

Special Issue Devoted to Selected Papers from the International Conference of Young Scientists on Innovative Applied Renewable Energy Researches (ICYS- ARE 2015)

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Editorial:

The International Conference of Young Scientists on Innovative Applied Renewable Energy Researches (ICYS-ARE 2015) was held at the German Jordanian University during May 18-20, 2015. It aimed at bringing young working in the renewable energy related fields together to exchange experiences and join efforts to promote the implementation of renewable energies. ICYS-ARE 2015 invited and supported the participation well-known international professors, Jordanian young scientists/ professors working abroad and international young scientists to meet and talk to local early career young scientists, graduate students, faculty members and professors on up-to-date research results and to familiarize with international colleagues' innovative applied renewable energy researches. ICYS-ARE 2015 presented contributions describing the latest scientific and technological research results on Concentrated Solar Power (CSP) systems, Solar thermal systems, Renewable energy for electricity generation, Biomass and biofuels, Energy management and efficiency, and Nano-Energy. It highlighted the importance of innovation in the generation of technologies and in the promotion of sustainable development. In addition, during the ICYS-ARE 2015 an intensive workshop on Energy Efficiency & Management was organized for students as well as conference participants. Furthermore, as ICYS, is a great venue for local scientists and researchers, a round table for local scientists and decision makers was organized with their counter arab and international colleagues to discuss on "Brain-Drain" to "Brain-Gain": Challenges and Opportunities. During this event the phenomenon of brain drain that faces developing countries like Jordan was discussed and opportunities to establish a collaboration between researchers in Jordan with those working abroad in areas that are a priority to the country including renewable energy, technology transfer, research, and training were explored and reviewed.

ICYS –ARE2015 aims and activities

From the beginning, ICYS committee set several aims and proposed innovative methods to satisfy the targets. Our first principal aim was promoting the exchange of information, ideas and experiences between young scientists and senior scientists in innovative applied renewable energy research. Conference sessions were organized to be on the most recent renewable energy topics including concentrated solar power, solar thermal systems, renewable energy for electricity generation, biomass and biofuels, energy management and efficiency, and nano-energy with invited talks on each topic. The sessions were arranged so that we can offer the young researchers a great opportunity to listen and interact with distinguished professors in the field in addition to giving them the chance to present their own recent research results in that field. Invited professors presented their recent research results and exchanged their experiences with the young scientists and local faculty members successfully. Information on invited talks are summarized in Table 1.

Table 1 List of invited talks

- **Factors Affecting the Performance of Double-Sloped Single-Basin Solar Still using Heat Absorbing Materials** by Prof. Bilal Akash, Dean, School of Graduate Studies and Research, American University of Ras Al Khaimah, UAE
- **Fuel Cells** by Prof. Martin Kaltschmitt, Institute of Environmental Technology and Energy Economics, Hamburg University of Technology , Germany
- **Sustainable System Solutions: RAK Research & Innovation Center** by Prof. Mousa Mohsen, Dean, School of Engineering, American University of Ras Al Khaimah, UAE
- **Co-generation of Electricity and Desalinated Sea Water using Concentrated Solar Power: Promise & Challenge** by Prof. Costas Papanicolas, CEO of CREF and President of the Cyprus Institute, The Cyprus Institute, Cyprus
- **Recipes for NanoEnergy Generacitor**, by Prof. Yousef Haik, Associate Vice President Graduate Studies, Qatar University, Qatar
- **Enhancement of the Photovoltaic device performance by using anti-reflection coating, plasmonic, and hydrophobic effects** by Prof. Omar Manasreh, Optoelectronics Research Lab, Department of Electrical, Engineering, University of Arkansas, USA
- **Development of an Egyptian Prototype CSP thermal loop** by Prof. Adel Khalil, Mechanical Power Engineering Department, Faculty of Engineering, Cairo University, Egypt
- **Nanoparticle Enhanced Solar Cells** by Nano Electronics and Photonics group, Masdar Institute of Science & Technology, UAE

The second principal objective is encouraging and attracting local and international young scientists to participate effectively in the conference. According to our statistics, 72 % of the ICYS participants were young scientists of less than 40 years old. Among them were 21% PhD students, 31 % master students, one bachelor student, and the others were faculty members (Fig. 1).

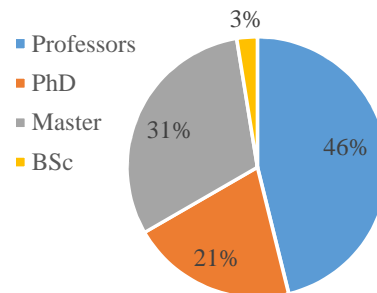


Figure 1. Statistics of ICYS participants according to academic position

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ICYS received about 45 submissions as full papers or abstracts. Participants were from different countries including: Algeria, Cyprus, Egypt, Jordan, Germany, Palestine, Qatar, Saudi Arabia, Tunisia, Austria, Turkey, UAE, UK, and USA which provided diversity in experiences and make it as an important opportunity to make contacts with colleagues from respected scientific research institutions towards further collaboration, training, studying and consultation opportunities. 89% of the submitted studies were accepted. The third principal objective was training under graduate, graduate student and early-career researchers on the recent and basic concepts in renewable energy. For that, an intensive workshop on Energy Efficiency & Management Workshop was organized. On the other hand, this unique opportunity was utilized to invite decision makers, local and international researchers to a round table where they can conclude the conference and discuss on "Brain-Drain"/ "Brain-Gain" Challenges and Opportunities. More details about these two events are as follow:

Energy Efficiency & Management Workshop

Innovative research on renewable energy technologies is a hot topic and becomes attractive and of high interest worldwide. During last few years, due to its economic sequences and environmental effectiveness, the implementation of renewable energy technologies gained a momentum worldwide, where several national and regional incentives and support programs has been successfully executed. This workshop was intensive and targeted on introducing the students as well as young conference participants the main topics in energy efficiency and management. Dr. Ismail Al-Hinti, who is a young Certified Energy Manager and a key expert in energy efficiency and renewable energy, presented the participants the following most important topics in the field from his own long academic teaching, research and industrial experiences:

- Introduction to energy efficiency and management.
- Energy conversion calculations.
- Energy benchmarking and electricity tariff structures.
- Conservation strategies and opportunities in lighting systems.
- Conservation opportunities in building envelope.
- Conservation strategies and opportunities in HVAC systems.
- Thermal energy storage.
- Power factor correction.
- Motor performance evaluation and conservation opportunities.
- Energy conservation opportunities in compressors & pumps.
- Boiler performance evaluation and conservation opportunities.
- Evaluating heat recovery potentials.

"Brain-Drain" to "Brain-Gain": Challenges & Opportunities round table

Brain-drain phenomenon is a serious issue facing developing countries like Jordan. Thousands of our graduates and researchers in areas like technology and medicine leave to work abroad. Many of them become experts in highly advanced fields. While attracting them to the country can be difficult mainly due to the limited available resources, a link should be established such that they can contribute directly to important issues facing our country including renewable energy, water, research and development, education, and training. This round-table addressed the possibility of establishing such a framework to support talented researchers in Jordan and reduce the possibility of them leaving the country. In addition, the integration of Jordanian, international and Arab researchers working abroad in local research activities will accelerate the research and strengthen the quality of the work. Moreover, such collaboration will promote our reputation in the academic community and will be a step in bridging the gap between developing and developed countries.

The round table discussed issues with invited conference attendees, decision makers, and funding agencies were on:

Technology Transfer: Renewable Energy, Nanotechnology

Research infrastructure in Jordan strengths and limitations: Available resources for research in Jordan, Local funding resources, Research and development in industry, Policy making (National Center Research & Development/Higher Council for Science & Technology),

Possibilities of collaboration in emerging research areas: Mutual research projects, International funding resources, Training and bilateral research fellowships for Jordanian researchers

The round-table included a presentation about the Jordanian Scientists and Technologies Abroad, JoSTA Network, given by Eng. Isam Mustafa from the "National center for Research and Development/Higher Council for Science and Technology (HCST)". He introduced the vision of "Jordan as a hub for industrial firms and research centers". The HCST project aims

towards realizing their vision by initially testing the feasibility of reverse the brain drain of Jordanian scientists and technologists through making the JoSTA network (<http://josta.gov.jo/?q=en>). HCST motivating researchers working abroad to register and join efforts with local scientists and apply for collaborative research proposals and concepts.

These concepts will be presented in a conference in Amman that gathers local and Jordanian colleagues working abroad together to present their ideas. This network should then allow supporting selected joint research and development projects aims at building capabilities of Jordanian human resources in the field of science, technology and innovation. Such projects should also allow to develop the infrastructure of scientific research and technological development, to assist the organizations of the different economic sectors, and to create new start-up businesses and therefore new job opportunities for Jordanians

After the presentation, round-table issues were discussed thoroughly and attendees agreed on the following recommendation:

- Supporting and encouraging micro projects
- Supporting invitations of researchers from abroad for short-time period to conduct joint research in Jordan.
- Supporting current available "national" industrial capabilities and technologies and then step forward in development Governmental support of private industrial sector, financially and politically, to encourage the private sector to upgrade its technology
- Increasing the graduate programs to increase activities in research and development by more master and doctoral students
- Initiating the concept of shared laboratories
- Supporting and increasing the role of "scientific research support fund (SRSF)"
- Increasing the number of scholarships for graduate studies
- Qualifying the administration staff working at research centers/ institutions
- Initiating a fast and effective communication lines with international/ regional research centers, institutions and agencies that are very open to exchange expertise, facilities access, and co-advising, internships.
- Focusing on research collaboration more than infrastructure advancement
- Decreasing teaching load to save more capacity for research and development activities
- Promoting the research culture to give more respect to time and fast responding to emails
- Encouraging the establishment of research groups based on interdisciplinary research interests

ICYS-ARE was a very exciting event where it provided a great opportunity, especially for young scientists, to make contacts with colleagues from respected scientific research institutions towards further collaboration, training, studying and consultation opportunities.

It opened new windows of hope for better research in the region. It showed that the financial support issue is not the main issue in Jordan. The Scientific Research Support Fund (SRF), German-Jordanian University (GJU) and the office of Naval Research Global (ONRG) provided a great financial support for the conference.

I believe the next steps for the young generation, in addition to above recommendations are promoting the impact of research on the country economics and future, taking the initiatives towards new innovative joint research collaborative projects with local as well as international colleagues, attending more conferences and meetings in the field of interest, targeting projects of top-priorities for the country, conducting fast and clear communications with partners, funding agencies and assistants, contributing positively to the research community in the country, region and over the entire world, and exploring research opportunities and share them with the network.

The editor of this special issue would like to express his deep thanks to the authors for their efforts in providing a full version of their papers. Deep appreciation is also extended to the reviewers who helped in the reviews for Int. J. of Thermal & Environmental Engineering and to the Coordinating Editor and Editor-in-Chief of the journal, Dr. Bilal Akash, for his continuous support during the submission process and his willingness in giving us the opportunity to edit this special issue.

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