



July-  
September  
2020



# ERC NEWSLETTER

July- September 2020

COMSATS UNIVERSITY ISLAMABAD, LAHORE CAMPUS

1.5 KM Defence Road, Off Raiwind Road,

Lahore Pakistan

UAN: +92 (42) 111-001-007

<https://www.lahore.comsats.edu.pk>





# ENERGY RESEARCH CENTER

COMSATS UNIVERSITY ISLAMABAD, Lahore Campus

## CONTENTS

<b>Dr.Sobia Baig joins as Head ERC</b>	<b>2</b>
<b>Head ERC Message</b>	<b>3</b>
<b>ERC launches Webinar Series on Energy</b>	<b>3</b>
<b>Energy Audit Service from ERC</b>	<b>5</b>
<b>International Research Collaborations</b>	<b>5</b>
<b>ERC Project in HEC GCF</b>	<b>6</b>
<b>Interactive Workshop of PV Solar Design</b>	<b>6</b>
<b>ERC Visits to Industries to Strengthen the Industry Academia Linkages</b>	<b>7</b>
<b>ERC Projects</b>	<b>8</b>
<b>ERC Publications</b>	<b>9</b>



**ENERGY RESEARCH CENTER  
(ERC),  
COMSATS UNIVERSITY  
ISLAMABAD, LAHORE**

### Dr. Sobia Baig joins as Head ERC

Dr. Sobia Baig joined the Centre as Head on 16<sup>th</sup> June 2020. Dr. Sobia Baig, CEng, MIET, SMIEEE, is currently Vice-Chair, IEEE Lahore Section. She has served as the Head of Department at the Department of Electrical Engineering, COMSATS Institute of Information Technology, Lahore, Pakistan from September 2013 till September 2016. She holds a B.Sc. in Electrical Engineering from University of Engineering and Technology (UET), Taxila, Pakistan and M.S. and Ph.D. in Electronic Engineering from GIK Institute of Engineering Sciences and Technology, Topi, Pakistan. She was awarded the Association of Commonwealth Universities (ACU) Titular fellowship, for research work in Smart Grid communication in 2016. Her research interests include work on non-orthogonal multiple access (NOMA) techniques, Smart Grid Communication techniques, multicarrier modulation techniques and application of wavelet based modulation techniques in the wireline Digital Subscriber Line (DSL), power line communication (PLC) networks and in 5G wireless communication networks. She has published papers in several areas including NOMA for 5G, power line communication (PLC), digital modulation techniques, etc.

She is an HEC approved PhD supervisor, currently supervising a PhD thesis, and has supervised several Final Year Projects and MS Thesis at COMSATS, Lahore. She is a regular reviewer of the IEEE Magazine, journal and letters on Communication and Signal Processing, Elsevier journals on Utilities Policies, IEEE Transactions on Smart Grids, etc. She is affiliated with professional organizations, such as Pakistan Engineering Council, IEEE USA, and IEICE, Japan. She has done several years of voluntary work with IEEE in Pakistan and held the position of Vice-Chair, IEEE Lahore Section in 2015-16. She has taught courses of digital communications, wireless communication, signal and systems, digital signal processing, probability and random variables, at both undergraduate and graduate level during her teaching experience.



## HEAD ERC Message

Affordable, reliable, sustainable and environmentally friendly provision of energy holds the fundamental key for an effective growth of the social and economic fabric of any society. With the new advancements and ever changing dynamics of the global energy situation, there is a strong need to actively pursue research and development (R&D) for out of the box thinking to provide solutions on various aspects of energy sector problems and create general awareness for Clean and Green Energy. Enhancing the portion of renewable energy in the energy mix is the key to reducing carbon footprint in the heavily populated South Asian region of the world. Pakistan is a signatory of Organization for Economic Cooperation and Development (OECD) and needs to address OECD's initiatives such as, Green Growth and Energy and Aid to Energy Generation and Supply Sector.

ERC's vision is to become a center of excellence and partnership for advanced research, innovative solutions, and practices in energy related fields. ERC aims at providing a platform to multidisciplinary researchers within and outside COMSATS University Isb to collaborate in research fields related to energy. The Center aspires to engage the scientific community in several different roles, such as, promoting clean energy research and technology, enabling research activities for greater penetration of renewable and sustainable energy, work on dynamics of new economic models and energy policies, improvement in energy efficiency rate, performing energy audits, etc. ERC is to play its role in capacity building, in terms of development of human resource and research facilities to cater the dynamically changing Energy Sector needs. We, at ERC believe in a result-oriented approach. ERC's sustainable progress will be ensured through its core staff in collaboration with adjunct faculty members.

## ERC launches Webinar series on Energy

ERC, COMSATS Lahore has organized series of webinars. Under pandemic situation across all the globe physical seminars were difficult to conduct. To disseminate knowledge regarding energy, Imminent professionals are now delivering webinars from the platform of Energy Research Center with collaboration from IEEE Lahore chapter. The webinars information is updated regularly on ERC website and Facebook page.



# ERC WEBINARS ON ENERGY



First Webinar "Living the Microgrid Paradigm" from the webinar series was delivered by Prof. Dr. Josep M. Guerrero. Prof. Guerrero is Director at Center for Research on Microgrid, Energy Technology department, Aalborg University, Denmark.



Second Webinar "Big Data Analytics based on short term electricity load forecasting models for residential buildings in smart grids" from the webinar series was delivered by Mr. Inam Ullah Khan. Mr. Inam is a PhD scholar at Lancaster University, UK.



Third Webinar "Reinventing the wheels" from the webinar series was delivered by Dr. Qadeer Ahmed. Dr. Qadeer is currently working as Associate Professor at Ohio State University. Dr. Qadeer has been awarded OSU's Lumley Research award (2018) and SAE's Buckendale award (2019).



Fourth Webinar "Hybridism of Power Line and Wireless Communication Systems" from the webinar series was delivered by Dr. Moises Ribeiro. Dr. Moises Ribeiro has been an Associate Professor at Federal University of Juiz de Fora since 2015. He co-founded Smarti9 LTD. and Wari LTD. in 2012 and 2015, respectively.



Fifth Webinar "Requirements and Challenges for Provision of Grid Services from Renewable Generation Plants" from the webinar series was delivered by Dr. Kamal Shahid. In 2015, he joined the Department of Electronic Systems (Wireless Communication Network Section), Aalborg University, Denmark as a PhD fellow, followed by the Post-Doctoral fellowship in the same department.



Sixth Webinar "The Green Oil Well of the Future" from the webinar series was delivered by Dr. Saqib Sohail Toor, Associate Professor, Department of Energy Technology, Aalborg University, Denmark.



Seventh Webinar "The Needs and Challenges of Electrical Energy Storage" from the webinar series was delivered by Dr. Ahmed F Zobaa. He is a Reader in Electrical and Power engineering, an MSc Course Director and a Full Member of the Institute of Energy Futures at Brunel University, London.

## Energy Audit Services from ERC

Energy research center is building team for conducting Energy Audits for commercial buildings and industries. In this regard, faculty members from ERC (Dr. Sobia Baig and Dr. Fawad Azeem) have registered for Energy Audit Certification at Excellence in Design for Greater Efficiencies (EDGE). EDGE is an innovation of IFC, a member of the World Bank Group. EDGE focus is to the next generation of green building certification in more than 170 countries. IFC created EDGE to respond to the need for a measurable and credible solution to prove the business case for building green and unlock financial investment. EDGE includes a cloud-based platform to calculate the cost of going green and utility savings. After having the certification, the ERC faculty members will be internationally recognized to conduct energy audit of commercial buildings.

## International Research Collaborations

Energy Research Center (ERC) COMSATS Lahore has taken the initiative to collaborate in the field of energy with research units and universities across the globe. As part of this initiative a research collaboration is going to be established with INERGE Brazil. INERGE, is a research institute under the seal of CAPES / CNPq and FAPEMIG, formed by a group of researchers from the Federal Universities of Juiz de Fora (UFJF), Itajubá (UNIFEI), Rio de Janeiro (UFRJ), Fluminense (UFF) and São João Del Rei (UFSJ). The institute was created with the objective of acting, mainly in the area of Electrical Energy through the development of scientific and technological research with a high quality standard in order to compete on an international level through international cooperation. Prof. Dr. Moises Vidal Ribeiro is the main research collaborator and Director INERGE. Dr. Moses is a Professor at Federal University of Juiz de Fora. He co-founded Smarti9 LTD. and Wari LTD. in 2012 and 2015. He was a Fulbright Visiting Professor at Stanford and Princeton Universities in 2011 and 2012. He was the General Chair for SBrT 2015, 2013 IWSGC and 2010 IEEE ISPLC. His research interests are signal processing, digital communication, computational intelligence, and IoT. He has authored over 200 papers, 9 book chapters, and filed 13 patents. The current collaboration will be initiated with joint supervision of MS/PhD students. The sharing of a list of researchers is the first step in this regard. The research areas focus on signal processing, digital communication, machine learning, physical layer secrecy, energy harvesting, power line communication and wireless communication for smart grids, the Internet of Things and Industry 4.0.

ERC is also collaborating with University of Aalborg, Denmark. Many faculty members from this university have given webinars on Energy from the platform of ERC. Research projects and joint publications particularly on topics related to Energy is the second step in this regard. In future, projects will be executed for indigenous energy problems of Pakistan with the help of their expertise.

## Energy Research Center project selected for second stage in HEC Grand Challenge Fund

Energy Research Center's project titled, "Electric Vehicles Adoption Design Model for Accessible Urban Transportation and Energy Sustainability". The project has passed the first evaluation phase and is in second phase (under review). The project PI is Dr. Fawad Azeem and Co-PI, Dr. Sobia Baig.

## Energy Research Center Conducted an Interactive Workshop on Solar PV Design and Installation under Approved PSF Project

Dr. Fawad Azeem Lecturer, ERC and Engr. Zubair Ahmed from Sky Electric conducted an Interactive Workshop on Solar PV Design and Installation under the approved PSF project. A large number of under graduate and graduate students attended the workshop. The workshop was a blend of Theoretical Knowledge of Solar PV system installations followed by the technical requirements and installation techniques. Dr. Sobia Baig, HoD, ERC concluded the workshop session with her remarks and presented the certificates to the participants.



## ERC Visits to Industries to Strengthen the Industry Academia Linkage

### Accurate (PVT) LTD

ERC team and two members from ECE department visited Accurate Pvt Ltd Sundar Industrial Estate factory for TTSF project in pursuit of industrial collaborator. Accurate Pvt (Ltd) are manufacturers of Conventional Energy meters and smart energy meters. Team visited their lab and manufacturing process. Future plans and collaboration were discussed.



### Crescent Bahuman Limited

ERC team and member from ECE department visited Crescent Bahuman Limited, a renowned textile mill with state of the art infrastructure. Team visited their power plants, their production lines and other auxiliaries. A meeting was arranged with management of the Factory for possible research projects between the university and the industry.

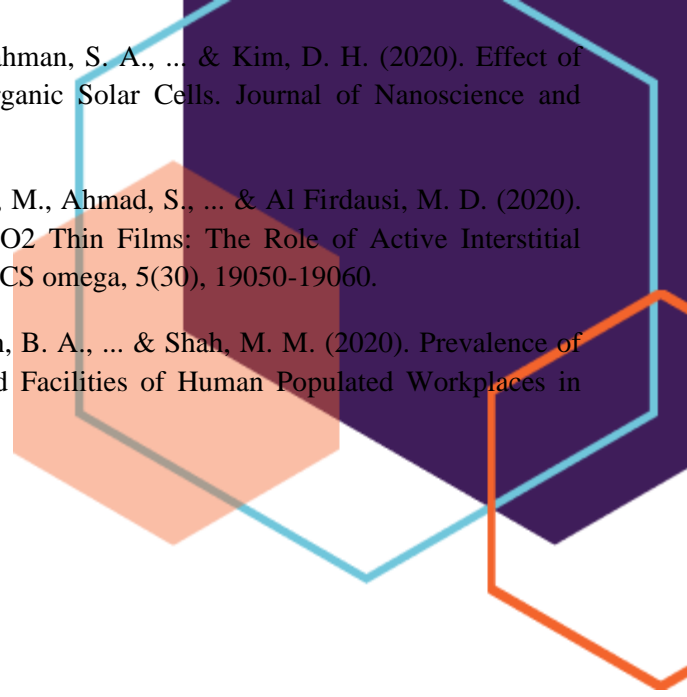




## ERC, Funded Projects

Sr. #	Title of Project	Amount (Million PKR)	Principal Investigator	Funding Agency	Department	Status Approved/Ongoing
1	Implementation and Testing of Microgrid in Rural Communities with Maximum Penetration of Renewable Energy Resources in Pakistan	6.8	PI: Dr. Sobia Baig. Co-PI:Dr.Fawad Azeem	PSF	ECE	Ongoing
2	Analysis of energy storage materials and systems for energy applications	6.4	Dr Tareq Manzoor	HEC	ERC	Approved
3	CFD analysis of engine exhaust system	2	Dr Tareq Manoor	PSF	ERC	Approved
4	Design, optimization based on CFD analysis of combustion of multiphase system in diesel engine	2	Dr.Tareq Manzoor	PSF	ERC	Approved
5	Basic Research and Capacity Investigation for Distributed Bio Energy Utilization via Thermo-Chemical Conversion	8.8 millions	Dr. Doggar and Dr Zakir	PSF	ERC	Ongoing

1. Ali, U., Baig, S., Umer, T., & Ding, Z. (2020). Performance analysis of discrete wavelet transform for downlink non-orthogonal multiple access in 5G networks. *IET Communications*, 14(10), 1666-1674.
2. Masood, B., Khan, M. A., Baig, S., Song, G., Rehman, A. U., Rehman, S. U., ... & Rasheed, M. B. (2020). Investigation of Deterministic, Statistical and Parametric NB-PLC Channel Modeling Techniques for Advanced Metering Infrastructure. *Energies*, 13(12), 3098.
3. Anees, J., Zhang, H. C., Lougou, B. G., Baig, S., & Dessie, Y. G. (2020). Delay aware energy-efficient opportunistic node selection in restricted routing. *Computer Networks*, 181, 107536.
4. Anees, J., Zhang, H. C., Baig, S., Guene Lougou, B., & Robert Bona, T. G. (2020). Hesitant Fuzzy Entropy-Based Opportunistic Clustering and Data Fusion Algorithm for Heterogeneous Wireless Sensor Networks. *Sensors*, 20(3), 913.
5. Azeem, F., Narejo, G. B., & Shah, U. A. (2020). Integration of renewable distributed generation with storage and demand side load management in rural islanded microgrid. *Energy Efficiency*, 13(2), 217-235.
6. Azeem, F., & Narejo, G. B. (2020). A FUZZY BASED PARAMETRIC MONITORING AND CONTROL ALGORITHM FOR DISTINCTIVE LOADS TO ENHANCE THE STABILITY IN RURAL ISLANDED MICROGRIDS. *Facta Universitatis, Series: Electronics and Energetics*, 33(2), 227-241.
7. Azeem, F. (2019). Garbage to Clean Fuel: An Integrated Solution for Karachi. *Engineering Review*, 44(20).
8. Manzoor, T., Gohar, G. A., Jamil, S. R., & Bashir, A. (2020). Integrated thermo—economic analysis of industrial boilers: a cost-effective approach. *International Journal of Energy and Water Resources*, 1-8.
9. Manzoor, T., Zafar, M., Manzoor, S., Manzoor, H. U., Ali, M., & Kim, W. Y. (2020). An improved micro-thermo-mechanics model for shape memory alloys: analysis and applications. *Materials Research Express*, 7(5), 055703.
10. Manzoor, H. U., Manzoor, T., Hussain, A., & Aly, M. H. (2020, January). FWM Mitigation in DWDM Optical Networks. In *Journal of Physics: Conference Series* (Vol. 1447, No. 1, p. 012033). IOP Publishing.
11. Manzoor, H. U., Zafar, M., Manzoor, S. U., Khan, T., Liu, S., Manzoor, T., ... & Ali, M. (2020). Improving FWM efficiency in bi-directional ultra DWDM-PON networking centered light source by using PMD emulator. *Results in Physics*, 16, 102922.
12. Gohar, G. A., Manzoor, T., Ahmad, A., Raza, H., Farooq, A., Karim, I., ... & Asad, F. (2020). Synthesis and investigate the properties of Cu–Al–Ni alloys with Ag addition using powder metallurgy technique. *Journal of Alloys and Compounds*, 817, 153281.
13. Saleem, S., Saeed, A., Usman, S., Ferzund, J., Arshad, J., Mirza, J., & Manzoor, T. (2020). Granger causal analysis of electrohysterographic and tocographic recordings for classification of term vs. preterm births. *Biocybernetics and Biomedical Engineering*, 40(1), 454-467.
14. Manzoor, M. T., Manzoor, T., & Khan, M. (2020). Workplace incivility: a cynicism booster leading to turnover intentions. *Decision*, 1-9.

- 
15. Zafar, M., Khan, S. A., Sher, F., Ali, M., Manzoor, T., Rahman, S. A., ... & Kim, D. H. (2020). Effect of Randomly Grown Morphology of ZnO Nanorods in Inverted Organic Solar Cells. *Journal of Nanoscience and Nanotechnology*, 20(7), 4414-4418.
16. Abbasi, M. S., Irshad, M. S., Arshad, N., Ahmed, I., Idrees, M., Ahmad, S., ... & Al Firdausi, M. D. (2020). Biomaterial-Induced Stable Resistive Switching Mechanism in TiO<sub>2</sub> Thin Films: The Role of Active Interstitial Sites/Ions in Minimum Current Leakage and Superior Bioactivity. *ACS omega*, 5(30), 19050-19060.
17. Nazir, R., Ali, J., Awan, M. O. U., Akca, G., Zeb, I., Amin, B. A., ... & Shah, M. M. (2020). Prevalence of Diversified Antibiotic Resistant Bacteria within Sanitation Related Facilities of Human Populated Workplaces in Abbottabad. *bioRxiv*.