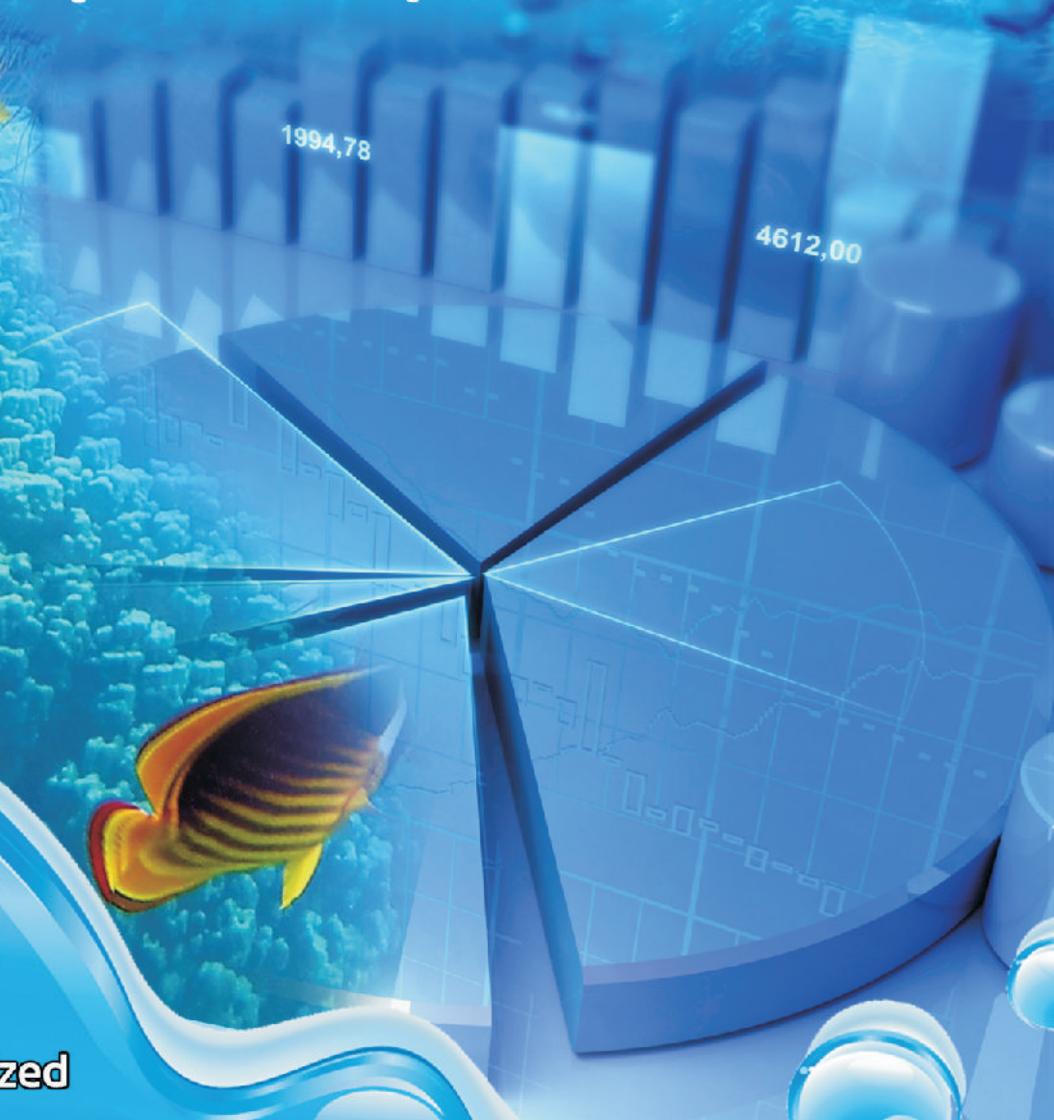




ITCOcean



**International Training Course
on
Fishery Stock Assessment and Ecosystem Modeling
September 16 - 22, 2015**



**Organized
by
International Training Centre for
Operational Oceanography (ITCOcean)
ESSO-INCOIS
Hyderabad, India**

Background:

Indian National Centre for Ocean Information Services (INCOIS) under Earth System Science Organization (ESSO) is a dedicated institution for operational oceanography and the only institution in the Indian region that has been providing operational ocean information and advisory services over the past 10 years. It has established leadership particularly in ocean observations, ocean modeling and ocean information and advisory services in the Indian Ocean region.

ESSO-INCOIS and UNESCO's Intergovernmental Oceanographic Commission (IOC-UNESCO) signed a Memorandum of Agreement on 4 July, 2013 during the 27th session of the IOC Assembly in Paris, for cooperation in conducting training courses at the International Training Centre for Operational Oceanography (ITCOcean) set up by ESSO-INCOIS in Hyderabad, India. The centre will operate as a contribution to IOC's training and capacity development activities in mainly the Indian Ocean rim countries. The Centre aims at promoting the development and optimization of scientific base, technology and information system for operational oceanography at national, regional and global levels.

About the Course:

Fishery is one of the oldest activities that made humans venture into the sea. Marine food resources are key to meet the challenge of nutritional requirements of growing population. Indian Ocean is a peculiar ocean that is land-locked on northern side and experiencing seasonal reversal of wind and resultant currents. While poorly understood even as compared to some of the marginal seas, Indian Ocean is the backbone of life for rim countries, most of which are of the poorest and most densely populated countries in the world.

Northern Indian Ocean region is part of this ocean that undergoes high intraannual variability. Much of its area is comprised of two basins namely Arabian Sea and Bay of Bengal. Major part of these basins falls under Exclusive Economic Zones (EEZs) of the rim countries and thus transboundary species becomes key concern for the food-share related issues. In this regard, assessment of stock availability is essential to prevent any stock collapse and to determine the exploitation ceiling for different commercially important species.

Science can offer various tools to address a particular aspect of stock, depending on the questions on hand. Policy makers need such information in order to execute better resource management either by offering incentive for environmentally responsible practices or by applying restriction for the ones that is not. Developed countries have insights for their stocks from long-running data collection and monitoring programs. This has yielded significant results in some parts of the world such as Northern Atlantic Ocean. In case of India, several institutes under Indian Council of Agricultural Research (ICAR) and Ministry of Earth Sciences (MoES) are working on fishery stock assessment in Indian Ocean adapting different techniques and with different data sets.

An ongoing technical cooperation between Ministry of Earth Sciences (MoES), India and National Oceanic and Atmospheric Administration (NOAA), USA - to enhance predictive capabilities for fishery in India - provides unique opportunity to bring the US and Indian researchers together to work on development of the predictive capabilities of marine fisheries in India. This training program aims to transcend their knowledge and provide insights on future scope of work towards development of fishery stock assessment program at a national level, in partnership with ICAR and MoES institutes, and towards improvement in the assessment of the fishery stocks in India. Additionally, the course will address the data requirements and will introduce the trainees to some of the best practices in the world and science behind these approaches. However, the course envisages beyond being just a lecture series. This will be achieved by the hands-on to the tools with trainees' own data. Such an approach will not only make trainees confident about using these tools but will also bring out never-seen-before insights from their own data. At the end of the lectures and mini-projects, draft documentation on recommended practices in North Indian Ocean scenario (multi-species, tropical fishery) is also envisaged.

Course Contents:

The Lectures will tentatively cover the following topics:

- ! Stock Assessment models (general population theory, modeling of exploited populations, concepts of surplus production & sustainable yield, equilibrium concept, data for stock assessment, data collection procedures, data assessment, methods to estimate abundance, stock assessment models, etc.)
- ! Underwater Acoustics (Fisheries and Plankton Acoustics, sound and underwater acoustics equipment, etc.)
- ! Ecosystem Modeling using ECOPATH and ECOSIM

The course also includes working on Mini-projects / practicum in linear modeling, statistics, stock assessment and acoustics. The participants are encouraged to bring the fish catch and effort data and fishery biology data such as length-weight and age data, etc.

Faculty:

The faculty for the course consists of scientists/experts in different fields drawn from the National Oceanic and Atmospheric Administration (NOAA), USA and Central Marine Fisheries Research Organization (CMFRI), India.



Dr. Aaron M. Berger is a Research Mathematical Statistician and member of the Integrated Fisheries Stock Assessment Team at the Northwest Fisheries Science Center (NWFSC), NOAA, USA. Dr. Berger joined the NWFSC team in 2014 after working as a Senior Fisheries Scientist with the Secretariat of the Pacific Community on western Pacific tuna stock assessments. He is interested in conducting research at the assessment-management interface, where alternative management procedures can be examined through simulation. Current projects include the refinement of spatial habitat and of tagging models, reference point and harvest control rule interactions, and the development of a multi-species bioeconomic model. Dr. Berger has taught stock assessment courses in South Africa, New Caledonia, and the Solomon Islands.

Dr. Elizabeth Eli Homes, Fisheries Research Centre, Northwest Fisheries Science Center, NOAA, USA. She has been working as a statistician and population modeler for the National Marine Fisheries Service (NMFS) since 1999. She has worked on risk assessments, status assessments and listing decisions for protected fish and marine mammal species throughout the U.S. West Coast including Steller Sea Lions, Southern Resident Killer Whales, Puget Sound Herring, Coho, Chinook salmon, Steelhead, and Puget Sound rockfish.



Her speciality is in multivariate time-series analysis and she developed one of the most widely used statistical packages for multivariate state-space modeling used by researchers in economics and environmental sciences (MARSS). She teaches a courses on time-series analysis and multivariate statistics in the Fisheries Dept at the University of Washington and international workshops on the same topic.



Dr. Juan Zwolinski is a Research Fisheries Biologist affiliated to the Fisheries Resources Division, Southwest Fisheries Science Center (SWFSC), NOAA, USA. Dr. Zwolinski's Ph.D. research focused on the use of underwater acoustics on the ecology and abundance estimation of *Sardina pilchardus* in Portuguese waters. He is a member of the Advanced Survey Technologies Program (AST) at SWFSC that supports ecosystem based fisheries management through new or innovative uses of sampling technologies on fisheries surveys in the California Current System.

He is currently working on the study of the distribution, abundance and population dynamics of pacific sardine and other pelagic fishes using acoustic-trawl surveys and ancillary oceanographic information.

Dr Kolliyil Sunilkumar Mohamed working on molluscan fisheries and mariculture in CMFRI since 1986 and presently heading the Molluscan Fisheries Division of CMFRI, Kochi. Dr. Mohamed has contributed to understanding of Indian cephalopod biology and population dynamics. In molluscan mariculture, he has contributed to the growth of commercial bivalve mariculture in the country. He has interests in marine ecological modelling particularly its application to fisheries management. He is the leader of a team of researchers from CMFRI working on trophic modelling of Indian marine ecosystems and has modelled the Arabian Sea ecosystem off Karnataka State, the northwest coast ecosystem and the Gulf of Mannar ecosystem.



Dr Mohamed is Secretary of the Marine Biological Association of India for the past 4 years. He has won the Jawaharlal Nehru Award for best PhD thesis from ICAR in 1991 and the TVR Pillay Aquaculture Award 2011 for outstanding aquaculture research and extension. Recently he is also the member of the Technical Advisory Board of the Marine Stewardship Council (MSC) which is global non-profit organization fostering certification and ecolabelling of sustainable seafood.

Dr. Owen S. Hamel is a Supervisory Research Fisheries Biologist and leader of the Integrated Fisheries Stock Assessment Team at the Northwest Fisheries Science Center (NWFSC), NOAA, USA. Dr. Hamel has been at the NWFSC since 2002 and has led multiple stock assessments of U.S. West Coast groundfish. His research activities are varied, including fish otolith ageing validation methods and ageing error, fishing gear selectivity, the potential of Marine Protected Areas to increase our understanding of fish life histories, and the dynamics of *Vibrio parahaemolyticus* concentrations in oysters. Dr. Hamel has been a member of the Pacific Fishery Management Council's Scientific and Statistical Committee since 2005, serving as its chair from 2012-2014. He has reviewed stock assessments for the U.S., Canada and Chile. Recently he taught a year-long course on applied stock assessment at the University of Washington in Seattle.



Dr. E. Vivekanandan is an Emeritus Scientist & Consultant, CMFRI, ICAR, India and has served CMFRI for the past 35 years in different capacities. Dr. Vivekanandan served as Principal Scientist, Head, Demersal Fisheries Division and Scientist-In-charge, Madras Research Centre of CMFRI. Dr. Vivekanandan's core areas of research include fish stock assessment, coastal fisheries management, marine mammal conservation, ecosystem modeling, and climate change. He served as Fisheries Team Leader in the UN Project and conducted valuation study on the impact of world's largest oil spill at King Fahd University of

Petroleum & Minerals, Dhahran, Saudi Arabia for one year. FAO and Bay of Bengal Large Marine Ecosystem have recognised him as a Regional Trainer on Ecosystem Approach to Fisheries Management, and Science Communication and he has conducted a number of training programmes in south and southeast Asian countries

Venue:

The training course will be held at ITCOcean, Indian National Centre for Ocean Information Services (INCOIS), Hyderabad, India. **The classroom will also be made available online (live)** where the aspiring applicants can join in the course through internet.

Who can apply?:

The training program is open to scientists & scholars from fishery research institutes, officials from fishery departments, and doctoral students involved in oceanographic work with specific reference to fisheries stock assessment, ecosystem modeling, etc. Priority will be given to trainees from Indian Ocean RIM countries.

The trainees are expected to have basic knowledge of fishery data collection, fishery biology, statistical analysis, knowledge in R program, etc. with basic computer skills. Preference will be given to the candidates who are presently working or building a carrier in the above topics.

For those participants who are unable to participate in person, facilities will be made available to join the course online. Such participants may specifically mention in their application about the same.

Course Fee and Financial Support:

There is no course fee charged for the training course. The participants are expected to make their own arrangements for all expenses, including to and fro travel. However, INCOIS can provide food and lodging at their Hostel for few deserving candidates. **Preference in admission will be given to candidates who are supported by their own organizations.** International participants may approach UNDP, UNESCO, UN-ESCAP, IOC, SCOR and other agencies for financial assistance.

How to apply?

The interested candidates should fill in the application form available at the following link. Recommendation letter from the Research Supervisor / Head of the Institute is must.

Application Form available at:

<http://www.incois.gov.in/documents/ITCOcean/StockAssessmentCourseApplicationForm.pdf>

Please send the completed and signed application in electronic form to **itcocean@incois.gov.in** on or before **August 21, 2015**. The total size of all the attachments together should be less than 5MB.



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