ERI President Statement

On the 30th anniversary of the Electronics Research Institute (ERI), Ministry of Higher Education and Scientific Research, we are proud to sponsor this supplement, and present it to the international readers and researchers all over the world. This is a new and unique opportunity for ERI to provide a broad description of its research, scientific platforms, collaborative innovation, international cooperation, talent, achievements, ongoing projects, and future visions to the global research community.

The ERI is transferring to new premises that include new laboratories, hosting technological incubators, small and medium enterprises in the field of electronics industry, and the halls dedicated to hosting international conferences, workshops, and specialized seminars.

ERI introduced Science and Technology Park for Electronics Research and Industry "STPERI". It is located on an area of fifty-five thousand square meters of buildings (55000 m^2) in front of Cairo international airport in East Cairo.

The STPERI is expected to help in the increase of the Gross Domestic Product (GDP) in the Egyptian electronics industry.

STPERI will establish a successful business model consisting of technology R&D, incubation (Tarieic incubator), venture capital, and an industrial cluster) DLMEI) to support the rapid development of innovative high-tech enterprises.

STPERI will also include a clean room fabrication facility, which will be established on an area of one thousand and eight hundred square meters (1800 m^2). This enables ERI to engage in the development and manufacturing of Micro electro mechanical(MEMS) as well as intelligent sensors in the micro and nanotechnology to be unique facility at the area of Arab and African region.

ERI is being established an industry 4.0 training center including fields of cloud computing, big data, artificial intelligence, natural language processing, robotics, nanotechnology, IoT, smart cities and self-control vehicles.

The innovation center "TARIEIC" was established by the ERI with the support of the Egyptian Academy of Scientific Research and Technology "www.tarieic.sci.eg". TARIEIC aims to work in new fields as well as in governmental urgent national fields such as: the new and renewable energy, smart sensors, and the environment and food challenges.

TARIEIC also aims to solve some existing industrial problems and challenges by inviting the owners of innovations and emerging projects in the field of electronics to obtain technical and financial support.

DLMEI, "The National Alliance to Deepen Local Manufacturing in Electronics industry" contributes and develops production in the national industrial sector through establishing strong links among research centers, universities, industrial institutions, NGOs, small and medium enterprises "www.dlmei.sci.eg".

I express appreciation to my colleagues whose efforts made all this possible.

We encourage future collaboration between ERI-STPERI and all the entities around the world for the benefit of all of international collaboration for Electronics Research Development.

Prof. Hesham Eldeeb

Electronics Research Institute in brief

The Electronics Research Institute (ERI), established by the Presidential Decree No. 38 in 1989, is one of the specialized institutes affiliated to the Ministry of Scientific Research, Egypt. The institute is considered an experience house for conducting studies and research in the fields of electronics engineering, communications, computers and systems, informatics, and new renewable energy.

ERI is composed of seven research departments mainly: Research Informatics, Computer and Systems, Power Electronics and Energy Conversion, Microelectronics, Photovoltaic, Microwave Engineering, and Microstrip Department. ERI has two specialized centralized laboratories: one for the nanotechnology applications, and the other for cloud computing and high-performance computing.

ERI has more than two- hundred and eighty research staff members, making it one of the largest research institutes in Egypt in the field of electronics engineering.

An area of seventeen-thousands of square meters was allocated to constructing the new premises of the institute at the beginning of Cairo-Ismailia Desert Road (EL-Nozha El-Jadida district, Cairo). The total requirements for various laboratories and services from the allocated area reached about fifty-five thousands square meters, including a clean room building which represents the nucleus of a national center for the design, development, and marketing of micro-electromechanical systems (MEMS) and nano electronics technology .The allocated area also includes other specialized labs such as: Antenna testing lab, robots lab, printed card lab, power electronics and microelectronics lab, microstrip and radio frequency-operated communication circuits lab, and other labs for computing and informatics.

ERI Achievements (2016 - 2019)

1. Starting the establishment of Science and Technology Park for Electronics Research and Industry (STPERI) after the issuance of law of incentives for science, technology and innovation No. 23 in 2018 .

2. Gaining the management of the National Alliance to Deepen Local Manufacturing in Electronics Industry (DLMEI) with fifteen partners from the key players in electronics from the Egyptian universities, research and industrial bodies.

3. Implementing the smart meter industrial product with the cooperation of faculty of engineering, Cairo university, the Egyptian electricity holding company, the Egyptian water holding company, and the Egyptian gas holding company.

4. Implementing the solar energy converters industrial product with the cooperation of both the AUC and Sola Company.

5. Developing and implementing the industrial product of a security system for museums using electromagnetic waves.

6. Launching the first specialized business incubator in Egypt in the field of electronics " Tarieic ". Tarieic is belonging to the ERI and supported by the Egyptian Academy of Scientific Research and Technology through its (Intilac program).
The main goal of this program is to adopt an umbrella for establishing technological incubators that contribute to the development of the culture of innovation for the sake of electronics industry in Egypt focusing on the research related to health, energy, environment and information technology.

7. Launching the «Pre-Tarieic» program which aimed at supporting the graduation projects for students from the faculties of engineering as well as the faculties of computers and information from all the Egyptian universities.

8. ERI is currently carrying out two promising projects. The first project addresses the topic of building digital video libraries, which is of great national importance for the preservation of the audiovisual national heritage. The second project involves using the virtual reality technology for tourism in Luxor.

9. Establishing an accredited lab for Lab VIEW, which is a system-design platform and development environment for a visual programming language from National Instruments, to serve the scientific research and industry.

10. Establishing a datacenter at the new Institutes, headquarter to help in producing the required reports and statistics, which aid in the decision-making process.

11. Developing the TICO offices for cooperation with the industry and intellectual property conservation, resulting in producing the energy-saving LEDs (green energy and environment friendly lightening devices).

12. Automating the ERI research, administrative, and financial affairs systems, which contributes to present the required reports and statistics quickly and with high quality.

13. Signing up agreements with some local and international bodies to increase communication with the scientific and international communities.

14. Updating the infrastructure of the ERI network, which contributes to the development and improvement of performance and communication with the outside world.

15. Providing the ERI with some original computer programs that help the research staff in executing their tasks, and maintaining the intellectual property rights

16. Training the employees to use the modern techniques in performing the administrative and financial tasks assigned to them, which positively affect on the performance .

17. Developing a system for ERI internal projects and forming a committee dedicated to them to determine the status of each project, setting instructions and taking the procedures related to their arbitration, financing, and follow-up.

18. Completing the preparation of three buildings in the institute's new premises: A, B, and S; and completing their infrastructure such as electricity, water, fire, and sewage systems for all the buildings, which are estimated to have a total area of fifty- five thousands of square meters.

19. Signing up a contract for completing the preparation of the remaining two buildings (C & D) with total cost of six- hundred millions of Egyptian pounds.

20. Establishing and developing specialized training halls in different fields of electronics at the new headquarters.

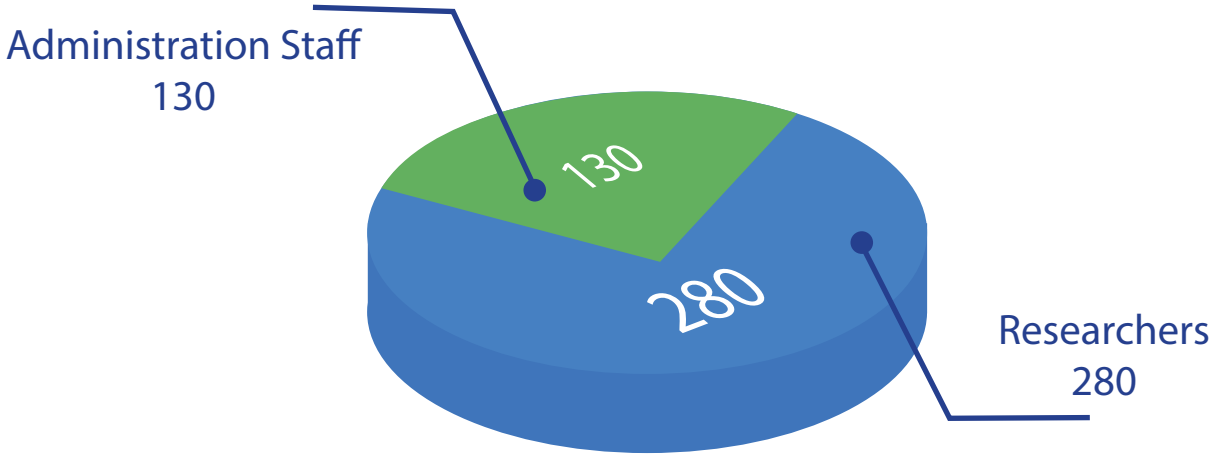
21. Conducting a competition for giving accredited awards based on the key performance indicators for the staff members and their assistants. The data of each applicant is extracted and the result can be calculated from the E-Science database. Distinguished persons from the general employee staff have also been honored according to the adopted specific criteria.

22. Launching the initiative experiment «Twasol,» the purpose of which is to communicate with the research committee members currently existing outside the institute to exchange views and ideas. This is important to promote the institute in the field of scientific research, link research to industry in order to maximize the return of scientific research, Push the national economy, and keep up with the latest trends and technologies in the scientific fields adopted by the institute.

23. Two documentary films were produced by the ERI to identify the transfer from the old buildings to the new one , and a detailed presentation of all projects in ERI https://youtu.be/xucpwrlci-g

24. ERI participated in the Global Forum for Higher Education and Scientific Research, which was opened by His Excellency Mr. Abdel Fattah Al Sisi, The President of Egypt and sponsored by the Ministry of Higher Education and Scientific Research.

Research and Administration Staff



ERI Research Departments and Specialized labs

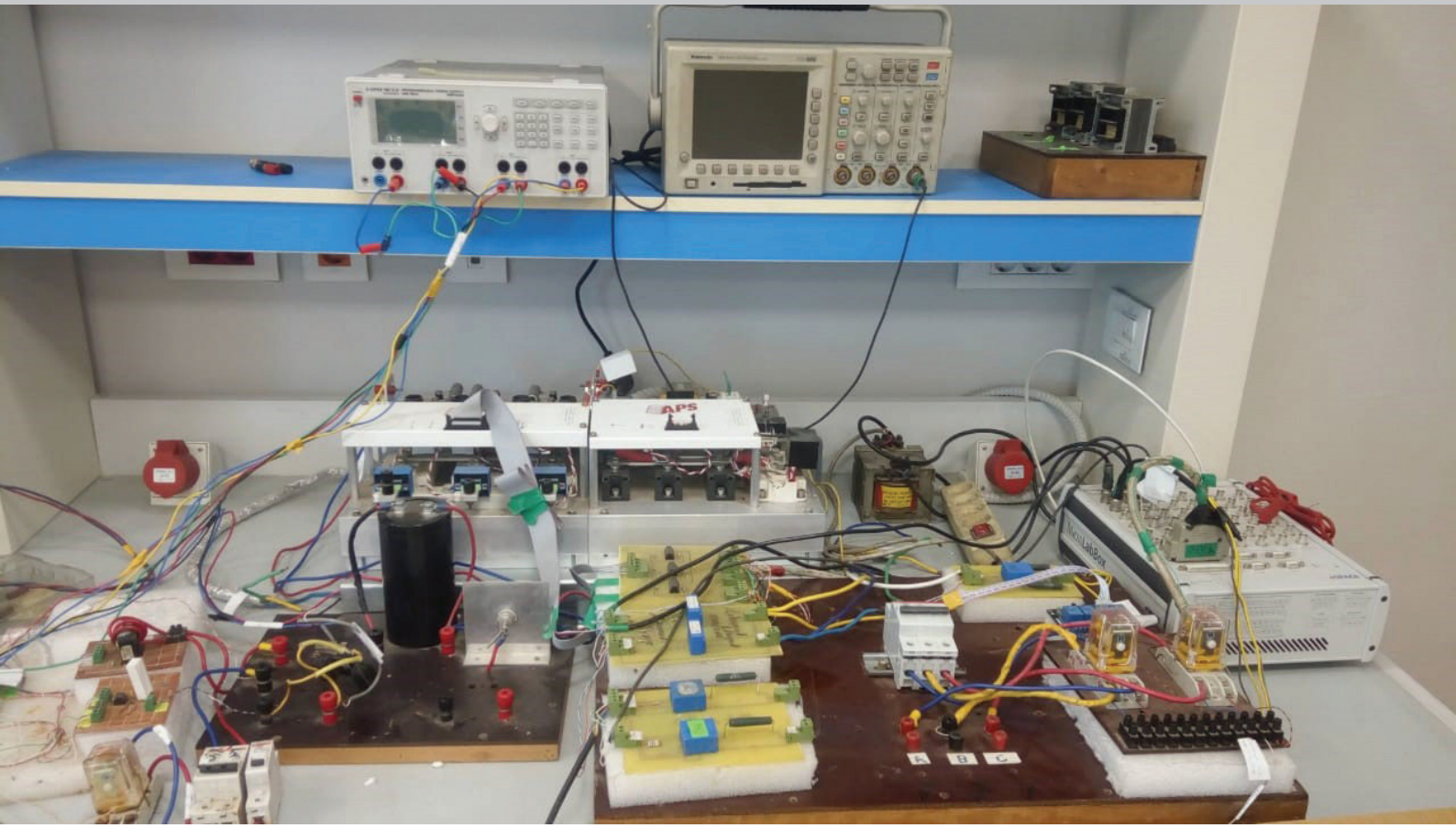
ERI consists of seven research departments covering all the disciplines related to the electronics research field. The departments are: Computers and Systems, Informatics, Microelectronics, Microstrip, Microwave Engineering, Photovoltaic, and Power Electronics and Energy conversion. The labs are concerned respectively with Nano technology and Cloud and High performance computing.

Computers and Systems Department

It includes 72 staff members and aims to do innovation and progress to build the knowledge society using the state-of-the-art of technologies, computer networks, high-speed Internet, high-performance computing, cloud computing and database building. It aims also to provide solutions to some problems of interest to the community, directing the research points to implement applied research projects, training, consultancy, capacity building, cooperation with external bodies, etc. The department research areas include: digital signal processing, bio-medical engineering, artificial intelligence, & its applications, communications & computer networks, automatic control and others.

Power Electronics and Energy conversion Department

It includes 60 staff members and aims at being a center of excellence in the field of power electronics and energy conversion at the national, regional and global levels. It is also concerned with conducting the applied and basic research in the field of electric power transmission, deepen the national capacity to develop added value, productivity and quality in the industry, energy generation and transmission systems. The department research areas include: electrical machines & drives, control systems, renewable energy systems, wind energy, factory automation, electrical and hybrid vehicles, and smart grid. Among the department research areas that have outputs, the power electronics. Department also involves the design, preparation, processing, testing and performance improvement of various electronic transformers. Electronic reflectors are used in high performance electric motors, advanced power sources, feed sources of emergency, electronic transformers for lighting lamps, and others.



Microwave Engineering Department

It includes 25 staff members and aims at developing leading research and innovations in the fields of antennas, electromagnetic wave propagation, scattering and diffraction problems, optics, optical communication hardware and other problems related to microwave circuits and systems. The department research areas include: the spread of electromagnetic waves in the atmosphere and ground layers (for geophysical exploration such as groundwater and minerals), applications of microwave communications such as satellite and radar communications, microwave components, antennas, radar dispersion ,and others.

Microstrip Engineering Department

It includes 31staff members and it provides, through the unit of special nature at the Institute, multiple services to the scientific community in Egypt which generate reasonable income for the Institute. The services include: supervision of scientific theses, technical consultation, training, design of non-active microstrip and microwave circuits using the latest software packages such as HFSS, CST Microwave Studio, Zeeland IE3D, design of active microstrip and microwave circuits using the latest software packages such as ADS, APPLAC, etc. The department is also concerned with the microstrip circuits fabrication using photolithographic technology, and the practical measurements of the manufactured circuit using the devices of the department's measurement laboratory such as the microstrip directional analyzer. The department research areas include: antennas, the components of negative properties, active components, and fiber optics, and others.

Photovoltaic Department

It includes 22 staff members, and aims at developing interdisciplinary applied research in the field of solar energy and other new and renewable energy systems and its various applications. The department also aims to develop specialized research staff, establish direct cooperation with industry partners, and contribute to future development in Egypt in all areas of life such as agriculture, industry, electricity, petroleum, telecommunications, etc. The department is also interested in conducting research and applied projects, and providing engineering services as well as consultancy in the department research fields. The department research areas include: design of solar systems for isolated places, connecting solar systems to the public network, and production of prototypes of hybrid solar energy systems with diesel generators. The Department also involves design and implementation of local solar emulators to measure the properties of solar cells and panels, design circuits and control systems for solar cell systems, new and renewable energy systems of all types and applications, solar thermal systems and their applications, measurement, collection and analysis of various weather variables, development of follow-up and operating programs for single or wired/ wireless hybrid solar systems .

The department is also interested in using the latest microprocessors that can be linked with modern programs such as LabView, and others.

Microelectronics Department

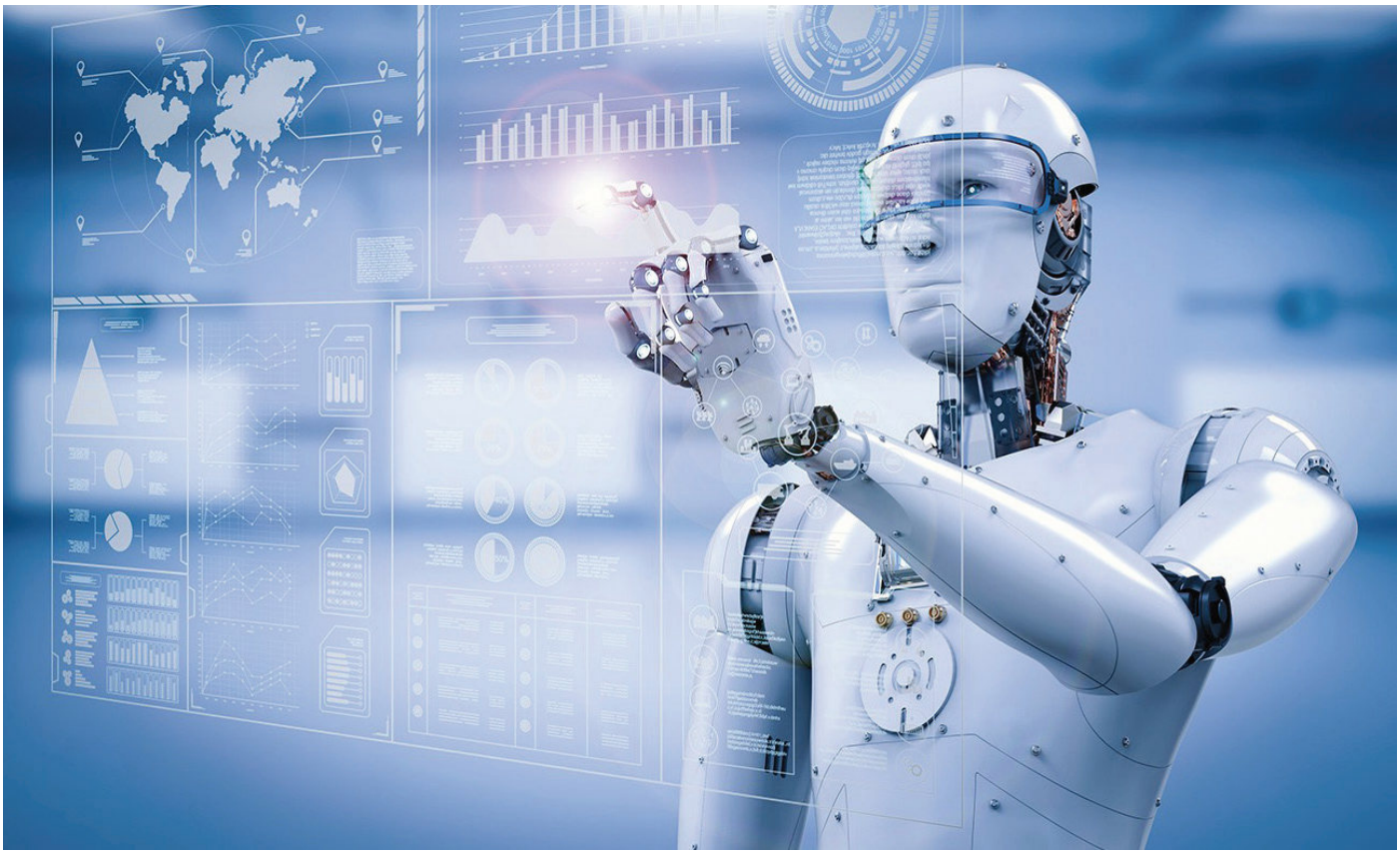
It includes 27staff members and aims at conducting research in the design and implementation of integrated circuits, which can be implemented in three phases:

1. Design and implementation of integrated circuits susing computer aided design programs (Analog, Digital, Mixed Signal, RFI and MEMS).

2. Production of integrated circuits by sending the designs to specialized manufacturing houses.

3. Tests and measurements.

The department also gives a focus on linking and applying these researches to the industry and comprehensive development. The department research areas include: Micro and nano system technology (NEMS-MEMS), integrated circuit design and representation using computer aided design, programs, design implementation and manufacturing of integrated electronic systems and others.



Informatics Department

It includes 35 staff members and aims to conduct studies and technological researches in the fields of computers and information technology .The department also proposes and implements projects to provide solutions from a computer perspective to some of the problems of different sectors, cooperation with scientific institutions and universities for technology transfer and carrying out the researches of M.Sc. and Ph.D. Theses .The department aims also to be an expert house in the field of information technology. Moreover, the department also involves encouraging innovation, creativity and scientific research, as well as outstanding high quality scientific publishing. The department research areas include: language engineering and computational linguistics; machine learning and computational intelligence; systems modelling and simulation; high performance computing; cyber security, privacy, and identity management; computer vision and multimedia technology; software engineering, embedded systems and mobile computing; education, health and business informatics; soft computing; and quantum computing recently.

Cloud and High-performance Computing Center of Excellence

The Scientific Cloud Computing Center, the first of its kind in the Egyptian research institutes, was founded by ERI to serve the research community in Egypt, exploiting the fund offered by the STDF. It was established to provide the center with the required facilities, administration, and infrastructure, and the cooperation with the city of Scientific Research and Technology Applications (SRTA-City) in Burj Al-Arab-Alexandri (SRTA), where SRTA city hosts an operational clone of the center, each center backups the other one for disaster recovery.

The increasing demand for computing power is causing the need for high-performance computing (HPC) and cloud computing where some scientific applications involve the construction of mathematical models and numerical solution techniques to solve scientific, engineering, and social problems. These models often require a large number of computing resources to conduct large-scale experiments or to reduce computational complexity within a reasonable time frame. Examples of the applications including but not limited to; health applications (liver disease, heart disease, kidney disease, cancer, stem cells, and human genetics research), industrial applications (textile, biotechnology, and metal industries), pharmaceuticals (biologically active substances and pre-clinical and clinical trials), theoretical physics, mathematics and space, desalination, solid waste management and so on.

The HPC team at ERI has established a unique cloud computing center that aims to enhance the expertise of cloud computing research team. The team members study and explore various models of high-performance infrastructure. Cloud computing will address several problems in scientific research. In addition, research studies will be carried out to develop a prototype of commercial middleware with appropriate features and capabilities for different communities. The experience gained by the team members allowed ERI to gain this center of excellence project from ASRT. The Center of Excellence to be eventually able to serve the scientific community in different research centers and universities in Egypt.

Services of the Center of Excellence:

The center provides for the Egyptian researchers a variety of services that entirely cover cloud computing, from the hardware level to the applications level, and accounting on the amount of consumption. Another important thing that scientists can take advantage of is the ability to expand the infrastructure of computing by increasing or decreasing according to application requirements and available budget. Using the cloud computing, scientists can easily access a large infrastructure and customize their environment, this providing optimal settings for their experiments.

The center provides many services to the scientists such as: virtual machines with different operating systems, tools and compilers, e.g., MATLAB, Microsoft Visual Studio, Microsoft office, MPI, etc., installing packages or software tools needed by served community, providing the served community with Mail Servers and Data Centers, and offering different HPC infrastructure such as Graphical Processing Units (GPUs) and cluster nodes for intensive data scientific problems.

Main Specifications of the Center of Excellence

- 430 TB Storage
- 38 Physical Processors
- 304 Physical Cores
- 3200 GB Physical Memory
- 6 GPUs

Nanotechnology Specialized Laboratory

The Laboratory of Nanotechnology Applications of the Electronics Research Institute, in short called the Nanotechnology Lab, is interested in one of the most important technologies that serve diverse research fields in agriculture, medicine, and many other domins. The Nanotechnology Lab, in collaboration with the various ERI departments, contributes in the process of providing, measuring, and shaping materials at the nanoscale to obtain advanced electrical and electromechanical components. This is important to serve the community and industry in research and development in the different areas of electrical and electronics engineering.

The laboratory contains a number of state-of-the-art devices of nanotechnology such as Plasma-Enhanced Chemical Vapor Deposition (PE-CVD) equipment, material micrometric-plotter, rotary deposition system, and burn furnace up to 1200 °C.

The laboratory also contains a four-dimensional Computer Numerical Control (CNC) for metal drilling applications with mechanical grinding machine to grind solids to reach the nano size, microwave reactor to break down materials using chemical thermal ways to reach the nano size.

Services of Nanotechnology Lab:

The laboratory prepares nanometric materials required for research and development in the fields of electronics and electrical engineering. It also forms these materials for manufacturing preliminary samples. The laboratory also conducts researches and studies in the areas related to nano-materials in electronics and electrical engineering, and provides consultancy and training for those working in this field.

International Journal of Electrical Systems and Information Technology

JESIT

JESIT is an international refereed journal seeking innovation, creativity and novelty in theory and applications of the electrical engineering and information technology fields. The journal is published and produced periodically three times annually hosted by Elsevier (from Jan. 2014 to Dec. 2018) and Springer (hence forward Jan. 2019) on behalf of ERI which is responsible for the peer review process. The JESIT Editors-in-Chief are Prof. M. Said Abdel Moteleb from Arab Republic of Egypt and Prof. Stefan Kozak from Slovak Republic. A pattern of JESIT issue is located at:

http://www.journals.elsevier.com/journal-of-electrical-systems-and-information -technology/recent-articless

Springer

Joint International Conferences

IEEE-ACCS & IEEE-PEIT

Two joint international conferences "Advanced Control Circuit and Systems",
IEEE-ACCS and "New Paradigms in Electronics and Information Technology",
IEEE-PEIT are periodically organized every two years since 2005 by ERI under the presidency of Prof. Hesham El Deeb, the head of ERI. These forums present the state of the art in the novel directions of automatic control, electronics, information technology and application fields, also explore the current theoretical developments as well as applications to engineering problems in a wide variety of sectors by providing an integrated round for scientists in these areas.
These conferences represent a distinctive model for the developed mutual cooperation between the Electronics Research Institute in Cairo, EG and the Slovak Technical University in Bratislava, SK.The last event, 5th ACCS'017 / 4th PEIT'017 was held in Alexandria on Nov. 2017 while the next event 6tACCS'019/ 5th PEIT'019 will be held in Hurghada on Nov. 2019. Both events are under the auspices of Prof. Khaled Abdel Ghafar, the minister of high education and scientific research.


HENRY SAMUELI

Major National & International Activities

The ERI has signed up many cooperation agreements with a number of national and international authorities, universities, research institutes, and industrial bodies, forming the network that help in improving and increasing the research benefits.
The agreements have been signed with national and international organizations such as:

- Nanotechnology center at the American University in Cairo (Egypt).
- Kobe University (Japan).
- The University of California, Irvine (USA).
- University of Waterloo (Canada).
- Al-Ahram Canadian University (Egypt).
- Hanabat National University (Korea).
- Ningxia University (China).
- North Minzu University (China).
- Great Wall Enterprise Consultant (China).
- Prince Sultan Center for Defense Studies and Research (Saudi Arabia).

Examples of Internal Projects at ERI

In the Renewable Energy field:

- Design and implementation of a wind- turbine emulator.
- Prototype for a smart solar photovoltaic emulator system.
- Typical station for a solar energy system, hybridized from Photovoltaic cells, diesel generator, and batteries.
- Design and implementation of single phase grid connected PV system.
- A system of nano-grids depending mainly on the distribution of energy as a continuous current.

In the Artificial Intelligence field:

- Using intelligent agents and Arabic natural language in education.
- Modeling student information to produce personalized-interactive learning software to solve the probabilities questions for the preparatory stage.

In the Microelectronics field:

- Designing a MEMS Gyroscope.
- Designing transmitter and receiver for mobile phones in the frequency field of LTE.

In the Internet of things field:

- Energy Harvesting for Wireless Sensors in the Internet of Things Systems.
- Development of a Prototype Wireless Sensor Network for Precision Agriculture.
- Building a fuzzy logic controller for tracking the maximum energy of the solar system using FPGA.
- Multi-feature fingerprint recognition system using the programmable circuit matrix (FPGA).
- Digital Library Construction Project.
- Synthesis of nano-materials and their applications in the field of electrical engineering.

- **One of the most successful projects that win the Golden medal in the the 5th Cairo International Exhibition of Innovation (CIEI 2018)**

Virtual Tour Summary

Tourism in Egypt has been facing a lot of hurdles lately causing a major decrease in the main source of foreign currencies in the economy. The proposed project ; Virtual Tour (abbreviated as Vir Tour) ; is introducing out of the box ideas to support the tourism industry. 'VirTour' uses state-of-the-art technologies and challenging experiences to promote tourism and site attraction in Egypt. The project digs into new technologies and intangible heritage to produce an innovative solution to the current tourism setback.

VirTour proceeds in three main tracks. The first produces a massive multi-player, multi-lingual gaming platform that introduces various gaming adventure(s) to explore Egypt across space and time. It's a multi-dimensional gaming universe covering Egypt's diverse history and culture. The proposed project was implemented in 18 months, which is comparatively a limited time considering Egypt's enormous historic resources. VirTour focused on intangible cultural event as a starter: the ancient "Opet Festival"; though the platform allows for future expansion.

The ERI National Projects

Due to the importance of national development projects and their impact on the citizens and the country and its economic development, the ERI adopted a number of national projects that fall under its areas of specialization, such as, establishing a science park, forming a national industrial alliance, and building technology incubators.

1.Science & Technology Park for Electronics Research & Industry

(STPERI)

Science & Technology Park for Electronics & Research Industries (abbreviated as STPERI) aims at increasing our (Gross Domestic Product) GDP through the linkage between the Egyptian local electronics industry and electronics scientific research in one place.

About STPERI

• Location : in the industrial zone, in front of Cairo Airport .
• Total area : The area of land about 17,000 m^2 , and the total area of buildings, the laboratories & the various services about 55000 m^2• Current status: it is about to be fully prepared. A Preliminary approval was taken from GAFI to establish it; the approval of the minister of Higher Education and Scientific Research was acquired, and the procedures ttttcompleted.
• Target industrial sectors : electronics & ICT sector
• Available Services: Clean Room (620 m^2), Technological incubators, The design of electronic circuits , Consulting firms in the electronics field , The Conference Hall , The training center and Research Departments & ERI's laboratories.

The Impact of STPERI on Economic Growth

• Help transforming the scientific research to primary products .
• Creating stable mechanisms for linking the industrial sector and research bodies and help in the application and use of advanced technology

• Creating new job opportunities and adding high quality jobs in the technology-based sectors

• Establishing of integrated clusters in the field of electronics industry

• Developing local products and enhancing their competitiveness against the similar foreign products

Advantages of working within STPERI

1- Harmonization of the investment activities in the electronics industry field.
2- Optimal exploitation of the specialized laboratories and the facilities of the research departments from human forces, equipment and tools, for facilitating innovation.
3- Providing a range of integrated services to all projects reside in the city.
4- The projects reside in the city enjoy the advantages and guarantees of the investment law and the freedom to deal with the local market.

STPERI has joined the International Association of Science Parks and Areas of Innovation (IASP) which represents a worldwide network of existing and developing science parks and areas of innovation. The Institute has also fulfilled the requirements for STPERI membership in the World Technopolis Association (WTA). Prof. Hesham El Deeb has been invited in September 2017 to hold a meeting with the Executive Council of the WTA to discuss ways to settle this membership, in addition to attending a workshop entitled "2017 UNESCO-WTA International Training Workshop" and an exhibition entitled "Global Innovation Forum and Hi-Tech Fair." In that workshop Prof. Hesham El Deeb made a presentation about STPERI and its importance in linking the scientific research with the industrial sector.
In the context of interest in international expertise in the field of science and technology parks, the Electronics Research Institute, headed by Prof. Hesham al-Deeb invited the British expert Dr. Malcolm Parry, President of the Scientific City (Surrey) for his experience in managing and working strategies for science and technology parks.
A delegation from the State of Japan visited the Institute. The delegation was headed by Dr. Sisi Quata, President of the Advanced Institute of Industrial Technology, Tokyo.

2.The National Alliance to Deepen Local Manufacturing in Electronics Industry (DLMEI)

In the first quarter of 2016, the Academy of Scientific Research and Technology (ASRT) had directed a call to submit proposals for coalitions with specific objectives to address national problems and build strong connections among research institutes, universities, industrial entities, and the small and medium-sized enterprises. The call focused on establishing groups of partners working to develop innovation in the national industrial sector.

In this context, the Electronics Research Institute (ERI), with the support of the ASRT, has initiated the establishment of a network of strong national competitors in the electronics industry from universities, research institutes, non-governmental organizations, small and medium-sized enterprises, industry entities and governmental entities that support the innovation and the transfer of technology, to solve some urgent national problems in different fields: energy and electricity, solar systems, thermal energy harvesting, sensor and sensing devices in various applications, security systems, etc. The executive phase of the alliance extends from June 2016 to the end of 2019.

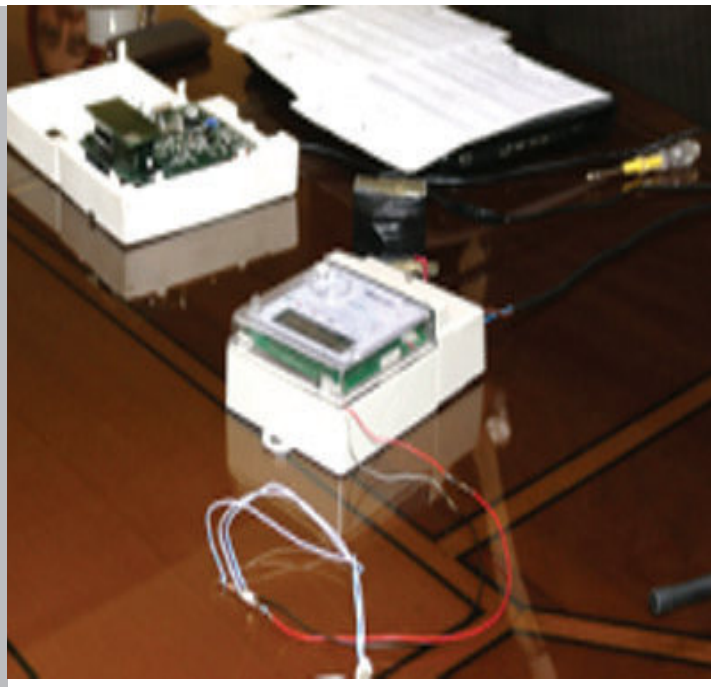
The closing ceremony and products Exhibition of the first phase of the National Alliance to deepen the component and the local product in the electronics industry welcomed Dr. Khalid Abdel Ghaffar " Minister of Higher Education and Scientific Research " and General Dr. Mohammed Al-Assar"Minister of State for Military Production. This event was organized by the ERI as the head of the National Alliance for Knowledge and Technology project with the support of the Academy of Scientific Research.

The alliance aims to raise the slogan "Designed and Manufactured in Egypt" to reduce imports in the electronics industry, which will have a great impact on the Egyptian economy and the increase in the domestic market coverage and exporting abroad. This will also have a positive impact on the society in terms of providing new job opportunities directly available to technicians, engineers, and workers in the fields of local design and manufacturing, as well as indirectly through the industrial sectors and foundations related to electricity and energy sectors, and sensors in the medical, security, and petrochemical fields.

Products of the project:

The network of the powerful group of national competitors in electronics industry that was established by DLMEI has resulted in producing seven innovative solutions in the field of energy and sensors in several different applications, as follows:

•Smart Electricity Meters



The developed design includes:

• Upgrading the existing digital meters with a novel communication module.

• Developing Data Transceiver over the RF communication media.

• Providing the Distributed Head-End System (DHES) and Meter Data Management (MDM) functions in different levels.

• PV unit

The Product succeeded in design and fabrication of a mostly local Grid-Tie unit that is very highly competitive to imported products in terms of price and performance. It converts the DC power generated from Solar panel to AC Power usable on the power grid by capacity of 10 KW. It can work on Grid or off Grid.

• Museum Security

This product resembles new commercial compact prototype of the museum security system.

It is divided to two innovations: A Database system for the museum objects depending on the E-pulse print and natural harmonics of each object and perimeter protection system which is an electromagnetic wall that surrounds any show case. It may be used at entrance gates.

• Gas Sensor

The objective of this product is to produce an integrated MEMS sensor that detects toxic gases.

It can be used in laboratories, petrochemical factories and petroleum pipe lines. The proposed sensor consists of a sensing composite immobolized on the MEMS membrance and an MEMS circuit that detects the performance change in the sensing layer according to gas concentration.

• CMOS-TEG Circuit

This product is Thermoelectric generators fabricated as CMOS solid state device that collects heat and converts it into electricity based on temperature difference.

it can be easily integrated on chip level and can fit for low-cost and small-size systems.

• Brain Electrodes

- This product includes the fabrication of implantable neural electrodes for epilepsy and Parkinson treatment.

- These electrodes are used to monitor the brain EEG signal and perform classifications on it to predict whether there will be a seizure or not.

• Bio Sensor

This product is a Microstrip cavity resonator sensor that depends on a micro immun sensing diagonostic assay.

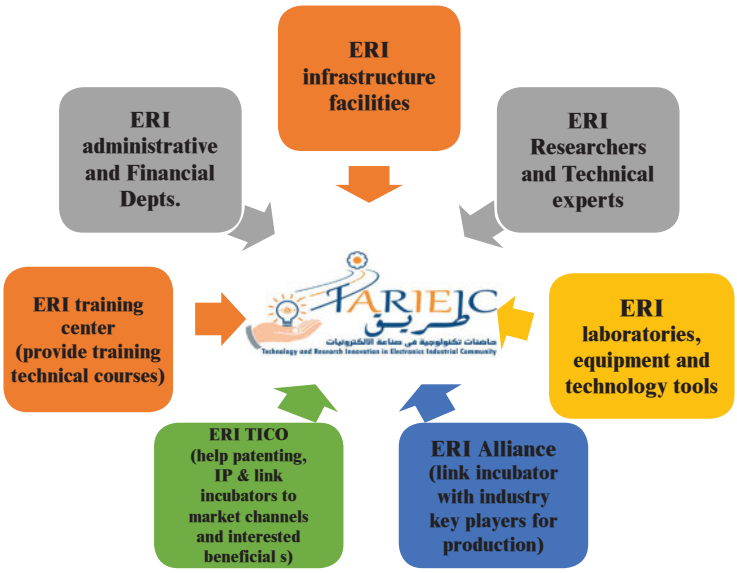
It is based on the classical antigen antibody reaction. It can diagnose through measuring the change in electrical properties in the reflection coefficient, input impedance and resonance frequency of the cavity biosensor.

3.Technology Incubators for Electronics Industry

TARIEIC is the first governmental incubator program specialized in electronics industry hosted and powered by ERI, and funded by the Academy of Scientific Research and Technology (ASRT). TARIEIC has been launched on February 2017 to invest in entrepreneurs, who dreams of building their startups that invent solutions based on Electronics field with a focus on the research areas of strategic goals and objectives of 2030 strategic plan. This includes; but no limited to; Renewable Energy, Smart Sensors IT applications, or A Solution to an Actual Environmental Challenge.

TARIEIC provides the selected entrepreneurs during the incubation period of 9 months with the following:

- **Funding up to EGP 200,000**
- **Access to co-working space and labs to develop prototypes**
- **Provision of industrial prototype creation through technical facilities, equipment, fabrication and measurement tools**
- **Mentoring and coaching from Business and Technical experts**
- **Workshops and training sessions to enhance and expand business skills**
- **Events like fairs and workshops for marketing and connecting with potential investors or domain experts**
- **Help in legal procedures for a company establishment**
- **Accounting management for the purchasing, hiring outsources or importing components**
- **Support in patenting, copyright and intellectual property (IP) rights**



What is introduced by ERI to TARIEIC??

There are mainly seven key tools which are provided by ERI. The tools can generate the added value in the incubation system and that are at the basis of the core activities of the incubator.

TARIEIC has been launched to propose solutions to some problems in the Electronics field. Three cycles have been published till now. 10 startups have been accepted during its first cycle and now they are in the post incubation stage for marketing and production processes. As well as, 5 startups have been accepted during the second cycle and now they are in the incubation stage. The third cycle call has been published in Jan 2019 and now the applicants are in filtration and selection stages.

The technology directions were targeted and covered by incubated startups in TARIEIC through 2 previous cycles 2017 & 2018:

Awards:

TARIEIC awarded 3 prizes during 2018 and 2019, 2 national prizes; from International Cairo Exhibition of Innovation 2018 and from the International Exhibition of Telecommunication and Information Technology (Cairo ICT 2018).

As for the international awards, one of the incubated startup of cycle 2 got the golden prize during itsparticipated in the International Exhibition ofInventions Geneva 2019.