conduct the tutorial exercises. There will be ample opportunities for participants to interact with the expert throughout the duration of course.

COURSE VENUE

Lecture Hall Complex
Indian Institute of Science Education and Research Kolkata
Mohanpur – 741 246, West Bengal, India

TARGET AUDIENCE

- The proposed course is aimed at 4th and 5th year BS-MS, Integrated PhD and PhD students of IISER Kolkata.
- Teachers and researchers from colleges and universities.

COURSE FEES

- Student participants: **INR 1,000/-** (refundable caution money)
- Academics, Researchers and Teachers : **INR 5,000/-**

The above fee includes instruction materials handouts, computer and internet facility usage. An additional fee of Rs 1200 per person will be charged for the field visit.

THE FACULTY



Richard Bellerby is a Distinguished Thousand Talents National Expert Professor as well as Director of SKLEC-NIVA Center for Marine and Coastal Research in East China Normal University based at Shanghai, China. Professor Bellerby also holds the position of Senior Scientist in Norwegian Institute for Water Research (NIWA), Norway. Professor Bellerby obtained his PhD from the University of Plymouth in Marine Chemistry in 1994. Following postdoctoral stints at several institutions based in Norway and United Kingdom including the highly prestigious Woods Hole Oceanographic Institution in United States of America, he joined as a Professor in Bjerknes Centre for Climate Research, Norway and subsequently as Senior Scientist in NIWAR, Norway. His research is on the interactions of marine ecosystems and climate change. His approach is to explore the ocean and shelf systems from ocean-going expeditions, *in situ* observation platforms, ocean models and global datasets; he studies deliberate perturbation experiments, taking the natural ocean out of its contemporary framework, and employs regional coupled physical-chemical-ecosystem and global ocean models to simulate future oceans. He is one of the leading scientists working in the area of ocean acidification research and considered as an authority in this domain. He has published more than 150 papers in peer-reviewed journals including numerous papers in the highly prestigious journals such as Nature, Environmental Science and Technology, Biogeosciences and Geophysical Research Letters. Professor Bellerby serves in numerous international committees including the Scientific Committee on Antarctic Research (SCAR) (SCAR Ocean acidification), Arctic Monitoring and Assessment Program (AMAP Ocean acidification) Scientific

Committee on Ocean Research (SCOR), Integrated Climate and Ecosystems Dynamics (ICED) and also in the Global Ocean Acidification Observing Network, an initiative of UNESCO. He leads numerous large scale projects funded by European Union and National Oceanic and Atmospheric Administration. Professor Bellerby is actively involved in teaching undergraduate and postgraduate programs on various aspects of ocean system including estuarine ecosystem dynamics and ocean acidification. Very recently, he has been conferred Distinguished Thousand Talents National Expert Professorship in China and invited to set up a new institute on marine ecosystem dynamics which also encompasses ocean acidification.



Punyasloke Bhadury is an Associate Professor of Biological Sciences at Indian Institute of Science Education and Research Kolkata and is currently Head, Department of Biological Sciences. His research focuses on disentangling complexity of biological systems in mangrove ecosystem, biogeochemical cycling of carbon, nitrogen and arsenic as well as investigating the genome level responses of photosynthetic eukaryotes under ocean acidification scenarios.

COURSE CO-ORDINATOR

Dr. Punyasloke Bhadury

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IMPORTANT INFORMATIONS

- For course registration please visit: <http://www.gian.iitkgp.ac.in/GREGN/index>
- Registration Deadline: **25 October 2016**
- Fess to be paid by NEFT:
 - Name of the Beneficiary: IISER Kolkata Project A/c
 - Name of Bank and Branch: Indian Overseas Bank, Mohanpur
 - Beneficiary Account No.: 325001000000002
 - Bank MICR Code: 700020092
 - Bank IFS Code: IOBA0003250
- Accommodation based on nominal charges (per day) will be available to all participants. Participants need to bear their own accommodation and food expenses.
- After successful completion of the course, all participants will get participation certificates.
- How to reach: <http://www.iiserkol.ac.in/contactus/how-to-reach>

ABOUT IISER KOLKATA

The Indian Institute of Science Education and Research (IISER) Kolkata was established in 2006 by the Ministry of Human Resource Development (MHRD), Government of India. This initiative was a part of the Government's effort to set up a number of new academic institutions of international standard that would train specialised manpower in basic sciences and allied technologies. Our central theme is to provide quality science education and to carry out research in basic and frontier areas of science involving both undergraduate and postgraduate students, in an intellectually vibrant atmosphere. Through borderless and flexible education programmes involving multi-disciplinary as well as inter-disciplinary curriculum, IISER Kolkata provides an unparalleled opportunity for young students to experience the excitements of research in basic sciences. In essence, IISERs are devoted to both teaching and research in an integrated manner – thus nurturing both curiosity and creativity. For more details please visit the link <http://www.iiserkol.ac.in>, and to reach **IISER Kolkata**, please see the link <http://www.iiserkol.ac.in/contactus/how-to-reach>.