

Conference Schedule

2022 The 1st International Conference on Climate Change and Ocean Renewable Energy

November 5th, 2022

Online via ZOOM



Organizers



Supporters



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Conference Schedule Summary

NOVEMBER 5 th Saturday (08:00-18:30 BST)			
(08:00-13:00/ Morocco-UK) (09:00-14:00/ Mozambique) (12:30-17:30/ India) (15:00-20:00/ Philippines) (14:00-19:00/ Indonesia) (13:00-18:00/ Kazakhstan) (10:00-15:00/ Turkey) (03:00-08:00/ United States)			
08:00-14:00	Conference registration		
08:30-09:30	Opening Ceremony	Chaired by <i>Dr. K.L. Priya</i>	<p style="text-align: center;">Welcome Introduction</p> <p style="text-align: center;"><i>Dr. Igor Ljubenkov, Water Development-Croatia</i></p> <p style="text-align: center;"><i>Prof. David Bowers, Bangor University-United Kingdom</i></p> <p style="text-align: center;"><i>Prof. A.M. Hogueane, Eduardo Mondlane University-Mozambique</i></p>
09:30-09:55	Session I: Impact of climate change on water resources management	Keynote Speech Chaired by <i>Dr. Decibel V. Faustino-Eslava</i>	<p style="text-align: center;">“Climate change impact on agriculture of Almaty region, Kazakhstan”</p> <p style="text-align: center;"><i>Dr. Zhansaya Bolatova, Almaty University of Power Engineering and Communication-Kazakhstan</i></p>
10:00-10:25			<p style="text-align: center;">“Ecosystem approach for sustaining water resources”</p> <p style="text-align: center;"><i>Dr. Tri Retnaningsih Soeprbowati, Universitas Diponegoro-Indonesia</i></p>
10:30-10:55			<p style="text-align: center;">“Impact of Climate Change on Streamflow and Water Resources Systems”</p> <p style="text-align: center;"><i>Dr. Gökçen Uysal, Eskişehir Technical University-Turkey</i></p>
11:00-11:25			<p style="text-align: center;">“Drought Analysis Based on Drought Indices in arid, semi arid and Humid Tropical Regions of India”</p> <p style="text-align: center;"><i>Dr. Surendran Udayar Pillai, Centre for Water Resources Development and Management-India</i></p>
11:30-11:55			<p style="text-align: center;">“Towards locally relevant global soil moisture monitoring for water resources and climate applications”</p> <p style="text-align: center;"><i>Dr. Noemi Vergopolan, Princeton University-United States</i></p>
12:00-12:10	Session I: Impact of climate change on water resources management	Oral Speech Chaired by <i>Dr. Joan Cecilia C. Casila</i>	<p style="text-align: center;">“Why is correct agricultural water management necessarily prerequisites in water shortage regions?”</p> <p style="text-align: center;"><i>Bilal ACAR, University of Selçuk- Turkey</i></p>
12:10-12:20			<p style="text-align: center;">“History of water pollution in rural area lake: analysis based on sediment core diatoms”</p> <p style="text-align: center;"><i>Alisha Revalia G. A., Universitas Diponegoro-Indonesia</i></p>
12:20-12:30			<p style="text-align: center;">“Evaluation of floc characteristics induced by heavy metals in an estuarine environment”</p> <p style="text-align: center;"><i>Febina A Manaf, TKM College of Engineering- India</i></p>
12:30-12:40			<p style="text-align: center;">Impact of Agro-chemicals Exposure on the Human Health and Environment</p> <p style="text-align: center;"><i>Shanta Kumari, Eternal University- India</i></p>
12:40-12:50			<p style="text-align: center;">Flood Modelling and Inundation Mapping of Meenachil River Using HEC-RAS and HEC-HMS Software</p> <p style="text-align: center;"><i>Athira S., Visvesvaraya National Institute of Technology- India</i></p>
12:50-13:00			<p style="text-align: center;">Impacts of climate change on groundwater Resiliency and strategies for groundwater development in Thuthapuzha river basin</p> <p style="text-align: center;"><i>Gokul T S, Govt Engineering College- India</i></p>
13:00-13:10			<p style="text-align: center;">Audience Q&A (10 min)</p>

13:10-14:00	Photo & Break		
(14:00-19:00/ Morocco-UK) (15:00-20:00/ Mozambique) (14:00-19:00/ Croatia) (19:30-00:30/ India) (21:00-02:00/ Singapore) (16:00-21:00/ Turkey) (20:00-01:00/ Indonesia) (18:00-21:00/ Bangladesh)			
14:00-14:25	Session II: Development and utilization of Ocean Renewable energy	Keynote Speech Chaired by Prof. A.M. Hogueane	<p>“Ocean Energy in Southeast Asia: Opportunities, Consequences, and Risks towards Holistic Adoption” <i>Dr. Mary Ann Quirapas-Franco, National University of Singapore- Singapore</i></p>
14:30-14:55			<p>“The Development of Tidal Current Energy Technology for Islands: A case Study of Indonesia” <i>Dr. Sony Junianto, Electronic Engineering Polytechnic Institute of Surabaya - Indonesian</i></p>
15:00-15:25			<p>“Out at sea - Floating energy solutions for wind and tidal energy generation” <i>Dr. Philipp Thies, University of Exeter- United Kingdom</i></p>
15:30-15:55			<p>“Offshore wind resource assessment along Indian Exclusive Economic Zone” <i>Dr. Nagababu Garlapati, Pandit Deendayal Petroleum University-India</i></p>
16:00-16:25			<p>“Ocean Renewable Energy: Prospects, Challenges, and Solutions” <i>Dr. Omar Farrok, Ahsanullah University of Science and Technology- Bangladesh</i></p>
16:30-16:55			<p>“Offshore Wind Energy Development in Europe and Asia and a SWOT Analysis for Turkey” <i>Dr. Samet ÖZTÜRK, Bursa Technical University-Turkey</i></p>
17:00-17:10			Oral Speech Chaired by Dr. I. Ljubenkov
17:10-17:20	<p>“Influence of Vertical Plates on the Pitching Motion of a SPAR Wind Floater in Waves” <i>Fuad Mahfud Assidiq, Universitas Hasanuddin-Indonesia</i></p>		
17:20-17:30	<p>“Developing a Decision Support System for a Pumped Storage Hybrid Power Plant” <i>Ilkay Ekcici, Eskişehir Technical University-Turkey</i></p>		
17:30-17:40	<p>“Investigation of instabilities of the plane Poiseuille flow of a viscoelastic fluid in a periodic channel” <i>Mohamed Madi, Ibn Zohr University- Morocco.</i></p>		
17:40-17:50	<p>“The Extended Graetz Problem for a Jeffery-Hamel Flow through a Plate Convergent Channel with a Step Change in Wall Temperature and Streamwise Heat Conduction” <i>Youssef Haddout, Ibn Zohr University-Morocco</i></p>		
17:50-18:00	Audience Q&A (10 min)		
18:00-18:10	Announcing the Best Oral Presentations		
18:10-18:30	Closing Ceremony	Chaired by Dr. S. Haddout	<p>Conclusions Vote of Thanks</p>

Online Presentation Instructions

- **Time Zone**

The time shown in this schedule is **British Summer Time (BST)** Please set-up your laptop time in advance.

- **Equipment Provided by the Presenters**

1. A computer with an internet connection (wired connection recommended)
2. USB plug-in headset with a microphone (recommended for optimal audio quality)
3. Webcam (optional): built-in or USB plug-in

- **Environment requirement**

1. Quiet Location and Proper lighting
2. Stable Internet Connection
3. Suitable Background

- **Duration of each Presentation**

Keynote Speech: about **25 Minutes** of Presentation + 5 Minutes of Question and Answer.

Oral Speech: about **10 Minutes** of Presentation + 10 Minutes of Question and Answer at the end of the session.

Please make sure that your speech is within the allotted time.

Opening Ceremony


**NOVEMBER 5th |Saturday (08:30-09:30 BST) | (09:30-10:30/ Mozambique)
| (13:00-14:00/ India)**

Zoom Meeting link:

<https://zoom.us/j/92279056891?pwd=TUs2aFFaUjVyUIBHeWtFRmdpZE1xZz09>

Session Chaired by:

Dr. K.L. Priya, TKM College of Engineering, India

	<p style="text-align: center;"><i>Dr. I. Ljubenkov</i></p> <p>Researcher and an authorized civil engineer employed in his own company Water Development, Split, Croatia. His scientific interest refers to hydrology, hydraulics, estuarine analysis, river engineering and water resource management, while the professional work focuses on designing and supervising the construction of utility facilities and hydraulic systems. He has several articles published in peer-reviewed journals and contributed chapters in books.</p>
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Prof. David Bowers

Emeritus Professor of Physical Oceanography at Bangor University in the UK. He studied Physics at Manchester at the tail end of the 1960's and came to oceanography as a mature student during an oil crisis in the mid-1970's. He obtained his Masters and PhD degrees at the University College of North Wales and worked on a post-doc at Flinders University in Australia before taking up a post as lecturer at Bangor. He retired in 2016 as head of physical oceanography at Bangor with a career researching tides, turbulence, particle flocculation and marine optics. He has written several books and is currently finishing a popular science account of the oceanography of shelf seas.



Prof. A.M. Hogueane

Full Professor of Physical Oceanography at the Eduardo Mondlane University. He graduated in Physical Oceanography and Mathematics in 1993 and obtained his PhD degree in Physical Oceanography in 1997, at the University College of North Wales, UK. He was a post-doc research fellow at the Institute of Geophysics, University of Bergen. Currently is the Director of the Centre for Marine Research and Technology and holds the UNESCO Chair in Marine Sciences and Oceanography at the Eduardo Mondlane University. His main research interest areas include tides and tidal currents, hydrodynamics of estuaries and coasts, marine physical-biological coupling and energy from the sea. He has several articles published in peer-reviewed journals and contributed chapters in books.

Session 1: Impact of climate change on water resources management

Keynote Speeches

NOVEMBER 5th | Saturday (09:30-12:00 BST) | (15:30-20:00 | Philippines)


Zoom Meeting link:

<https://zoom.us/j/92279056891?pwd=TUs2aFFaUjVyUIBHeWtFRmdpZE1xZz09>

Session Chaired by:

Dr. Decibel V. Faustino-Eslava, School of Environmental Science and Management

University of the Philippines, Los Baños, Laguna

	Dr. Zhansaya Bolatova
	Department of Science and Commercialization, Almaty University of Power Engineering and Communication, Kazakhstan Department of Agronomy and Technical Sciences, Zhetysu University named after I. Zhansugurov
	Speech Title: <i>Climate change impact on agriculture of Almaty region, Kazakhstan</i> (09:30-09:55 BST) (13:30-13:55 Kazakhstan)
<p>Abstract: The global processes of climate change under the influence of anthropogenic factors entail extreme and almost irreversible consequences. It is obvious that climate change affects agricultural production and its productivity throughout the world. Agriculture, which is one of the major sources of greenhouse gas emissions, can play an important role in mitigating the effects of climate change. Kazakhstan is the most important supplier of grain and grain products, is an important link for Central Asia. Kazakhstan also has plans to increase the number of livestock for 100% domestic supply of meat, but the issue rests on the quality and availability of pastures affected by climate change. Analyzes showed that under the conditions of the expected climate in 2030, the average yield of spring wheat in seven studied Kazakhstan's regions (Akmola, Aktobe, West Kazakhstan, Karaganda, Kostanay, Pavlodar) will be decrease and in the conditions of 2050 - 51-80% will be decrease of production. This means that while maintaining the existing stage of farming culture, the yield of spring wheat by 2030 will decrease to 13-37%, which will lead to a reduction in the area by 23.86% of the total area of crops in 2019. Objectives of the review: to analyze the processes of climate change and to study the economic impacts of climate change on agriculture in Kazakhstan. For article have been used different literature as IPCC, WMO, WTO, FAO, UNEP, UNFCCC, UNDP, IMF, WB,</p>	

OECD, KAZHYDROMET, IRRI, Committee of the Statistics of the Kazakhstan, Turkish State Meteorologic Service reports etc.



Dr. Tri Retnaningsih Soeprbowati

**School of Postgraduate Studies, Universitas
Diponegoro, Semarang, Indonesia
Center for Paleolimnology, School of
Postgraduate Studies, Universitas Diponegoro,
Semarang, Indonesia
Department Biology, Faculty Science and
Mathematics, Universitas Diponegoro,
Semarang, Indonesia**

Speech Title:

***Ecosystem approach for sustaining water
resources***

(10:00-10:25 BST) | (16:00-16:25 | Indonesia)

Abstract: Water quality is one of the challenges related to human activities, which in such part, reduces ecosystem services. Ecosystem services are the contribution of ecosystems to human beings. Ecosystem services of most aquatic ecosystems in Indonesia are water provisioning, fisheries, irrigation, recreation, hydroelectricity power, flood protection, erosion prevention, habitat for biodiversity, and socio-culture-religion. An ecosystem has to provide support for living organisms and has to be capable of withstanding pressure. However, when the pressure is too high, it influences the performance of ecosystem services. Sustainable water resources management based on the ecosystem approach could be the application of science and technology, such as integrated water and catchment area, pollution control, conservation of biodiversity; community-based management; and good governance. In terms of water resource management, biodiversity can be applied to evaluate realistic target achievement, ecosystem services, and human impacts. At the ecosystem level, biodiversity expresses natural variability reference conditions. The ecosystem approach for sustaining water quality and quantity was developed for Cebong Lake, Dieng Plateau, Indonesia.



Dr. Gökçen Uysal

**Department of Civil Engineering, Eskişehir
Technical University, Turkey**

Speech Title:

***Impact of Climate Change on Streamflow and
Water Resources Systems***

(10:30-10:55 BST) | (12:30-12:55 | Turkey)

Abstract: This keynote presentation is based on continuing studies of our research group* which is working on different facets of streamflow estimation and water resources management issues under the effects of climate change. Most of the existing water structures are designed and operated according to historical data sets. However, a drastic change in the inflows patterns is inevitable in the future even if the emission reduction policies will be well implemented; thus, the balance between water supply and water availability will directly impact the operation of dam reservoirs. Also, the multi-purpose characteristics of water resources systems among different users (hydropower, flood control, irrigation) and future demands will make the operations more challenging. Our group works are dedicated to analyse the reference and future projection simulations of the Global Circulation Model (GCM) climate data, their hydrological future responses/estimation through hydrological models, and the their future effects on operations through systems analysis approaches. Hydrological models are accomplished under conceptual (HBV and HEC-HMS) or soft computing (Neural Network) models, and reservoir operation is run via rule-based simulation model (HEC-ResSim). During the winter, the eastern part of Turkey is completely or partially covered in snow, and large rivers such as the Euphrates and Tigris are primarily fed by snowmelt. Thus, the first case focuses on the future implication of climate change on the characterization of snowmelt runoff using a conceptual modelling framework. The second case is aimed to integrate neural network model-based hydrological simulations together with a reservoir simulation to estimate future storage content and releases of one of the important water supply dams of Ankara (the capital city of Turkey).

* **Research group members:** Gokcen Uysal, Aynur Sensoy, A. Arda Sorman, Y. Ogulcan Dogan, H. Soykan Civelek at Eskişehir Technical University, Turkey; and A. Unal Sorman at Middle East Technical University



Dr. Surendran Udayar Pillai

**Land and Water Management (Agriculture)
Division
Centre for Water Resources Development and
Management
Kozhikode -673 571, Kerala, India**

Speech Title:

***Drought Analysis Based on Drought Indices in
arid, semi arid and Humid Tropical Regions of
India***

(11:00-11:25 BST) | (15:30-15:55 | India)

Abstract: Drought is considered as a major natural hazard/ disaster, affecting several sectors of the economy and the environment worldwide. Drought is a recurrent regional multi-dimensional phenomenon affecting wide areas and a large number of people. Droughts have dramatically increased in number and intensity over the last few decades and affecting more people than any other natural hazard. Even though drought is a complex phenomenon, it can be characterized by its severity, duration and areal extent. Drought indices are essential tools for the characterization and the monitoring of drought, since they simplify the complex climatic functions and can quantify climatic anomalies as for their severity, duration and frequency. With this as back ground drought indices were worked out for different regions of semi arid, arid and humid tropical region of India using DrinC (Drought Indices Calculator) software. This calculates the drought indices by providing a simple, though adaptable interface by considering all the factors. The drought of 3, 6 and 9 months is estimated using the reconnaissance drought index (RDI). Further, using a wide range of scenarios possible climatic changes and drought events of varying severity, are devised. The results showed that these approaches can be useful for developing preparedness plan to combat the consequences of drought. Several strategies to mitigate this drought with respect to agriculture are also discussed. Findings from such studies are useful tools for devising strategic preparedness plans to combat droughts and mitigate their effects on the activities in the various sectors of the economy.



Dr. Noemi Vergopolan

¹Princeton University, Atmospheric and Ocean Science Program, Princeton, NJ, United States

²NOAA Geophysical Fluid Dynamics Laboratory, Princeton, NJ, United States

Speech Title:

Towards locally relevant global soil moisture monitoring for water resources and climate applications

(11:30-11:55 BST) | (06:30-06:55 | United States)

Abstract: The distribution of water resources over land highly varies in space and time. From local to global scales, it plays a key role in modulating water, energy, and carbon interactions between the land and the atmosphere. In a fast-changing climate, detailed spatial and temporal hydrologic information is essential to understand and monitor hydroclimate extremes (e.g., droughts and floods), natural hazards (e.g., wildfires and landslides), irrigation demands, biogeochemistry, and ecosystems dynamics. In-situ hydrologic observations can provide detailed information, but their representativeness is limited, and networks of sensors are often not widely available. Hyperspectral satellite observations provide global coverage, but measurements can be infrequent or too coarse to capture the local spatial variability. This observation data gap limits the use of hydrologic information for scientific and water resource applications. To address these challenges, my research develops novel and scalable satellite land data assimilation approaches that use high-resolution land surface modeling, machine learning, and in-situ observations to obtain hydrologic information at the local spatial scales. In this presentation, I will introduce SMAP-HydroBlocks – the first 30-m resolution satellite-based surface soil moisture dataset for the United States. This unique dataset reveals the high degree of soil moisture spatial variability at the local scale and its complex interplay with the diverse landscape and hydroclimate. This spatial variability, however, does not persist across large spatial scales – up to 80% of the spatial information is lost at 1-km resolution, with complete loss expected at the scale of current state-of-the-art hydrologic and drought monitoring systems (5–25-km). I will conclude by presenting pathways forward to leverage the increasing availability of satellite Earth observations, high-performance computing, as well as advances in machine learning and Earth system models to further understand the impact of local-scale hydrology on hydroclimate predictability.

Oral Presentations

NOVEMBER 5th | Saturday (12:00-13:10 BST)

Zoom Meeting link:

<https://zoom.us/j/92279056891?pwd=TUs2aFFaUjVyUIBHeWtFRmdpZE1xZz09>

Session Chaired by:

Dr. Joan Cecilia C. Casila, Land and Water Resources Division, IABE, CEAT, University of the Philippines Los Baños, Philippines.

Paper ID: CCW22-01 (12:00-12:10 BST) (14:00-14:10 Turkey)
Authors: Bilal Acar, Nuh Uğurlu, Sena Afacan, Emrah Gülen, Nasuh Açık, Erdal Kökdere, and Yusuf Taştan
<i>University of Selçuk, Faculty of Agriculture, Department of Farm Buildings & Irrigation, Konya, Turkey</i>
Speaker: <i>Bilal Acar</i>
Speech Title: <i>Why is correct agricultural water management necessarily prerequisites in water shortage regions?</i>
Abstract: The study focused on importance of correct water management in water shortage agro-lands such as Konya Basin of Türkiye. In that purpose, agro as well as water potential of Konya plain was analyzed in regard to water management. In results, water resources particularly groundwater is not used sustainably since there is dramatic groundwater depletion in most parts of the region. The reasons are widening of cultivated lands for favor of crops having grand water consumption, and areas bringing into irrigation with no care. In accordance of our previous study findings in our region, following solutions could be addressed: crop pattern redesigned in accordance of current water resources for example crop pattern of cereals could be increased, landowners producing low water consuming crops must be subsidized, sprinkler or drip irrigation systems should be used more, water charges should be volume-basis, and farmers should be trained about deficit irrigation with visual materials.

Paper ID: CCW22-02 (12:10-12:20 BST) (18:10-18:20 Indonesia)
Authors: Alisha Revalia Ghassani Amir ¹ , Tri Retnaningsih Soeprbowati ^{1,2,3,*} , Riche Hariyati ¹
¹ <i>Department Biology, Faculty Science and Mathematics, Universitas Diponegoro, Indonesia</i>
² <i>Center for Paleolimnology, School of Postgraduate Studies, Universitas Diponegoro, Indonesia</i>
³ <i>School of Postgraduate Studies, Universitas Diponegoro, Indonesia</i>
Speaker: <i>Alisha Revalia G. A</i>
Speech Title:

History of water pollution in rural area lake: analysis based on sediment core diatoms

Abstract: Lake is a body of water surrounded by land that has an important role in human life. Lake Galela as one of the largest freshwater sources in North Maluku, faces the threat of anthropogenic activities that impair the function of the lake ecosystem. Diatoms are used as one of the paleolimnological approaches to reconstruct environmental conditions. This study aims to examine the abundance and diversity of diatoms, as well as the status of water pollution observed through the diversity index (H'), evenness (e), dominance (D) and diatom indices. Samples were taken using piston corer at the Galela Lake inlet location adjacent to Wasi River. The method was carried out by digestion of sediment using 10% HCl and H_2O_2 to remove organic matter, preparation of preparations with Naphrax and identification using a microscope under 1000x magnification. Based on observations there were 51 species of diatoms from 25 genera. The diversity index (2,10 – 3,21), evenness (0,69 – 0,92) and dominance (0,05 – 0,14) were categorized as medium to high, highly distributed and low dominance. The representative diatom indices for Lake Galela are IBD, IPS, IDG and TDI because >70% of species encountered are in accordance with the OMNIDIA database. Based on IBD and IDG, Galela Lake's inlet has good ecological status in bottom core and gradually decreases to moderate in the upper core. While IPS index showed moderate or lower. The obtained results showed that there are changes in the diatom species composition caused by anthropogenic activities around the lake affecting the change in nutrient concentration.

Paper ID: CCW22-03 (12:20-12:30 BST) | (16:50-17:00 | India)

Authors: Febina A Manaf^{1,*}, Priya K L², Hamie Harold³, Suchith⁴

¹Department of Civil Engineering, TKM College of Engineering, Kollam, India

² Department of Civil Engineering, TKM College of Engineering, Kollam, India

³ Department of Civil Engineering, UKF College of Engineering and Technology, Kollam, India

⁴ Department of Civil Engineering, UKF College of Engineering and Technology, Kollam, India

Speaker: *Febina A Manaf*

Speech Title:

Evaluation of floc characteristics induced by heavy metals in an estuarine environment

Abstract: The present study investigated the role of non-cohesive fraction of sediments on the flocculation of kaolin suspension. The floc characterization was achieved through micro-scale investigations using an image capturing system followed by an image processing technique. Initially, the variations in the characteristics of flocs of kaolin with salinity and turbulence were examined, along with the addition of metal concentration at different proportions (0, 0.1, 0.5, 1, 5, 10, 20mg/l). The work was done followed by analyses of floc size, fractal dimension, floc density, and floc volume fraction in three size classes: 0-50 μ m, 50-100 μ m, and >100 μ m. The maximum floc size was observed at a salinity of 30 and turbulence shear of $5s^{-1}$ with heavy metal concentration of 20 mg/l. The floc density was

identified to be a decreasing function of floc size. Increase in heavy metal concentration was found to enhance the aggregation process at high salinity conditions and low turbulence shear rate. The breakage coefficient of macro-flocs was determined from the experimental results and a relationship for it in terms of metal concentration is proposed. The study suggests that the binary breakage model finds application at intermediate turbulence ranges of $20s^{-1}$ with highest metal concentration of 20 mg/l. Thus, the detailed analysis of the breakage coefficient from the experimental results led to the development of a relationship for breakage coefficient in terms of metal concentration. Therefore the developed model can be applied to quantify breakage coefficient under all ranges of turbulence shear encountered in estuaries with mixed sediments.

Paper ID: CCW22-04 (12:30-12:40 BST) | (17:00-17:10 | India)

Authors: Shanta Kumari

Department of Economics, Eternal University, Baru Sahib, Sirmour-173101, Himachal Pradesh, India

Speaker: *Shanta Kumari*

Speech Title:

Impact of Agro-chemicals Exposure on the Human Health and Environment

Abstract: Use of agro-chemicals in agriculture has serious repercussions on the farmers and the environmental health. The study was conducted in Kullu district of Himachal Pradesh. The primary data was collected from 100 farmers by using pre-tested schedule. From the last decades, intensification of the agriculture has led to exhaustive use of agro-chemicals by the farmers especially in cash crops like apple and vegetable crops. Most of the farmers using agro-chemicals without using the protective equipment and have its direct exposure. The study concluded that agro-chemicals exposure is more in recent time than the earlier. The practice of using the more agro-chemicals is due to climate change, its inferior quality and resistance developed by the crops. It was also accounted that farmers are familiar about the excessive use of agrochemicals even then they are constantly following the same practice. Only few farmers using less agro-chemicals who have the income from other sources. Therefore, there is a need to enhance and provide depth knowledge to the farmers to strengthen their understanding regarding the use of agrochemicals which have direct or indirect impact on human health and environment.

Paper ID: CCW22-05 (12:40-12:50 BST) | (17:10-17:20 | India)

Authors: Athira S.^{1, a *}, Yashwant B. Katpatal^{1, b}, and Digambar S. Londhe^{1, c}

¹*Department of Civil Engineering, Visvesvaraya National Institute of Technology, Nagpur, Maharashtra, India*

Speaker: *Athira S.*

Speech Title:

Flood Modelling and Inundation Mapping of Meenachil River Using HEC-RAS and HEC-HMS Software

Abstract: The flood modelling and inundation mapping study was done for the Meenachil river basin in Kerala. The study shows the usage of HEC-RAS and HEC-HMS tools in determining the flood hazard and vulnerability. Flood inundation maps for different return periods were developed to analyze the future flooding scenarios. Abnormal heavy rainfall in July-August 2018 which leads to severe flooding caused loss of many lives and damages to properties in Kerala. This study also analyzed the 2018 flood event to develop the flood inundation maps and to identify the flood affected area of different land use classes as well as the flood affected road infrastructure. The Meenachil river basin was delineated using HEC-HMS and the topographic characteristics were extracted from SRTM DEM. Hydrologic model was developed using SCS Curve number method, SCS unit hydrograph method and Muskingum method for loss, transform and routing method respectively. The simulated hydrologic model was manually calibrated using discharge data. The precipitation data from the year of 1990 to 2017 was used to run the hydrologic simulation to obtain the discharge values which were used as input for hydraulic analysis using HEC-RAS. The discharge values obtained were then used to find the peak discharge for different return periods of 5, 10, 50, 100, 500 years using Gumbel's method. The simulated discharge is fed to HEC-RAS as the upper boundary condition for identifying the flood affected area. One dimensional steady state analysis was carried out to obtain the flood depth for different return periods. Similarly, hydraulic analysis was carried out for the year of 2018. The developed flood inundation map was superimposed on road map to find the length of different classes of roads that got submerged. Land use map was generated for the year of 2018 through Isocluster method of unsupervised classification of LISS III image. This was used to identify the area of different land use classes that were affected during 2018 flood as per the simulation.

Paper ID: CCW22-06 (12:50-13:00 BST) | (17:20-17:30 | India)

Authors: Gokul T S^{1,*}, Prajith V² Smitha Mohan K¹

¹Department of Civil Engineering, Govt Engineering College, Thrissur, India

²Centre for Water Resources Development and Management, Calicut, India

Speaker: Gokul T S

Speech Title:

*Impacts of climate change on groundwater Resiliency and
strategies for groundwater development in Thuthapuzha river
basin*

Abstract: Groundwater is considered as a hidden treasure among all the available water resources in the world however, it is seriously threatened due to various climate-induced and anthropogenic factors. Groundwater resiliency mapping is one of the most effective method for identifying the areas which are vulnerable to the groundwater depletion. The objective of this study is to prepare a groundwater resiliency map of the Thuthapuzha River Basin of

Kerala under changing climate scenarios. A hydrologic model of the study area is developed using Soil and Water Assessment Tool (SWAT) for evaluating the ground water recharge prospects of the study area. In addition to that Global circulation models (GCMs) outputs are downscaled using the statistical downscaling model (SDSM) to project the future changes in meteorological parameters at the local scale so as to estimate the future groundwater recharge using the hydrologic model. The SWAT model was calibrated during 2007 to 2011 and validated for the period of 2011 to 2014. The value of coefficient of determination R^2 and NSE are 0.93 and 0.81 respectively for the calibration steps and 0.93 and 0.78 respectively during validation. Also, the results show that the temperature in the area is expected to increase by 0.707°C with considerable variations in rainfall pattern by 2060. It will influence the groundwater recharge characteristics of the study area and it shows a declining trend in the groundwater level towards 2060. The study also examined the impact of climate change on groundwater levels by preparing the groundwater profile maps for 2030 and 2060. Knowing the simulated groundwater level and recharge, the groundwater resiliency map for 2030 and 2060 are prepared. The results show that out of 8 sub-basins of Thuthapuzha, the Pulamantole sub-basin is not resilient to groundwater depletion. However, the other sub basins such as Tenkara, Kanjirappuzha, Kalladikkode, and Kottappuram are fairly resilient, and all other sub-basins are highly resilient. Based on the groundwater resiliency map, the study also investigated the possibilities of constructing the artificial groundwater recharge structures for replenishing the shallow aquifers. Various thematic maps like soil permeability, slope, runoff potential, and stream order maps were overlaid to identify the most suitable groundwater recharge structure and its location as per the IMSD guidelines. Results shows that the construction of check dams can influence on the groundwater resiliency of the study area.

Photo & Break



13:10-14:00 BST

Session 2: Development and utilization of Ocean Renewable energy

Keynote Speeches

NOVEMBER 5th | Saturday (14:00-17:00 BST) | (15:00-18:00 | Mozambique)


Zoom Meeting link:


<https://zoom.us/j/92279056891?pwd=TUs2aFFaUjVvUjBHeWtFRmdpZE1xZz09>

Session Chaired by:

Prof., A.M. Hogueane, Eduardo Mondlane University, Mozambique

	<i>Dr. Mary Ann Quirapas-Franco</i>
	Senior Consultant (Policy and Planning Manager) Aquatea Asia Pte Ltd, Singapore
	Speech Title: <i>Ocean Energy in Southeast Asia: Opportunities, Consequences, and Risks towards Holistic Adoption</i> (14:00-14:25 BST) (21:00-21:25 Singapore)
<p>Abstract: This presentation is based on a current study of the authors that examines the opportunities, challenges, and risks of adopting ocean renewable energy (ORE) in Southeast Asia (SEA) beyond its technical aspects. It gives a critical analysis of the socio, economic and political aspects of ORE development at a regional scale, which has been less studied in the existing literature. Aside from providing a sustainable energy source, the development of the ORE as a sector could provide various benefits to SEA countries through employment opportunities, inter-industry learning, and improving economic resilience. However, these benefits can only be maximised if the costs of deployment, operation and maintenance are reduced, the impact on the marine environment is taken into consideration, and public acceptance issues are addressed. Beyond a cost-benefit analysis, this presentation assesses the unintended risks and consequences of ORE technologies and activities in the SEA and recommends different policy strategies to mitigate them. It concludes that for the region to reap the benefits of ORE, a coordinated approach among various stakeholders (technology developers, policymakers, and end-users) is needed to minimise the risks and unintended consequences.</p> <p>*Original paper is co-written with Araz Taeihagh, PhD of Policy Systems Group, Lee Kuan Yew School of Public Policy, National University of Singapore. DOI: https://doi.org/10.1016/j.rser.2020.110403</p>	

	<p><i>Dr. Sony Junianto</i></p>
	<p>Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia</p>
	<p><i>Speech Title:</i> <i>The Development of Tidal Current Energy Technology for Islands: A case Study of Indonesia</i> (14:30-14:55 BST) (20:30-20:55 Indonesia)</p>
<p>Abstract: Indonesia’s electrification ratio in the third quarter of 2021 will reach 99.40%. This achievement was followed by a surplus of electricity supply conditions on the island of Java. On the other hand, several regions outside Java, especially the islands of eastern Indonesia, have electrification ratios far below the national electrification ratio. For this reason, the increase in electricity supply in the area is carried out by using Diesel Power Plant (DPP), where this plant releases carbon into the environment. Currently, the government will implement an energy transition program in which energy use will be diverted to energy sources that are environmentally friendly and do not produce carbon. This energy transition is carried out using renewable energies that can be utilized by the archipelago is marine energy. The technology for generating marine energy that is currently developing rapidly is tidal current energy. Since 2015, Dr. Sony Junianto has been researching the technology of tidal current energy conversion system (TCECS) with single and twin turbines with a floating system using Quad-spar. Therefore, this research is expected to continue to downstream in the fulfillment of tidal current energy industry in Indonesia.</p>	

	<p><i>Dr. Philipp Thies</i></p>
	<p>Professor Renewable Energy - Offshore Reliability, Co-Director EPSRC Supergen ORE Hub, University of Exeter, Penryn, United Kingdom</p>
	<p><i>Speech Title:</i> <i>Out at sea - Floating energy solutions for wind and tidal energy generation</i> (15:00-15:25 BST)</p>
<p>Abstract: Being placed in highly energetic environments, Offshore Renewable Energy (ORE) technologies are facing hostile environmental and operational conditions. The engineering challenge is formidable as the system and component design has to be reliable and cost-effective compared to the cost of energy of other technologies. In particular floating wind and tidal energy technologies have gained momentum for commercial developments.</p>	

This presentation gives a brief overview to the different technologies and working principles for floating wind and tidal energy solutions. The talk will give an overview to recent research and development efforts under the Carbon Trust Floating Wind Joint Industry Project, demonstrating new mooring technology solutions, as well as The Tidal Stream Industry Energiser Project, working with UK and French tidal energy developers. An update on local and regional project initiatives, such as the Floating Wind developments in the Celtic Sea will also be provided.



Dr. Nagababu Garlapati

Assistant Professor, Department of Mechanical Engineering, School of Technology, Pandit Deendayal Petroleum University, Gandhinagar, Gujarat, India

Speech Title:

Offshore wind resource assessment along Indian Exclusive Economic Zone

(15:30-15:55 BST) | (20:00-20:25 | India)

Abstract: Harnessing offshore energy help to achieve carbon neutrality. However, the availability of wind resources is susceptible to climate change owing to which it is imperative to investigate if baseload power harnessed using the installed plants. In this regard, the use of reanalysis data to study the susceptibility has gained traction. This study uses ERA5 data to study the susceptibility of offshore wind energy potential to the climate change. Assessments have been conducted by considering near hub height (100 m) wind products and a real air density. The effect of air density variation is considered while estimating wind power density (WPD) and actual power generation with the two latest wind turbines (WTs) (9MW V164/9500 and 8MW SG8.0-167 DD). Findings suggest that consideration of standard air density overestimates the WPD by 5-7.5%, and the wind turbines power output by 2.5-5.1% compared to real air density. Spatial distribution maps have been developed to explicitly show the variability. The occurrence of exploitable wind energy (WPD>0.2 kW/m²) and optimum hotspot index for offshore wind (OHIwind) are developed. The highest mean wind speed (7-10 m/s) and WPD (0.5-0.65 kW/m²) are found along the southern coast. Besides these areas, Gujarat, Andhra Pradesh and Odisha experience mean wind speed and WPD of 5-7 m/s and 0.25-0.4 kW/m², respectively. The coastal region of Gujarat and Tamil Nadu experience the peak frequency of exploitable wind energy (>60%). Higher values of OHIwind (>20) are noticed along the southern coast. Based on the local maxima of OHIwind and depth constraint, three hotspot sites are identified along the east, west and south coast of the study area after eliminating conflicted regions. Wind direction analysis at the hotspot location indicates that most wind blows from SW-N directions. The suggested hotspots for OWFs have the potential of generating up to 3.96 GWh/year using a V164/9500 WT in a 11 km² region. Findings of this study help decision makers to device strategies to exploit offshore wind energy in India.



Dr. Omar Farrok

Professor, Electrical and Electronic Engineering, Ahsanullah University of Science and Technology, Dhaka, Bangladesh

Speech Title:

Ocean Renewable Energy: Prospects, Challenges, and Solutions

(16:00-16:25 BST) | (21:00-21:25 | Bangladesh)

Abstract: Renewable energy source based electrical power plants are widely considered green and clean due to their contribution to decarbonizing the energy sectors. Oceanic waves can cover a significant share of the required global energy by using only a fraction of the untapped energy. Nowadays, the EU and many other leading countries have started generating abundant electrical energy from the oceanic wave energy. Wave energy can produce up to several thousand terawatt-hours/year, and it has the highest production of energy compared to other renewable energy sources such as solar and wind energy. Therefore, there is plenty of opportunity to produce electricity from the ocean. It is apparent that harvesting oceanic wave energy does not produce carbon dioxide, however their significant negative impacts on the environment are still found and cannot be ignored. For this reason, the environmental impact of ocean energy based power plants requires to analyze considering hydroelectric, tidal, ocean current, oceanic wave, ocean thermal, and osmotic effects. The strength, weakness, opportunity, and threat analysis is also required as a part of this study. Besides environmental impact, oceanic wave has some other limitations. The problem that slows down the development of wave energy harvesting is the high cost of the project and low dynamics of the energy converter due to the nature of the oceanic wave. Wave energy converter faces a technical problem of having a low frequency of wave which is around 0.1 Hz or a little bit higher. Voltage frequency of the generated electricity must be increased up to 50/60 Hz before supplying it to the load/grid. Although there are a number of challenges of harvesting oceanic wave, scientists and researchers are doing hard work to overcome them. It includes improvement of the wave energy converter and the electrical generators by application of various methods. Such as, application of advanced magnetic core, special winding, and permanent magnets to the electrical generator. Adoption of new constructional features of the electrical generators such as split translator flux switching, optimized shape, and dual port topology. Cooling system can be incorporated to prevent demagnetization of the permanent magnet of the electrical generator. Finally, the way of supplying the generated electrical power from the generator to load/grid needs to be considered as well.



Dr. Samet ÖZTÜRK

**Environmental Engineering Department
Bursa Technical University, Turkey**

Speech Title:

*Offshore Wind Energy Development in Europe
and Asia and a SWOT Analysis for Turkey*

(16:30-16:55 BST)| (18:30-18:55 | Turkey)

Abstract: The increasing energy need and climate change crisis force countries to seek alternative energy sources. In the last decade, there is a dramatic increase in the investment of renewable energy systems globally. In the renewable energy systems one of the leading energy systems is wind energy. Although current installations of wind energy mostly compose of onshore wind energy systems, offshore counterparts are raising attention recently. In this study, offshore wind development in European and Asian countries is reviewed and a Strength, Weaknesses, Opportunities and Threats (SWOT) analysis for Turkey in terms of an investment on offshore wind is applied.

Oral Presentations

NOVEMBER 5th | Saturday (17:00-18:30 BST)

Zoom Meeting link:

<https://zoom.us/j/92279056891?pwd=TUs2aFFaUjVvUjBHeWtFRmdpZE1xZz09>

Session Chaired by:

Dr. I. Ljubenkov, Water Development, Croatia

Paper ID: OER22-01 (17:00-17:10 BST) (18:00-18:10 Mozambique)
Authors: Alberto Filimão Siteo ^{a,b} , António Mubango Hogueane ^c and Soufiane Haddout ^{*d}
^a <i>Faculty of Natural and Exact Science, Save University (UniSave), Chongoene, Mozambique,</i> ^b <i>Department of Physics, Faculty of Science, Eduardo Mondlane University (UEM), Maputo, Mozambique,</i> ^c <i>Centre for Marine Research and Technology (CePTMar), Eduardo Mondlane University, P.O.Box 128, Quelimane, Mozambique,</i> ^d <i>Department of Physics, Faculty of Science, Ibn Tofail University, B.P. 133 Kenitra, Morocco,</i>
Speaker: <i>Alberto Filimão Siteo</i>
Speech Title: <i>Preliminary Assessment of near-shore Wave Energy Potential in the Mozambique Channel</i>
Abstract: This paper presents the results of study of ocean wave energy in Mozambique Channel, an open channel located in the Western Indian Ocean and oriented north southwards. Weekly data of significant wave height and wave period, obtained from marine-analyst, on the web, were analysed in 10 selected sites, located near the coast, being 5 on each side of the Channel. The Channel receives swells generated from the extratropical South Indian Ocean, from the south and monsoon generated swells from the north, modified by trade winds and cyclones. The result indicated that the waves were highly variable ($\geq 80\%$), with high (1.5-2 m on average), longer (8-20 s, on average) and more energetic (10-23 kW m ⁻¹ , on average) waves were found in the southern part of the Channel, followed by the northern part of the channel (1.2-1.4 m, 6-8 s, 6-7 kW m ⁻¹ , on average), with the middle part displaying low energetic (6 kW m ⁻¹ , on average) wave climate. Peaks of high waves (up to 5 m) and high energy waves (up to 90 kW m ⁻¹), attribute to the storm, were observed throughout the study period. Despite high variability in wave characteristics, the probability for wave exceeding the threshold values for viable exploitation for electricity production were about 61% and 63% for the western and eastern side of the channel, respectively. Hence, the study concludes that southern Mozambique Channel has potentially wave energy to tap the energy deficit, and it is therefore, recommended location for deployment of energy extraction devises for electricity production. Further, the whole Mozambique Channel possesses wave energy sufficient for other applications such as desalination and irrigation.

Paper ID: OER22-02 (17:10-17:20 BST) (23:10-23:20 Indonesia)
Authors: Fuad Mahfud Assidiq ^{1,*} , Daeng Paroka ¹ , Habibi ¹ , Hidayatullah ¹ and Muhammad Fajar Fitra Ramadan ¹
¹ Department of Ocean Engineering, Universitas Hasanuddin, Indonesia
Speaker: <i>Fuad Mahfud Assidiq</i>
Speech Title: <i>Influence of Vertical Plates on the Pitching Motion of a SPAR Wind Floater in Waves</i>
Abstract: One of the concerns regarding the imposing of a heave plate on a SPAR floater is to minimize inadequate pitch response. In this study, a time domain based experimental test was developed to investigate the extent of the contribution of the number and configuration of vertical plates to the pitch response for enhancing wind energy harvesting operations. The modified SPARs are of 3VP-S, 3VP-3H, 3VP-6H, 4VP-S, 4VP-3H, 4VP-6H, 5VP-S, 5VP-3H, and 5VP-6H. The effects of pitch response, pitch reduction percentage, wave steepness, natural period, and viscous damping of the proposed model are assessed in 120 regular wave cycles. There were 10 scenarios examined in the wave tank. The results indicated that the 4VP-6H, 5VP-3H, and 4VP-S models consistently provided better estimates than the other modified models. The best model observation for the smallest pitch motion was 2.305 degrees, and the largest was 12.189 degrees. The smallest pitch motion of the second best model was 2,443 degrees, and the largest was 13,338 degrees. The last model is worth 2,385 degrees and 13,574 degrees, respectively. It was also identified that the pitch reduction has been inversely proportional to the period and wave height. The pitch reduction percentage of the proposed model ranges from 20 to 56% compared to the base SPAR floater. The correlation between wave steepness and pitch response reduction is also expected to be reversible in all scenarios. This is mostly due to the geometry of the vertical plate structure and its configuration layout. Notice also that the pitch natural period is directly comparable to the mass of the SPAR floater. It is strongly affected by the initial rise of resonance. The natural pitch period of the best model is approximately 1.908 seconds, or a reduction of nearly 28%. The second natural pitch period of the next model is decreased by 19.61% of the base SPAR. Finally, the non-dimensional damping coefficient is in line with the natural period, whereas the value is substantially different from 0.127 between the best model and the base SPAR. This outcome is related to the water trapped in the six-perforated vertical plates, which significantly dampens the pitch motion.

Paper ID: OER22-03 (17:20-17:30 BST) (19:20-19:30 Turkey)
Authors: Ilkay Ekici ^{1,*} , Feyza Durgut ¹ , Gokcen Uysal ²
¹ Department of Civil Engineering, Eskişehir Technical University, Turkey
Speaker: <i>Ilkay Ekici</i>
Speech Title:

Developing a Decision Support System for a Pumped Storage Hybrid Power Plant

Abstract: Investments in renewable energy systems around the world have been increasing in recent years due to the goal of reducing climate-dependent fossil fuels and the increased energy demand. But one of the main problems of these resources is that it depends on environmental/meteorological conditions and can produce less/more energy than instantaneous demands. Energy storage systems are being developed to preserve the excess energy produced and to use it in situations where energy production is less than expected. In this regard, the "Hydroelectric Power Plant with Pump Storage (PSH)", which has been widely used in the world recently but has not yet had a real-case application in our country, is emphasized. Operating PSH in a hybrid manner with another renewable energy source (solar, wind, etc.) is useful for improving system efficiency. In this study, the planned hybrid system will develop a decision support system that wind energy and solar energy separately will be the main energy generator, which will store the excess energy produced with PSH. The estimated energy generated by the wind power plant is calculated by means of wind speed data acquired by the ERA5 windspeed dataset. The estimated energy generated by the solar power plant is calculated by the solar radiation data. Using the pre-day market data in the past years to run the PSH in the best way, the market forecast will be made for the next day. For this, the Long Short-Term Memory (LSTM) model in machine learning is planned to be used. It is assumed that this work will make energy resources management more efficient and will set an example for future studies since it combines the PSH and Wind Power Plant hybrid system and the PSH and Solar Power Plant hybrid system which is not yet in operation in Turkey.

Paper ID: OER22-04 (17:30-17:40 BST)

Authors: M. MADI^{1,*}, A. RAFIKI², Y. HADDOUT³, K. SOUHAR⁴

^{1,4}Laboratory of Energy Engineering Materials and Systems, ENSA, Ibn Zohr University, Agadir, Morocco.

²Department of Physics and Chemistry, Polydisciplinary Faculty of Ouarzazate Box 638, Ibn Zohr University, Morocco.

³Research Team ERMAM, Polydisciplinary Faculty of Ouarzazate, Ibn Zohr University, Ouarzazate, Morocco

Speaker: *Mohamed Madi*

Speech Title:

Investigation of instabilities of the plane Poiseuille flow of a viscoelastic fluid in a periodic channel

Abstract: In this paper, we perform the local linear stability analysis of the Poiseuille plane flow of a viscoelastic fluid through a periodic channel in two flow regimes, i.e., Inertial ($Re > 0$) and purely elastic ($Re \equiv 0$) regimes. The obtained dispersion equations system is solved using a spectral method based on the Chebyshev collocation discretization. The creeping flow is studied numerically to analyze the combined effects of periodic channel modulation and fluid elasticity (E) for an upper convected Maxwell (UCM) fluid on the stability. This

study proves the existences on the one hand, of a dangerous section ($x_c = 3\pi/2n$) with a wavenumber ($n = 0.1$), and on the other hand, of several discrete modes depending on the section (x) and the channel amplitude (ε).

Paper ID: OER22-05 (17:40-18:50 BST)

Authors: Youssef Haddout^{1,*}, Elhoucine Essaghir², Abdelaziz Oubarra² and Jawad Lahjomri²

¹ERMAM, Polydisciplinary Faculty of Ouarzazate, Ibn Zohr University, Ouarzazate, Morocco

² Laboratory of Mechanics, Faculty of Science Ain Chock, Hassan II University, Casablanca 20100, Morocco

Speaker: Youssef Haddout

Speech Title:

The Extended Graetz Problem for a Jeffery-Hamel Flow through a Plate Convergent Channel with a Step Change in Wall Temperature and Streamwise Heat Conduction

Abstract: The problem of thermally developing steady laminar of Newtonian fluid of Jeffery-Hamel flow through a convergent plate channel, including streamwise heat conduction with step change of uniform wall temperature is analytically investigated. The temperature profiles and local Nusselt number have been derived assuming the flow is symmetric and purely radial. The solution obtained is based on a powerful method of self-adjoint formalism due to Papoutsakis and Ramkrishna for the extended Graetz problem. This method results from a decomposition of the energy equation into a system of first-order partial differential equations. The analytical solution represents an extension to that obtained in the earlier work, by taking into account the heat transfer conduction in the radial direction. This extension has been done by using a matrix operator and a suitable scalar product between two vectors in the Hilbert space. The analytical results are compared for simplified limiting cases to available calculations and good agreement is found, that supports the validity of this solution. Results show that the heat transfer characteristics in the thermal heating section are strongly influenced by the streamwise heat conduction in the flow and the aperture angle between the two plane walls of the channel.

Best Oral Presentations Selection

(18:00-18:10 BST)



Following are the criteria for selecting the best oral presentation:

- ✓ *Research Quality*
- ✓ *Presentation Performance*
- ✓ *Presentation Language*
- ✓ *PowerPoint Design*

The Best Presenter will receive an official certificate and a free registration to the CCORE 2023

Closing Ceremony

NOVEMBER 5th |Saturday (18:10-18:30 BST)

Zoom Meeting link:

<https://zoom.us/j/92279056891?pwd=TUs2aFFaUjVyUIBHeWtFRmdpZE1xZz09>

Session Chaired by:

Dr. S. Haddout, Ibn Tofail University, Morocco.

Acknowledgements

On behalf of the CCORE-2022 Organizing Committee, we would like to take this opportunity to express our sincere gratitude to our participants. We would also like to express our acknowledgements to the Committee members who have given their professional guidance. For those who contribute to the success of the conference organization without listing the name below, we would love to say thanks as well.

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