

## Final Program



# The International Symposium on Green Technologies and Applications

December 27-29, 2023  
Casablanca, Morocco

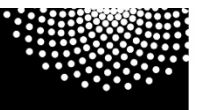


Technically co-sponsored by



ELSEVIER

Procedia  
Computer Science





## Welcome to ISGTA2023

It gives us a great pleasure to welcome you in Casablanca for ISGTA 2023, the International Symposium on Green Technologies and Applications ISGTA 2023. ISTGA 2023 is technically co-sponsored by Elsevier Procedia Computer Sciences. ISGTA'2023 is a symposium focusing on the challenges of promoting a sustainable and livable city to the citizens. This goal can't be achieved without considering three essential elements: reducing energy consumption, improving the quality of citizens' daily life, and making citizens active and proactive actors of green smart city solutions.

### Highlights

- 1 **Welcome Message**
- 2 **ISTGA Organizing Committee**
- 3 **Technical Program Members**
- 4 **Keynote Speakers**
- 5 **Program Itinerary**
- 6 **About Casablanca**

This year we have received altogether 190 submissions from 33 countries. Each submission went through a peer-reviewed process by members of the Technical Program Committee as well as additional reviewers. These reviews provided detailed comments on the quality of the submitted papers. Based on these reviews, we have selected 74 submissions as full paper (i.e., an acceptance ratio of 38.5%).

We have put together an exciting program for ISTGA this year. Firstly, we are delighted to have Professor Steffen Lehmann (University of Nevada, Las Vegas, USA) delivering a keynote address entitled "Integrating green thinking: What matters now", Professor Haitham Abu-Rub (Texas A&M University, Doha, Qatar) delivering a keynote address entitled "Renewable Energies Dominated Grid: Visibility, Opportunity, and Challenges", Professor Ahmed Ennaoui (Helmholtz Center Berlin for Materials and Energy, Germany) delivering a keynote address entitled "Challenges in the development of (Photo)Electrochemical solar fuels technology", and Professor Ismael SAADOUNE (Mohammed VI Polytechnic University, Bengurir, Morocco) delivering a keynote address entitled "Understanding the Chemistries of Lithium-Ion Batteries to Explain the Recent Implementation of Gigafactories in Morocco".

Secondly, the 74 high-quality papers that we have accepted from the open-call will address the research challenges in many areas of green technology and applications, including Renewable Energy and Green Technology, Green Communication Systems and Networks, Education and Green Energy, AI Application to Sustainable Technologies, and Economics and Green Energy. The conference will therefore bring together researchers from many different areas of green technology to exchange ideas.

Finally, we would like to thank all authors and reviewers for their work and valuable contributions. The friendly and welcoming attitude of conference supporters and contributors made this event a success!

**Mufi Mahmud**  
Nottingham Trent University, UK

**Mohamed Lahby**  
Hassan II University of Casablanca, Morocco

**ISTGA 2023 General Co-Chairs**

---

*ISTGA features very strong technical program in the area of Green Technology and applications.*

---

## ISTGA Organizing Committee

### Honorary Chairs

Ahmed Ennaoui (Chairman of the scientific council, IRESEN, Morocco)

Houssine AZEDDOUG (President of Hassan II University of Casablanca, Morocco)

Saad ALAMI YOUNSSI (Director of ENS, Casablanca, Morocco)

### General Chairs

Mufti Mahmud (Nottingham Trent University, UK)

Mohamed Lahby (Hassan II University of Casablanca, Morocco)

### GENERAL CO-CHAIRS

Pietro Manzoni (Universitat Politècnica de València, SPAIN)

Hartmut Hinz (Frankfurt University of Applied Sciences, Germany)

### TPC CHAIRS

Youssef Baddi (University Chouaib Doukkali, El Jadida, Morocco)

Sérgio D. Correia (Polytechnic Institute of Portalegre, Portugal)

Rachid Saadane (Hassania School of Public Works, Morocco)

Chaker Abdelaziz Kerrache (Amar Telidji University, Algeria)

Lu Ding (East China University of Science and Technology, China)

### ORGANIZING COMMITTEE CHAIRS

Mustapha Bassiri (University Hassan II, ENS, Casablanca, Morocco)

Youssef Lghazi (University Hassan II, ENS, Casablanca, Morocco)

Said Aqil (University Hassan II, ENSAM, Casablanca, Morocco)

Maroua Zuigui (EHTP, Casablanca, Morocco)

### KEYNOTE CHAIRS

Tarek Bejaoui (University of Carthage, Tunisia)

Marta Chinnici (ICT Division- HPC Lab Via Anguillarese ROMA, Italia)

### POSTER CHAIRS

Sanjay Misra (Ostfold University College, Halden, Norway)

Said Rhoulane (École Polytechnique de Montréal, Canada)

### PUBLICITY CHAIRS

Elif Ak (Istanbul Technical University, Turkey)

Fatima Zahra Fagroud (Hassan II University of Casablanca, Morocco)

Om Prakash Jena (Ravenshaw, University, India)

Abdeslam Jakimi (Univeristé Moulay Ismail, FST Errachidia, Morocco)

### SPONSORSHIP CHAIRS

Mohamed Rachdi (École Nationale Supérieure d'Art et de Design, Casablanca, Morocco)

Mohamed El Khaili (University Hassan II, Casablanca, Morocco)

### PUBLICATION CHAIRS

M Shamim Kaiser (Jahangirnagar University, Dhaka, Bangladesh)

Yassine Maleh (Sultan Moulay Slimane University, Morocco)

### WEB CHAIR

Youness Abakarim (Hassan II University of Casablanca, Morocco)

## **Steering Committee**

hui Yu (University of Technology Sydney, Australia)

Roberto Castello (Swiss Federal Institute of Technology Lausanne, Switzerland)

Mohamed Lahby (Hassan II University of Casablanca, Morocco)

Pietro Manzoni (Universitat Politècnica de València, SPAIN)

Ala Al-Fuqaha (Hamad bin Khalifa University, Qatar)

Chunsheng Zhu (Southern University of Science and Technology, China)

Yilun Shang (Northumbria University, UK)

Mohamed Younis (University of Maryland Baltimore County, USA)

## **Technical Program Committee**

Abbas Bradai, University of Poitiers, France

Abbass Kaviani Imam Khomeini International University, Qazvin, Iran

Abdelazeem Hemid Minia University, Egypt

Abdelbari Redouane ENIM, Rabat, Morocco

Abdelmajid BEN HAMADOU Sfax University, Sfax Tunisia

Abdelwahab Boualouache, University of Luxembourg, Luxembourg

Abeer A. Amer Sadat Academy and Management Sciences, Egypt

Adil Bouhouch University Chouaib Doukkali, Eljadida Morocco

Adriana Burlea-Schiopoiu University of Craiova, Romania

Ahmed J. Obaid University of Kufa, Najaf, Iraq

Aiyo Gayeta University of the East Caloocan, Metro Manila, PHILIPPINES

Ali Hussein Wheeb College of Engineering, University of Baghdad, Iraq

Ali Jwaid, De Montfort University, United Kindom.

Ait El Fqih Mohammed, ENSAM, Hassan II University of Casablanca, Morocco

Anjum Razzaque, Ahlia University, Bahrain

Antonio Ruiz Martínez University of Murcia, Murcia, Spain

Ashish Khanna Maharaja Agrasen Institute of Technology, Delhi India

Augusto Casaca, INESC-ID, Portugal

Azza Béjaoui, High Institute of Management of Tunis, Tunisia

Bahaa Al-Musawi University of Kufa, Iraq.

Beiyu Lin University of Nevada – Las Vegas, USA

Benjelloun Saad , Makhbar Mathematical Sciences Institute, Morocco

Bibudhendu Pati Rama Devi Women's University, Bhubaneswar, India

Bilal Ahmad Bhat Faculty of Fisheries, SKUAST-Kashmir, J&K, India

Bouchaib CHERRADI CMRF, Casablanca, Morocco

Chaker Abdelaziz Kerrache, University of Laghouat, Algeria

Chefi Triki Hamad Bin Khalifa University, Qatar

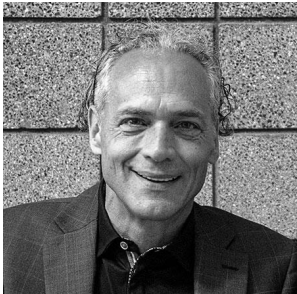


Chien Nguyen Thu Dau Mot University, Thu Dau Mot City, Vietnam  
 CongDuc Pham, University of Pau, France  
 Badii Jouaber, Telecom Sud-Paris, France  
 Bandar Elghamdi, Champagne-Ardenne University, France  
 Basel Solaiman, telecom Bretagne, France  
 Bo Gu, Kogakuin University, Japan  
 Bouabdellah Kechar, Oran University, Algeria  
 Boudour Ammar, University of Sfax, Tunisia  
 Burak Kantarci, Clarkson University, USA  
 Celimuge Wu, University of Electro-Communications, Japan  
 CongDuc Pham, University of Pau, France  
 Cristian Borcea, New Jersey Institute of Technology, USA  
 Cristian Olariu, University College Dublin, Ireland  
 Cristina Thorpe, University College Dublin, Ireland  
 Christophe Reich, Hochschule Furtwangen University, Germany  
 Damien Magoni, University of Bordeaux, France  
 Djallel Eddine Boubiche, University Hadj Lakhdar of Batna, Algeria  
 Dzmitry Kliazovich, University of Luxembourg, Luxembourg  
 Elhassan Ibnelhaj, Mohamed V University Hassan II, Morocco  
 Erdal Irmak, Gazi University, Turkey  
 Fadila Bentayeb, University of Lyon 2, France  
 Faical Azouazou, Ecole Nationale Supérieure d'Informatique Algeria  
 Faiez Gargouri, University of Sfax, Tunisia  
 Faouzi Bouali, ICS, University of Surrey, UK  
 Farouk Mezghani, INP-ENSEEIH, France  
 Fatma Rouissi, University of Carthage, Tunisia  
 Gabriel-Miro Muntean, University College Dublin, Ireland  
 Galip Aydin, Firat University, Turkey  
 Gilles Vanwormhoudt, Telecom Lille, France  
 Gregorio Martinez, University of Murcia, Spain  
 Hacene Fouchal, University of Reims Champagne-Ardenne, France  
 Hakim Ghazzai, Qatar Mobility Innovations Center, Qatar  
 Hamid Mcheick, University of Quebec at Chicoutimi, Canada  
 Hani Ragab Hassen, Heriot Watt, UK  
 Hassan Badir, ENSA Tanger, Morocco  
 Hassine MOUNGLA, Paris Descartes University, France  
 Haythem Gazouani, University of Carthage, Tunisia  
 Hazem Fekir, University of Carthage, Tunisia  
 Hector Marco, University of the West of Scotland, UK  
 Heithem Abbes, University of Carthage, Tunisia  
 Huaqun Guo, Institute for Infocomm Research, A\*STAR, Singapore  
 Hussein Al Zubaidy, KTH Royal Institute of Technology, Sweden  
 Imane Horiya Brahmi, University College Dublin, Ireland  
 Imen Jemili, University of Carthage, Tunisia  
 Intesab Hussain, QUEST, Nawabshah, Sindh, Pakistan

DANIEL D. DASIG, De La Salle University-Dasmarias, Philippines  
 David G. Schwartz Bar-Ilan University, Ramat-Gan, Israel  
 Dimitris N. Kallergis University of West Attica, Greece.  
 Doron Handelman, Independent researcher  
 Elrharras Abdessamad, EHTP, Casablanca, Morocco  
 Essaid Elbachari University Cadi Ayyad, Marrakech, Morocco  
 Fetia Bannour, ENSIE, France  
 Giuseppe Ciaburro, Università della Campania Italy  
 Hải Đào Thanh Post and Telecommunication Institute of Technology, Hanoi, Vietnam  
 Hassine MOUNGLA, Université de Paris, France  
 Hefley, William University of Texas, Dallas, USA  
 Hicham GHENNIoui University sidi Mohammed Ben Abdellah, Fez, Morocco  
 Jaafar Gaber UTBM, France  
 Jeremie Leguay, Huawei Technologies, France Research Center, France  
 Jihene Rezgui College Maisonneuve, Canada  
 Jorge Eloy Quichimbo Universitat Politècnica de Valencia Valencia, Spain  
 Jozef Wozniak, Gdansk University of Technology, Poland  
 KACI Abdellah Ecole Nationale Supérieure de Technologie, Alger  
 Khalid El Yassini Moulay Ismail University, Meknes, Morocco  
 Khalil AMINE SBAI Mohammed V University of Rabat, Morocco  
 Khan Ashraf Jammu and Kashmir, India  
 Khursheed Khursheed King Saud university, Riyadh , Saudi Arabia  
 Luca Davoli, University of Parma, Italy  
 Luis Henrique Costa, Federal University of Rio de Janeiro, Brazil  
 M Shamim Kaiser Jahangirnagar University Library, India  
 Marc-Oliver Pahl, IMT Atlantique, France  
 Marcelo Carvalho, University of Brasília, Brazil  
 Marta Chinnici ICT Division- HPC Lab Via Anguillarese ROMA, Italia  
 Maria Tresita Paul V., Kumaraguru College of Technology, CBE, TN, India.  
 Martin Andreoni Lopez, Technology Innovation Institute, UAE  
 Maurizio Naldi, LUMSA University, Italy  
 Mazin Abed Mohammed University of Anbar, Iraq  
 Meriem Kassar, University Tunis El Manar, Tunisia  
 Miguel Elias Campista, Federal University of Rio de Janeiro, Brazil  
 Miguel Guirao Aguilera New Mexico State University, Mexico  
 Miki Yamamoto, Kansai University, Japan  
 Mohamed AL-SAREM, University Taibah-Medina, Saudi Arabia  
 Mohamed El kamili University Hassan II, EST, Casablanca, Morocco  
 Mohamed EL KHALIL, UH2C, Casablanca, Morocco  
 Mohamed Ghoneim Nile University, Egypt  
 Mohammad T Yaseen University of Mosul, Iraq  
 Mohammad Tariq Yaseen University of Mosul, Iraq

Mohammed Saber, Marquette University, USA  
 Mohd Helmy Bin Abd Wahab Universiti Tun Hussein Onn Malaysia  
 Moiz Khan Sherwani University of Calabria, Italy.  
 Mostafa AZIZI University Mohammed First (UMP), Oujda, Morocco  
 Mostapha Zbakh University of Mohammed V, Rabat, Morocco  
 Muazzam A. Khan Khattak Quaid-i-Azam University, Islamabad, Pakistan  
 Muhammad Habib urRehman Khalifa University of Science and Technology, UAE  
 Muhammad Shafiq Guangzhou University, China  
 Muhammad Suhail Shaikh Yanshan University, Qinhuangdao , China  
 Mukherjee, Partha Pennsylvania State University, Malvern, USA  
 MUÑOZ CARRIL PABLO CESAR University of Santiago de Compostela, Spain  
 Muhibul Haque Bhuyan, American International University Bangladesh (AIUB) Dhaka, Bangladesh  
 Najiba EL AMRANI EL IDRISSE Faculty of Science and Technology – Fez, Morocco  
 Nathalie Mitton, Inria Lille – Nord Europe, France  
 Nordine Quadar, University of Ottawa, Canada  
 Omer Deperlioglu Afyon Kocatepe University, Turkey  
 Ouzzif Mohammed University Hassan II, EST, Casablanca, Morocco  
 Pascal Lorenz, University of Haute Alsace, France  
 Paulo Pinto, Universidade Nova de Lisboa, Portugal  
 Praneet Dutta Google DeepMind, USA  
 Rajesh Prasad, MIT Art, Design and Technology University, Pune, India.  
 Rasool Sadeghi Islamic Azad University, Isfahan, Iran  
 Rathin Chandra IIIT, Bhubaneswar, India.  
 Redouane Tlemsani University Mohamed Bodiaf, Oran, Alger  
 RIM Moussa University of Carthage , ENI-Carthage, Tunisia.  
 Rodrigo Couto, Universidade Federal do Rio de Janeiro, Brazil  
 Sabour Abderrahim IBN ZOHR UNIVERSITY, Agadir, Morocco  
 Sachin Agnihotri South Ural State University, Chelyabinsk, Russian Federation  
 Saïd NOUH, UH2C, Casablanca, Morocco  
 Saleh Bouarafa, Mohammed V University, Rabat, Morocco  
 Salim Khediri , QassimUniversity, Saudi Arabia  
 Samaresh Bera Indian Institute of Science (IISc), India  
 Schahram DUSTDAR, TU Wien, Austria  
 Stefano Giordano, University of Pisa, Italy  
 Stefano Secci, Cnam, France  
 Takuya Asaka, Tokyo Metropolitan University, Japan  
 Tarek Bejaoui University of Carthage, Tunisia  
 Utku KÖSE Süleyman Demirel University, Turkey  
 Vasilis Friderikos, King's College London, UK

## Keynote Speakers



**Prof. Steffen Lehmann**

University of Nevada, Las Vegas,  
USA

**Biography:** Dr. Steffen Lehmann, Assoc. AIA, RIBA, AA. Dipl. (born in Stuttgart, Germany) is an internationally recognized designer, educator, scholar, author, scientific researcher, and strategic leader. He is a senior tenured Professor of Architecture & Urbanism, and former Executive Director of three schools of architecture (in the US and Australia), including the UNLV School of Architecture in Las Vegas. He is also Director of the interdisciplinary Urban Futures Lab, and former CEO of the Future Cities Leadership Lab Institute, is translating a strategic outlook into programmatic initiatives and positive impact, and dealing with a rapidly changing profession and transforming society. Before joining UNLV, Steffen Lehmann was a chair professor in the UK and the chairholder of the UNESCO Chair for Sustainable Urban Development for the Asia-Pacific Region.

**Title: Integrating green thinking: What matters now**

**Summary:** What will it take to design, build, and operate the next generation city? What is the future of our urban spaces and neighbourhoods, which will be healthier, greener, mixed-use, compact, walkable, and enhance urban resilience? In times of a changing profession, transforming society and a warming climate, Professor Steffen Lehmann will present strategies and actionable recommendations for urban transformation, health and well-being. Steffen is an esteemed author and pioneer of sustainable urbanism with a long list of published books (23) including the bestseller, 'The Principles of Green Urbanism' which he published in 2010. His latest books relevant to this keynote address include 'Informality through Sustainability' (Routledge, London, 2021) and 'Urban Regeneration. A Manifesto' (Palgrave MacMillan, London, 2019).

---

*We are pleased to  
share with you excellent  
Keynote Speeches  
Delivered by leading  
Scientists.*

---





**Prof. Haitham Abu-Rub**  
Texas A&M University, Doha,  
Qatar

**Biography:** Dr. Haitham Abu-Rub holds two PhDs in electrical engineering and humanities from Poland. He has a long experience of teaching and research at many universities worldwide, including Qatar, Palestine, Poland, the U.S.A., and Germany. Since 2006, Abu-Rub has been associated with Texas A&M University at Qatar where he is currently a professor and the managing director of the Smart Grid Center – Extension in Qatar. He also has served for five years as the chair of the Electrical and Computer Engineering Program at Texas A&M at Qatar. Abu-Rub's main research interests are power electronics, electric drives, renewable energy systems, and smart grid. He has co-authored more than 600 journal and conference papers, six books, and two issued patents. Abu-Rub has received many prestigious international awards and recognitions, including the American Fulbright Scholarship and the German Alexander von Humboldt Fellowship. He is an IEEE Fellow and Co-Editor in Chief of the IEEE Transactions on Industrial Electronics.

**Title: Renewable Energies Dominated Grid: Visibility, Opportunity, and Challenges**

**Summary:** Electric energy security is one of the most challenging tasks that faces humanity. The fluctuating cost, geopolitical conflicts, limited sources of fossil fuels, in addition to the need to reduce greenhouse gasses emissions, have made renewable resources very attractive in today's world economy and energy mix. The potential for renewable energy resources is enormous as they can, in principle, continually meet many times the world's current and future energy demand. Therefore, various types of renewable energies will have a significant share in the future world's energy portfolio. Hence, various countries worldwide are now concentrating on advancing their share of renewable energy resources and targeting to dominate their grids with such clean energy. Accordingly, during the seminar it will be presented the future renewable energy dominated grid, perspectives and challenges associated with it. Finally, the talk will represent the impact of smart grid paradigm to enable the domination of renewable energy and power electronics in the future grid paradigm.



**Prof. Ahmed Ennaoui**  
President of the Scientific  
Council of IRESEN, Morocco

**Biography:** Prof. Dr. Ahmed Ennaoui was born and grew up in south Morocco. He obtained his MSc and Doctoral thesis in Solid State Electronic from "University de Bourgogne", France. He began his career as assoc. Professor in 1979 at University Mohamed V and joined the Hahn-Meitner Institute-Berlin (HMI) in 1983 for conducting research for his Habilitation. In April 1987, he obtained his habilitation (summa cum laude) on new earth abundant materials for solar energy conversion. In 2000, he was appointed head of a research group in the Institute for Heterogeneous Material Systems at Helmholtz-Zentrum Berlin (HZB) for materials and energy. He serves as visiting professor at the Research Center for Solar Energy Chemistry Osaka University, Japan, and Research Director at Qatar Environmental and Energy Research Institute (QEERI) and Joint Professor at Hamad Bin Khalifa University (2015-2017). Ennaoui's published mostly on transition metal chalcogenide, binary and ternary thin film solar cells. Recently he conducted research on inkjet printed thin film solar cells, and PV soiling solution.

**Title: Challenges in the development of (Photo)Electrochemical solar fuels technology**

**Summary:** The production of fuels as a potential energy vector to store renewable energy on a large scale, plays a crucial role in sustainable global development. The development of novel materials as (Photo)Electrocatalysts to effectively produce molecular hydrogen ( $H_2$ ) or to reduce Carbone dioxide ( $CO_2$ ) are the most important fields of research and development (R&D). Furthermore, understanding hydrogen evolution reaction (HER) and oxygen evolution reaction (OER), the two key half- electrochemical reactions for efficient Power-to-Hydrogen (PtH) process are still challenging. This talk, provides a combination of theory and application skills in current and emerging photovoltaic technologies, with particular interest of the background to understand the concept of (photo)electrochemistry, and photocatalysis for hydrogen production. Thermodynamic free energy versus kinetics (photo)catalytically-driven catalysis are discussed. The conversion of solar-to-chemical energy such as Hydrogen (STH) efficiency are explored in term of fundamental experimental methods (Lab set-up). Hydrogen can contribute to 100% energy transition production offering a solution to lower emissions in the chemicals manufacturing (e.g. Haber-Bosch process) for the production of ammoniac ( $NH_3$ ) as fertilizer or for the fixation of carbon oxides to manufacture methane (e.g. Methanation) with water ( $H_2O$ ) as byproduct. Hydrogen can be used for powering fuel cells to produce electricity in a Carbone free transport sector with heat and water as byproducts.



**Prof. Ismael SAADOUNE**

Mohammed VI Polytechnic  
University, Bengurir, Morocco

**Biography:** Dr. Ismael SAADOUNE was graduated from the University of Bordeaux, France (French PhD, 1992) and the University Cadi Ayyad UCA-Marrakech, Morocco (Moroccan PhD, 1996). These Two PhDs were in Material Science with the specific research topic 'Active Materials for Lithium and Sodium-ion Batteries'. In 2002, He created the Laboratory of Materials and Environmental Chemistry. More than 100 graduate and 40 Master students were hosted in his Lab. 25 PhD Students have been under his supervision, all of them are now involved in the industry or in research laboratories. He is the principal investigator of 17 national and 15 international research funded projects on Battery Materials. He was involved in two European Master ERASMUS MUNDUS: 'Materials for Energy Storage and Conversion' and 'Functionalized Advanced Materials and Engineering'. Prof I. Saadoune recently received an award from Tokyo University of Science, Japan as a result of his intensive activity on lithium-ion batteries and the 'Innovative project award' from IRESEN. Prof SAADOUNE was invited in many prestigious universities/research centers (Uppsala University, Sweden; Argonne National Lab., USA; KIT, Germany). He has authored/co-authored over 160 articles, conference papers, and project reports. He is currently a member of editorial boards for three journals and reviewer of more than 200 research papers. His publications have received more than 3400 citations and his current Hirsch index is  $h = 26$ .

**Title: Understanding the Chemistries of Lithium-Ion Batteries to Explain the Recent Implementation of Gigafactories in Morocco**

**Summary:** Over the past three months, several prominent Chinese groups have revealed their plans to establish operations in Morocco for the production of electric batteries. Morocco, indeed, offers optimal conditions to attract such gigafactories, including the presence of strategic mineral resources essential for the development of competitive Lithium-ion Batteries. Lithium-ion Batteries (LiBs) represent the cutting-edge technology for applications in Electric Vehicles and the storage of intermittent renewable energies. Essentially, an LIB consists of two electrodes, namely the cathode (positive electrode) and anode (negative electrode), separated by an ionic conductive electrolyte, generating voltage through the potential difference between the two electrodes. The performance of LiBs is intricately linked to the chemistry of the cathode materials. In this context, we will delve into the chemistries of various electrode materials and electrolytes in connection with the available mineral resources in Africa.

Date	Time	Event
Day 1 – Wednesday December 27, 2023	08:30 am – 09:30 am	Registration
	09:30 am – 10:00 am	Opening Ceremony Prof. Houssine Azeddoug, Prof. Saad AlamiYounssi&Prof. Ahmed Ennaoui (HonoraryChairs) Prof. Mufti Mahmud & Prof. Mohamed Lahby(General Chairs)
	10:00 am – 10:30 am	Coffee Break
	10:30 am – 11:30 am	Keynote Speaker 1 Prof. Ismael SAADOUNE (Mohammed VI Polytechnic University, Benguerir, Morocco)
	11:30 am – 13:00 pm	Session P1: Renewable Energy and Green Technology I
		Session P2: Smart Cities and Green Communication I
	01:00 pm – 02:30 pm	Lunch
	02:30 pm – 03:30 pm	Keynote Speaker 2 Prof. Steffen Lehmann (University of Nevada, Las Vegas, USA)
	03:30 pm – 04:00 pm	Coffee Break
	04:00 pm – 06:00 pm	Session P3: Artificial Intelligence for Green IoT
Session P4:Renewable Energy and Green Technology II		
Session P5:Data Science for Sustainable Technologies I		
Session P6:Advanced Materials for Energy Technologies		
Day 2 – Thursday December 28, 2023	10:00 am – 12:00 am	Keynote Speaker 3 Prof. Ahmed Ennaoui (President of the Scientific Council of IRESEN, Morocco) Keynote Speaker 4 Prof. Haitham Abu-Rub (Texas A&M University, Doha, Qatar)
	12:00 am – 02:00 am	Lunch Break
	02:00 pm – 03:45 pm	Session O1: Renewable Energy and Green Technology III
		Session O2: Resources Management and Climate Change
		Session O3: Sustainability Education on Green Energy
		Session O4: Smart Cities and Green Communication II
	03:45 pm – 05:00 pm	Session O5: Artificial Intelligence for Green Transportation
Session O6: Data Science for Sustainable Technologies II		
Session O7: Sustainable Technologies for Smart Solutions		
05:00 pm	Closing Ceremony	



**Wednesday, Dec 27, 2023**

GMT+1

Time	Event
8:30 – 9:30	Registration
9:30 – 10:00	<p style="text-align: center;"><b>Welcome &amp; Opening Ceremony</b></p> <p>Prof. Houssine Azeddoug, Prof. Saad AlamiYounssi &amp; Prof. Ahmed Ennaoui (Honorary Chairs) Prof. Mufti Mahmud &amp; Prof. Mohamed Lahby (General Chairs)</p> <p><b>Meeting Link:</b> <a href="https://us06web.zoom.us/j/88202286908?pwd=HC6OpobrG5Af43f6Afy0bcEJGINweL1">https://us06web.zoom.us/j/88202286908?pwd=HC6OpobrG5Af43f6Afy0bcEJGINweL1</a></p>
10:00 – 10:30	Coffee break
10:30 – 11:30	<p><b>Keynote Speaker 1:</b> "Understanding the Chemistries of Lithium-Ion Batteries to Explain the Recent Implementation of Gigafactories in Morocco". <b>Prof. Ismael SAADOUNE</b> (Mohammed VI Polytechnic University, Benguerir, Morocco) Chair: Mufti Mahmud (Nottingham Trent University, Nottingham, UK)</p>
11:30 – 13:00	<p><b>Parallel Sessions</b></p> <p><b>In Person Session P1: Renewable Energy and Green Technology (I)</b> <b>Session Chair :</b> Dr. Mohammed Mostafizur Rahman (American International University, Bangladesh) <b>Meeting link:</b> <a href="https://meet.google.com/vao-tfdn-bxm">https://meet.google.com/vao-tfdn-bxm</a></p> <p><b>Room: 1</b></p> <ol style="list-style-type: none"> <li><b>Determination of temperature profile inside a PV module operating under specific conditions using a model coupling internal heating to optical absorption" #ID_975.</b> <i>Khadija IBAARAREN, Mhammed ZAIMI, Khadija EL AINAoui and El Mahdi ASSAID (Faculty of Sciences, Chouaïb Doukkali University El Jadida, Morocco)</i></li> <li><b>Assessing the potential of green hydrogen production from wind power: case of microgrid #ID_1144</b> <i>Mariam Bibiha, Karim Choukria, Mohamed El khailia , Houssam Eddine Chakira (ENSET Mohammedia, Hassan II university of Casablanca, Morocco)</i></li> <li><b>A Brief Review of Energy Consumption Forecasting Using Machine Learning Models #ID_2322</b> <i>Zahra Eddaoudia, Zineb Aaraba, Khadija Boudmena , Asmae Elghazia, Moulay Driss Rahmani (Faculty of Sciences, Mohammed V-Agdal University, Rabat, Morocco)</i></li> <li><b>Towards Sustainable Buildings: Predictive Modeling of Energy Consumption with Machine Learning #ID_1665</b> <i>Zineb Zoubir, Houda ER-RETBY, Niima ES-SAKALI (Green Energy Park (IRESEN, UM6P, Ben Guerir, Morocco); Abdellah SOULDI ( Univ Lyon, ENTPE, Ecole Centrale de Lyon, CNRS, France )</i></li> <li><b>Nexus between economy, renewable energy, population and ecological footprint: empirical evidence using STIRPAT model in Morocco #ID_8564</b> <i>Elmehtdi Farouki (Hassan II University of Casablanca, Morocco)</i></li> <li><b>Electrocoagulation-based AZO DYE (P4R) Removal Rate Prediction Model using</b></li> </ol>

	<p><b>Deep Learning #ID_1463</b>  Meryem Akoulih, Fouuzia Byoud , Meryem El Rharib, Sanae El Ghachtouli (Hassan II University of Casablanca, Morocco); Smail Tigani ( Research and Development Unit, Accsellium LTD, Fez, Morocco); Rachid Saadane (EHTTP, Casablanca, Morocco); Samuel Pierred ( Polytechnique Montréal, Québec, Canada ) and Abdellah Chehri (Royal Military College of Canada, Kingston, Canada)</p> <p><b>In Person Session P2: Smart Cities and Green Communication (I)</b>  <b>Session Chair :</b> Dr. Hicham SADOK, Mohammed V University Rabat, Morocco  <b>Room: 2</b>  <b>Meeting link:</b> <a href="https://meet.google.com/xcr-moup-uru">https://meet.google.com/xcr-moup-uru</a></p> <ol style="list-style-type: none"> <li><b>Federated learning efficient communication: Sparse single layer updates #ID_3118</b>  Rachid El Mokadem, Yann Ben Maïssa and Zineb El Akkaoui (INPT, Rabat, Morocco)</li> <li><b>Kolmogorov-Smirnov based method for detecting black hole attack in vehicular ad-hoc networks #ID_3591</b>  Badreddine Cherkaoui (High School of Technology, Chouaïb Doukkali University, Sidi Bennour, Morocco); Mohammed-Alamine El Houssaini (ESEF, Chouaïb Doukkali University, El Jadida, Morocco); Mohammed Kasr, Abderrahim Beni-Hssane (Faculty of Sciences Chouaïb Doukkali University, El Jadida, Morocco) and Mohammed Erritali ( Sciences and Technics Faculty, University of Sultan Moulay Slimane, Béni-Mellal, Morocco)</li> <li><b>Impact of Renewable Energy Resources on the Performance of DTN Networks in the Context of Hierarchical Routing Tree Topology (HRTT) #ID_5056</b>  EL MASTAPHA SAMMOU (Cadi Ayyad University, Faculty of Science and Technology)</li> <li><b>Smart Waste Collection Based on Vehicle Routing Optimization: Case of Casablanca City #ID_1087</b>  Aya Idrissi, Rajaa Benabbou, Jamal Benhra and Mounia El Haji (ENSEM, University Hassan II, Casablanca, Morocco)</li> <li><b>Deep learning and Vegetation indices-based approach for leaf diseases classification in RGB images #ID_110</b>  Soukayna Benaïssa, Mohamed NAJOUÏ and Atman JBARI (ENSAM, Mohammed V University in Rabat);</li> <li><b>Role of Academic Libraries in the Achievement of Sustainable Development Goals Case Study: The Mohamed Sekkat University Library #ID_7371</b>  Khalid Lahyani (ENSAM, Université Hassan II de Casablanca); Ghizlane Diab (FSJESM, Hassan II University of Casablanca, Morocco) and Ghizlane Moukhliiss (ENS Casablanca, Hassan II University of Casablanca, Morocco)</li> </ol>
<b>13:00 – 14:30</b>	<b>Lunch Break</b>
<b>14:30 – 15:30</b>	<p><b>Keynote Speaker 2:</b> “Integrating green thinking: What matters now”. <b>Prof. Steffen Lehmann</b> (University of Nevada, Las Vegas, USA)  Chair: Mohamed LAHBY (Hassan 2 University, Casablanca, Morocco)</p> <p>Meeting link:  <a href="https://us06web.zoom.us/j/83198923552?pwd=AYLIAhZQpQedBvTmOBVnV">https://us06web.zoom.us/j/83198923552?pwd=AYLIAhZQpQedBvTmOBVnV</a></p>

	<a href="#">scwaG8FAq.1</a>
15:30 – 16:00	Coffee break
16:00 – 18:00	<p><b>Parallel Sessions</b></p> <p><b>In Person Session P3: Artificial Intelligence for Green IoT</b>  <b>Session Chair :</b> Dr. SAÏD AQIL, ENSAM, Casablanca Morocco  <b>Room:</b> 1  <b>Meeting link:</b> <a href="https://meet.google.com/idg-gpke-sot">https://meet.google.com/idg-gpke-sot</a></p> <ol style="list-style-type: none"> <li><b>Environmental Impact Assessment of IoT Devices: A Graph-based Approach #ID_1343</b>  Mohamed Ramadane, Sonja Meyer, Doris Bohneta (HTWG Konstanz - University of Applied Sciences, Konstanz, Germany)</li> <li><b>Towards a novel approach based on machine learning to assess environmental suitability in smart campuses #ID_1887</b>  Mossab Batal (FSBM Casablanca, Morocco); Abdellah DAISSAOUI (LPRI, EMSI, Casablanca, Morocco); EL FILALI Sanaa (FSBM, Casablanca, Morocco) and Ahmed LBATH (LIG, Grenoble-Alpes, France)</li> <li><b>Application of Transfer Learning in Smart Agriculture to Combat Black Rot Bacteria #ID_4933</b>  TACE Youness (FSBM, HIIU, Casablanca, Morocco); Mohamed TABAA (LPRI, EMSI, Casablanca, Morocco); EL FILALI Sanaa (FSBM, Casablanca, Morocco) and Cherkaoui LEGHRIS (FST Mohammedia, HIIU, Casablanca, Morocco)</li> <li><b>Lightweight secure compression scheme for green IoT applications #ID_5901</b>  Samia AL FALLAH, Mounir ARIOUA and Ahmed EL OUALKADI (National School of Applied Sciences of Tetuan, Abdelmalek Essaadi University, Morocco)</li> <li><b>Energy Efficiency in Green Industry: A Meta-heuristic Approach #ID_2246</b>  Nejjarou Omar ((ENS, University Hassan II, Casablanca, Morocco); Said Aqil (ENSAM, University Hassan II, Casablanca, Morocco) and Mohamed Lahby (ENS), University Hassan II, Casablanca, Morocco)</li> <li><b>Green Algorithms for Energy-Efficient Distributed Flow-Shop Manufacturing Problem #ID_7614</b>  SayahAchraf/ (ENS, University Hassan II, Casablanca, Morocco); Said Aqil(ENSAM, University Hassan II, Casablanca, Morocco) and Mohamed Lahby (ENS), University Hassan II, Casablanca, Morocco)</li> <li><b>NST-SAM : Approach for Water-Stressed Plant Classification via Neural Style Transfer and Segment Anything Model #ID_3326</b>  Hatim Asslik (Hassania School of Public Works, Morocco) and Youssef Alj (AI movement, Mohammed VI Polytechnic University, Rabat, Morocco)</li> </ol> <p><b>In Person Session P4: Data Science for Sustainable Technologies</b>  <b>Session Chair :</b> Dr. Khalifa MANSOURI ENSET, Mohammedia  <b>Room:</b> 2  <b>Meeting link:</b> <a href="https://meet.google.com/met-mtfk-jav">https://meet.google.com/met-mtfk-jav</a></p> <ol style="list-style-type: none"> <li><b>Harnessing Deep Learning Techniques for Enhanced Detection and Classification of Cracks in Concrete Imagery #ID_443</b>  Knnou Omar, Elarbi Abdellaoui Alaoui and Hanae Errouso (Faculty of Sciences and Techniques, Moulay Ismail University of Meknes, Errachidia, Morocco)</li> <li><b>Towards Transparent Cybersecurity: The Role of Explainable AI in Mitigating Spam</b></li> </ol>

**Threats #ID\_2232**

El Arbi ABDELLAOUI ALAOUI (ENS, Moulay Ismail University of Meknes, Morocco); Adnane Filali (EST, Moulay Ismail University of Meknes, Morocco); Amine Sallah (Faculty of Sciences and Techniques, Moulay Ismail University of Meknes, Errachidia, Morocco); Mohammed Hajhouj (ENSIAS, University Mohammed V in Rabat Rabat, Morocco); Abdelaziz Hessane (Faculty of Sciences and Techniques, Moulay Ismail University of Meknes, Errachidia, Morocco) and Mostafa Merras (EST, Moulay Ismail University of Meknes, Morocco);

**3. Multimodal Deep Learning for Oil Price Forecasting Using Economic Indicators #ID\_5390**

Siham Akil (FST Mohammeda, University Hassan 2 of Casablanca, Morocco); Sara SEKKATE (Higher National School of Arts and Crafts of Casablanca, Morocco) and Abdellah ADIB (FST Mohammeda, University Hassan 2 of Casablanca, Morocco)

**4. Enhancing Spam Detection with GANs and BERT Embeddings: A Novel Approach to Imbalanced Datasets #ID\_6040**

Adnane Filali (EST, Moulay Ismail University of Meknes, Morocco); El Arbi Abdellaoui Alaoui (ENS, Moulay Ismail University of Meknes, Morocco) and Mostafa Merras (EST, Moulay Ismail University of Meknes, Morocco)

**5. Modeling Speech Emotion Recognition via ImageBind representations #ID\_6496**

Adil CHAKHTOUNA (FST Mohammeda, University Hassan 2 of Casablanca, Morocco); Sara SEKKATE (Higher National School of Arts and Crafts of Casablanca, Morocco) and Abdellah ADIB (FST Mohammeda, University Hassan 2 of Casablanca, Morocco)

**6. A TinyML Model for Gesture-Based Air Handwriting Arabic Numbers Recognition #ID\_127**

Ismail Lamaakal, Khalid El Makkaouia, Ibrahim Ouahbia (Multidisciplinary Faculty of Nador, University Mohammed Premier, Oujda, Morocco) and Yassine Maleh (ENSAK, USMS University, Beni Mellal, Morocco)

**In Person Session P5: Renewable Energy and Green Technology II**

**Session Chair:** Dr. Lghazi Youssef, ENS, Casablanca Morocco

**Room:** 1

**Meeting Link:** <https://meet.google.com/oej-qdmq-obt>

**1. The energy transition in Morocco: assessment and implementation challenges #ID\_1448**

Rachid SAADANE (EHTTP, Casablanca, Morocco); Hicham Sado, Houda Mahboub (Mohammed V University, Rabat, Morocco) and Mimoun Benali (National School of Commerce and Management of Fez, Morocco)

**2. Prediction of energy production in a building-integrated photovoltaic system using machine learning algorithms #ID\_4643**

Zineb Zoubir, Niima ES-SAKALI, Houda ER-RETTY, Mohamed Oualid MGHAZLI, (Green Energy Park IRESEN, UM6P, Ben Guerir, Morocco)

**3. Challenges and Limitations of Artificial Intelligence Implementation in Modern Power Grid #ID\_4302**

Abderrahmane El Rhatri, Bouchra Bouih, Mohammed Mestari (ENSET, Hassan II university of Casablanca, Morocco)

**4. Review of the Integration of Photovoltaic and Electric Vehicles on Distribution Network: Impacts and Enhancement Approaches #ID\_5739**

Boutaina Talbi, Mounir Derri, Touria Haidi, Abderrahmane Janyenne (EHTTP, Casablanca, Morocco)

**5. Proactive Environmental Management's Drive for Green Technology Adoption in**



**MENA Firms: Regulatory Mediation and Financial Moderation #ID\_8127**

Omar Ayouni and Zouiri Lahboub (Faculty of Law, Economics and Social Sciences Agdal, Mohammed V University)

**In Person Session P6: Advanced Materials for Energy Technologies**

**Session Chair:** Dr. Mohammed Ait El Fqih, ENSAM, Casablanca Morocco

**Room:** 2

**Meeting Link:** <https://meet.google.com/vdu-oafs-fhy>

**1. Simulation and experimental study of concrete beams reinforced with a natural fibers composite" #ID\_2382.**

BOUNJOUM Youssef, Mohammed Ait El Fqih and Naoufal Bouktib (ENSAM, Hassan II University of Casablanca, Morocco)

**2. Thermal and mechanical properties of light-weight concrete utilizing Moroccan Pozzolan #ID\_6626**

Khadija Annaba (National High School of Mines of Rabat, Morocco); Sara Belarouf (Agronomic and Veterinary Institute of Hassan II of Rabat, Morocco ); Fatima Zohra El Wardi ( Faculty of Sciences Ain Chock, Hassan II University, Casablanca, Morocco); Bennaceur Ouaki (National High School of Mines of Rabat , Morocco) and Mouha Cherkaoui ( National High School of Mines of Rabat, Morocco)

**3. Dynamical analysis of a supercapacitor based multilevel inverter #ID\_9844**

Jamila LAKBIR (ENSET, Hassan II University of Casablanca, Morocco); Soukaina BOUDOUDOUH (IRESEN, Rabat, Morocco) and Omar BOUATTANE ( ENSET, Hassan II University of Casablanca, Morocco)

**4. Effect of terrace covers on temperature inside buildings #ID\_9856**

Naoual Raouj, Moulay Cherif Harrouni , Lahoussaine Baamal and Nourredine Benaouda Tlemçani (Institut Agronomique et Vétérinaire Hassan II, Rabat, Morocco)

## THURSDAY, Dec 28, 2023

10:00 – 11:00	<p><b>Keynote Speaker 3:</b>“Challenges in the development of (Photo)Electrochemical solar fuels technology”. <b>Prof. Ahmed Ennaoui</b> (President of the Scientific Council of IRESEN, Morocco)</p> <p><b>Session Chair:</b> Rachid SAADANE (EHTTP, Casablanca, Morocco)</p> <p>Meeting link: <a href="https://us06web.zoom.us/j/89306488305?pwd=BrXQO4GFn6ZVT0PXNYo2cbZTfHefHn.1">https://us06web.zoom.us/j/89306488305?pwd=BrXQO4GFn6ZVT0PXNYo2cbZTfHefHn.1</a></p>
11:00 – 12:00	<p><b>Keynote Speaker 4:</b>“Renewable Energies Dominated Grid: Visibility, Opportunity, and Challenges”. <b>Prof. Haitham Abu-Rub</b>(Texas A&amp;M University, Doha, Qatar)</p> <p><b>Session Chair:</b> Yassine MALEH (ENSA, Khouribga, Morocco)</p> <p>Meeting link: <a href="https://us06web.zoom.us/j/89306488305?pwd=BrXQO4GFn6ZVT0PXNYo2cbZTfHefHn.1">https://us06web.zoom.us/j/89306488305?pwd=BrXQO4GFn6ZVT0PXNYo2cbZTfHefHn.1</a></p>

12:00 – 14:00	Lunch Break
14:00 – 15:45	<p><b>Online Parallel Sessions</b></p> <p><b>Online Session O1: Renewable Energy and Green Technology III</b>  <b>Session Chair:</b> Dr. Fagroud Fatima Zahra, EMSI, Casablanca Morocco  <b>Meeting link:</b> <a href="https://meet.google.com/tqo-rpjf-uwg">https://meet.google.com/tqo-rpjf-uwg</a></p> <ol style="list-style-type: none"> <li><b>Design optimization of a multi-source renewable energy system using a novel method based on selective ensemble learning#ID_157.</b>  Anas Bouaouda, Yassine Sayoutia (FST Mohammeda, Hassan II University of Casablanca, Morocco)</li> <li><b>Solar To Hydrogen Production Barriers And Opportunities In Oman: A Case Study In The Dhofar Region #ID_7909</b>  C.Balakrishna Moorthy (University of Technology and Applied Sciences, Salalah, Oman); Ammar Suhail Al Yafi (Oman Electricity Transmission Company, Dhofar, Oman); Teofilo Sabangan, Selvaraju Sivamani (University of Technology and Applied Sciences, Salalah, Oman)</li> <li><b>Review on Biodiesel Generations: Energy Demand, Costs, and Emissions #ID_5015</b>  AMDH HOUDA, Imane Hajjout, Reda Errais, Mohammed Jmili, Khalid Guissi, El Houssain Baal (Institut Agronomique et Vétérinaire Hassan 2, Rabat, Morocco) and El Mostapha Boudi (Ecole Mohammadia d'Ingénieurs, Rabat, Morocco)</li> <li><b>Deep Learning and Econometric Analysis of CO2 Emissions in Bangladesh: A Transition Towards Renewable Energy and Sustainable Practice #ID_7415</b>  Tamanna Siddiqua Ratna, Tanzin Akhter (American International University-Bangladesh); Md. Ashraf Babu (Independent University, Bangladesh, Dhaka, Bangladesh); Md. Mortuza Ahmmed, M. Mostafizur Rahman (American International University-Bangladesh, Dhaka, Bangladesh) and Mufti Mahmud (Nottingham Trent University, Nottingham, UK)</li> <li><b>Integrated Thermodynamic Analysis and Channel Variation Effects on Solid Oxide Electrolysis for Efficient Hydrogen Generation #ID_269</b>  Mohamed-Amine Babay, Mustapha Adara , Redouane Nouri , ,<i>Mustapha Mabrouki</i> (Faculty of Science and Technologies, Sultan Moulay Slimane University, Beni Mellal); Ahmed Chebak (Green Tech Institute (GTI), Mohammed VI Polytechnic University, Benguerir, Morocco)</li> <li><b>MODELING AND ANALYSIS OF A HORIZONTAL AXIS CURRENT TURBINE #ID_8252</b>  Rajae Gaamouche (EMSI, Rabat Morocco); M.Belaida, A.El Hasnaoui ( National Superior School of Mines, Rabat, Morocco) and Mohamed LAHB Y (ENS, University of Hassan 2 of Casablanca, Morocco)</li> <li><b>Sustainability-Driven Hourly Energy Demand Forecasting in Bangladesh Using Bi-LSTMs #ID_6603</b>  Md Saef Ullah Miah (American International University-Bangladesh, Dhaka, Bangladesh); Md. Imamul Islam(Universiti Malaysia Pahang Al-Sultan Abdullah, Pekan, Malaysia); Ahanaf Ahmed(Green University of Bangladesh, Narayanganj, Bangladesh) and Mufti Mahmud (Nottingham Trent University, Nottingham, United Kingdom)</li> </ol> <p><b>Online Session O2: Resources Management and Climate Change</b>  <b>Meeting link:</b> <a href="https://meet.google.com/diz-cjhz-swi">https://meet.google.com/diz-cjhz-swi</a>  <b>Session Chair:</b> Dr. Marta Chinnici (ICT Division- HPC Lab Via Anguillarese</p>

ROMA, Italia)

**1. Approach based on camera for extraction of meters index #ID\_3874**

Ayman NAIM, Younès EL BOUZEKRI EL IDRISS (National School of Applied Sciences Ibn Tofail University Kenitra, Morocco) and Youssef Baddi (Chouaib Doukkali University El Jadida, Morocco)

**2. Long-term trend prediction of surface water quality of two main river basins of China using Machine Learning Method #ID\_4710**

Md Sahidul Islam, Hailong Yin (Institute of Environment for Sustainable Development, Shanghai, China) and Mustafizur Rahman (School of Mechatronic, China University of Mining and Technology, China)

**3. Can Digital Technology Breakthroughs Contribute to Climate Change Mitigation? #ID\_4324**

ChehriAbdellah (Royal Military College of Canada, Kingston, Canada), Hasna Chaibib (SUPMTI, GENIUS Laboratory, Hassan-Rabat, Morocco) and Zineb Rhajbal, Badre Eddine Chegri (Mohamed V University, Rabat, Morocco)

**4. FinTech and Climate Action, and Affordable and Clean Energy #ID\_666**

Nejra Omeragic, Azra Zaimovic, Tarik Zaimovi (University of Sarajevo, Trg Oslobodjenja Bosnia and Herzegovina)

**5. The Net Zero Energy Building Definition Framework: An Overview Pathway to Enhancing Sustainable Development and Mitigating Climate Change in Morocco #ID\_9135**

Mohamed Oualid MGHAZLI (Green Energy Park, Benguerir, Morocco); Mohamed ELMANKIBI (Univ Lyon, ENTPE, Ecole Centrale de Lyon, CNRS, France) and Nouzha LAMDOUAR (Mohammadia School of Engineers, Mohammed V University in Rabat, Morocco)

**6. Enhancement of MCF-7 and HeLa Cell Interfacial Interactions using Pulse Electric Field and Natural Sustainable Resources #ID\_6315**

Suhassni Ganeson, Muhammad Mahadi bin Abdul Jamil, Radzi bin Ambar, Wan Suhaimizan bin Wan Zaki, Mohd Helmy Abd Wahab (Universiti Tun Hussein Onn Malaysia); Shamala Marimuthu (Mila University, Seremban, Malaysia); Nur Adilah Abd Rahman (Universiti Tun Hussein Onn Malaysia) and Hassan Buhari Mamman (Tafawa Balewa University Bauchi, Nigeria)

**Online Session O3: Sustainability Education on Green Energy**

**Session Chair:** Dr. Mustapha Saadi (ENSA Khouribga, Morocco)

**Meeting link:** <https://meet.google.com/owp-owvn-ypx>

**1. Extent of environmental awareness in the framework of waste management among pre-service teachers: Is sustainability a 'lesson plan' for pre-service teachers? #ID\_1104**

Precious Angel M. Gapol, Franchesca Marie O. Bantoto, Justine O. Fuentes, Anthony I O. Pil, Jovannie M. Sarona1, Lolita R. Lacao-Lacao, Arvin B. Casimiro, Ericson O. Alieto (Western Mindanao State University Zamboanga City, Philippines); Ronel Peromingan (Zamboanga Peninsula Polytechnic State University Zamboanga City, Philippines); Keir A. Balasa (Jose Rizal Memorial State University - Tampilisan Campus Zamboanga del Norte, Philippines) and Bernadeth Encarnacion (Western Mindanao State University Zamboanga City, Philippines)

**2. Enabling Sustainable Learning: A Machine Learning Approach for an Eco-friendly Multi-factor Adaptive E-Learning System #ID\_5252**

Ezzaim Aymane, DAHBI Aziz, HAIDINE Abdelfatteh, AQQAL Abdelhak (National

School of Applied Sciences, ChouaibDoukkali University, El Jadida, Morocco)

3. **Assessing the Adoption Readiness of Moroccan Consumers for AI-Powered Assistance and CRM Systems. #ID\_2000**

Karim DARBAN, Smail Kabbaj (ENCG, University Hassan II, Casablanca, Morocco)

4. **Exploring the Impact of Virtual Reality and Augmented Reality Technologies in Sustainability Education on Green Energy and Sustainability Behavioral Change: A Qualitative Analysis #ID\_7845**

Sunder Kala Negi (NIT Hamirpur Himachal Pradesh, India)

5. **Are Future Teachers 'Green'? A Quantitative Analysis of Ability, Knowledge, Perception, and Attitude toward Renewable Energy #ID\_4004**

Frenz Djaxxas D. Clorion, Jenny C. Ceballos, Mary Emm C. Berganio, Felixberto C. Labastilla, Eric-Roland R. Natividad, Criselda Dela Rama Ricohermoso, Mark Anthony G. Tolentino (Western Mindanao State University, Philippines); Therese T. Toriano (Eastern Samar State University, Borongan City, Eastern Samar) and Ericson O. Alieto (Western Mindanao State University, Philippines);

6. **Sustainable Topic Modeling for Legal Moroccan Arabic Language: A Challenging Study on BERTopic Technique #ID\_6686**

Soufiane Aouichaty (Hassan First University of Settat, Faculty of Sciences and Techniques, Morocco); Yassine Maleh (ENSA Khouribga, Sultan Moulay Slimane University, Beni Mellal, Morocco) and Mohamed Taib Mohtadi, Abdelmajid Hajami, Hakim Allali (Hassan First University of Settat, Faculty of Sciences and Techniques, Morocco);

## **Online Session O4: Smart Cities and Green Communication II**

**Session Chair:** Dr. Moukhliiss Ghizlane (ENS Casablanca, Morocco)

**Meeting link:** <https://meet.google.com/hfm-zvsw-sqx>

1. **Quantitative and Qualitative study of the human body effect on the Electromagnetic Probe at 5G and 6G frequencies #ID\_2951**

Meryem Bekkouch, Chakib Taybi, Mohammed Anisse Moutaouekkil, Bachir Elmagroud (National School of Applied Sciences, Mohammed First University, Oujda, Morocco) and Abdelhak Ziyat (Faculty of Sciences, Mohammed First University, Oujda, Morocco)

2. **The Importance of Robust Communication in Large-Scale Agile Development #ID\_4659**

Shariq aziz butt (University of South Asia, Lahore, Pakistan) and Piñeres-Espitia Gabriel, Paola Ariza-Colpas Patricia, Marlon Alberto Piñeres-Melo (Universidad De la Costa, CUC Barranquilla, Colombia)

3. **Artificial Intelligence for Sustainable Dermatology in Smart Green Cities: Exploring Deep Learning Models for Accurate Skin Lesion Recognition #ID\_6137**

Youssra El Idrissi El-Bouzaidi and Otman Abdoun (Faculty of Science, Abdelmalek Essaadi University, Tetouan, Morocco)

4. **Towards a unified metamodel for developing the conversational agents for smart tourism #ID\_7443**

Lamy Benaddi, Adnane Souhaa, Charaf Ouaddia, Abdeslam Jakimia, Brahim Ouchao (Faculty of Sciences and Technics, University of Moulay Ismail, Morocco)

5. **Monitoring Urban Green Space Using Remote Sensing Derived-vegetation Indices in Colombo District, Sri Lanka #ID\_8072**

Ibra Lebbe Mohamed Zahir, Mohamed Hassan Fathima Nuskiya, Athem Lebbe Iyooob, Meerasa Lewai Fowzul Ameer (South Eastern University of Sri Lanka, Sri



	Lanka)
15:45 – 17:00	<p><b>Online Parallel Sessions</b></p> <p><b>Online Session O5: Artificial Intelligence for Green Transportation</b>  <b>Session Chair:</b> Dr. Abdelkebir Sahir (Hassan 1st University, Morocco)  <b>Meeting link:</b> <a href="https://meet.google.com/rif-mebn-mvm">https://meet.google.com/rif-mebn-mvm</a></p> <ol style="list-style-type: none"> <li><b>Enhancing green energy security: exploring multi-agent systems perspectives for a secure smart grid information System #ID_1617</b>  Fayçal Rahmoune, Nawal Ait Aali and Younès El Bouzekri El Idrissi (National School of Applied Sciences, University of Ibn Tofail, Kenitra, Morocco)</li> <li><b>Intelligent transport systems for green transformation of transport corridor #ID_6388</b>  Igor Kabashkin (Transport and Telecommunication Institute, Latvia) and Zura Sansyzbayeva (Eurasian National University, Satpajeva, Kazakhstan)</li> <li><b>Probabilistic Graph Modeling based Safety Classifier Algorithm for Smart Transportation #ID_378</b>  Najib El Karkouri (Faculty of Sciences, University Ibno Tofial, Kenitra, Morocco); Smail Tigani (Research and Development Unit, Accsellium LTD, Fez, Morocco); Rachid Saadane (Hassania School of Public Labors, Casablanca, Morocco); Abdelah Chehri (Royal Military College of Canada, Kingston, Canada); Samuel Pierre (Polytechnique Montreal, Canada) and Nouredine Neya ( Faculty of Sciences, University Ibno Tofial, Kenitra, Morocco)</li> <li><b>Assessment of the impact of driver behavior on the carbon footprint in Morocco's transportation sector #ID_642</b>  Laila BENABBOU, Mimoun BENALI, Ghada MOUFDI (Sidi Mohamed Ben Abdellah University, Fez, Morocco) and Hicham SADOK (Mohammed V University, FSJES-Souissi, Rabat, Morocco)</li> <li><b>Enhancing Real-time Simultaneous Localization and Mapping with FPGA-based EKF-SLAM's Hardware Architecture #ID_8697</b>  Slama HAMMIA (ENSA, Ibn Zohr University, Agadir, Morocco); Anas Hatim (ENSA, Cadi Ayyad University Marrakech, Morocco) and Abdelilah Haijoub (ENSA Abdelmalk Essaadi University Tanger, Morocco)</li> </ol> <p><b>Online Session O6: Data Science for Sustainable Technologies II</b>  <b>Session Chair:</b> Dr. Mounia Zaydi (Catholic University of Lille, France)  <b>Meeting link:</b> <a href="https://meet.google.com/bqo-ajfs-ngn">https://meet.google.com/bqo-ajfs-ngn</a></p> <ol style="list-style-type: none"> <li><b>Closed Loop Control of Blood Glucose Levels in Diabetes Using an Artificial Neural Network Controller #ID_4693</b>  DOUNIA NASIR, Anas Hatim, Mohamed El Mehdi Ait Bourkha, Said El Beid (ENSA Marrakech, Cadi Ayyad University, Marrakech) and Siham Ez-ziymy (ENSA Agadir, Ibn Zohr University, Agadir, Morocco)</li> <li><b>Extraction of UML class diagrams using deep learning: Comparative study and critical analysis #ID_2879</b>  Zakaria Babaalla, Hamza Abdelmalek, Abdeslam Jakimi, Mohamed Oualla (FST Errachida UMI-Meknes, Errachida)</li> <li><b>Machine Learning Algorithms for Intrusion Detection in IoT Prediction and Performance Analysis #ID_5091</b>  ENNAJI ELMAHFOUD, Salah Elhajla, Yassine Maleh, Soufyane Mounir (Sultan</li> </ol>

	<p>Moulay Slimane University Beni Mellal)</p> <p><b>4. Ventricular Ectopic beats detection-based wavelet scattering network and ensemble bagged trees for smart medical systems #ID_2195</b>  Mohamed Elmechdi Ait Bourkha, Anas Hatim, Dounia Nasir, Said El Beid (ENSA Marrakech, Cadi Ayyad university); Siham Ez-ziymy(ENSA Agadir, Ibn Zohr University, Agadir, Morocco) and Assia Sayed Tahiri( ENSA Marrakech, Cadi Ayyad University, Marrakech, Morocco)</p> <p><b>5. An Efficient Fuzzy Colored Petri-Nets-Based Ubiquitous Framework for Diversified Culture of Building Automation in India#ID_2850</b>  Shalini Puri (Manipal University Jaipur, Jaipur, India); Md. Ashraful Babu (Independent University, Bangladesh, Dhaka, Bangladesh); Md. Mortuza Ahmmed, M. Mostafizur Rahman (American International University-Bangladesh, Dhaka, Bangladesh) and Mufti Mahmud (Nottingham Trent University, Nottingham, UK)</p> <p><b>Online Session O7: Sustainable Technologies for Smart Solutions</b>  <b>Session Chair:</b> Dr. Youness Khourdifi (FP Khouribga, Morocco)  <b>Meeting link:</b> <a href="https://meet.google.com/wwwv-yynt-pxt">https://meet.google.com/wwwv-yynt-pxt</a></p> <p><b>1. Strategies to Improve Building Construction Sustainability Through Utilisation of Drones in the Building Construction Sector. #ID_748</b>  Timothy AduGyamfi (Koforidua Technical University, Ghana); Wellington Didibhuku Thwala (University of South Africa, South Africa); Clinton Aigbavboa (University of Johannesburg Faculty of Engineering and Built Environment, South Africa) and Siyabulela Dywili (Walter Sisulu University, South Africa)</p> <p><b>2. Measuring digital financial literacy #ID_3607</b>  Azra Zaimovic, Minela Nuhic-Meskovic, Lejla Dedovic, Almira Arnaut-Berilo, Tarik Zaimovic, Anes Torlakovic (University of Sarajevo, School of Economics and Business, Bosnia and Herzegovina)</p> <p><b>3. A Blockchain-based Intrusion Detection/Prevention Systems in IoT Network: A Systematic Review #ID_5860</b>  Khawla shalabi, Qasem Abu Al-Haija, Mustafa Al-Fayoumi (Princess Sumaya University for Technology, Amman, Jordan)</p> <p><b>4. A novel approach for estimating root orientation by surface fitting of the hyperbola signature #ID_4753</b>  Mohammed Kahlaoui, Aboulkacem Karkri, Mohammed Anisse Moutaouekkil, Chakib Taybi (Faculty of Sciences, Mohammed First University Oujda)</p> <p><b>5. Comparative analysis of mobile application Frameworks: A developer's guide for choosing the right tool #ID_5336</b>  Adnane Souha, Lamya Benaddi, Charaf Ouaddi, Abdeslam Jakimi (FST Errachida, UMI-Meknes Errachidia)</p> <p><b>6. Analysis of land use and land cover transpose using remote sensing and GIS approach: a case of Hamirpur, India #ID_7541</b>  Rashmi Kumari, Bharti Kasav (National Institute of Technology Hamirpur, India)</p>
17:00	<p style="text-align: center;"><b>Closing Ceremony</b></p> <p><b>Meeting Link:</b>  <a href="https://us06web.zoom.us/j/89876439408?pwd=6szRViPyoP0KU3BeGJhPa6fbhPAEDQ.1">https://us06web.zoom.us/j/89876439408?pwd=6szRViPyoP0KU3BeGJhPa6fbhPAEDQ.1</a></p>

## About Casablanca



Casablanca located in the central-western part of Morocco bordering the Atlantic Ocean, is the largest city in Morocco. It is also the largest city in the Maghreb, as well as one of the largest and most important cities in Africa, both economically and demographically. Casablanca is Morocco's chief port and one of the largest financial centers on the continent. According to the 2014 population estimate, the city has a population of about 3.35 million in the urban area and over 6.8 million in the Casablanca-Settat region.

Casablanca is considered the economic and business center of Morocco, although the national political capital is Rabat. The leading Moroccan companies and international corporations doing business in the country have their headquarters and main industrial facilities in Casablanca. Recent industrial statistics show Casablanca retains its historical position as the main industrial zone of the country. The Port of Casablanca is one of the largest artificial ports in the world, and the second largest port of North Africa, after Tanger-Med 40 km east of Tangier. Casablanca also hosts the primary naval base for the Royal Moroccan Navy.

The Grand Casablanca region is considered the locomotive of the development of the Moroccan economy. It attracts 32% of the country's production units and 56% of industrial labor. The region uses 30% of the national electricity production. With MAD 93 billion, the region contributes to 44% of the industrial production of the kingdom. About 33% of national industrial exportations, MAD 27 billion comes from the Grand Casablanca; 30% of the Moroccan banking network is concentrated in Casablanca. One of the most important Casablanca exports is phosphate. Other industries include fishing, fish canning, sawmills, furniture production, building materials, glass, textiles, electronics, leather work, processed food, spirits, soft drinks, and cigarettes.

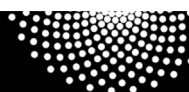
The Casablanca and Mohammedia seaports activity represent 50% of the international commercial flows of Morocco. Almost the entire Casablanca waterfront is under development, mainly the construction of huge entertainment centres between the port and Hassan II Mosque, the Anfa Resort project near the business, entertainment and living centre of Megarama, the shopping and entertainment complex of Morocco Mall, as well as a complete renovation of the coastal walkway. The Sindbad Park is planned to be totally renewed with rides, games and entertainment services. Royal Air Maroc has its head office at the Casablanca-Anfa Airport. In 2004, it announced that it was moving its head office from Casablanca to a location in Province of Nouaceur, close to Mohammed V International Airport. The agreement to build the head office in Nouaceur was signed in 2009. The biggest CBD of Casablanca and Maghreb is in the North of the town in Sidi Maarouf near the mosque of Hassan II and the biggest project of skyscrapers of Maghreb and Africa Casablanca Marina.

# Thank YOU FOR OUR PARTNERS & SPONSORS



ELSEVIER

Procedia  
Computer Science



جامعة الحسن الثاني بالدار البيضاء  
+o0^oUz+ I Aoooi UZOO OZI X EEoGWθZEo  
UNIVERSITÉ HASSAN II DE CASABLANCA



U|H|E|N|S  
ECOLE NORMALE SUPERIEURE  
UNIVERSITÉ HASSAN II DE CASABLANCA  
المدرسة العليا للأساتذة  
جامعة الحسن الثاني بالدار البيضاء



NOTTINGHAM  
TRENT UNIVERSITY



FRANKFURT  
UNIVERSITY  
OF APPLIED SCIENCES



UNIVERSITAT  
POLITÈCNICA  
DE VALÈNCIA



AMRST

الجمعية المغربية لتشجيع البحث العلمي والتقني

+E0E:It +E4O.0z+ I :000Z0 I :OЖ: eEo0o. I A :+zZi4z  
Association Marocaine pour la Promotion de la Recherche Scientifique et Technique