



Editorial

Letter from the Editor-in-Chief of AIMS Electronics and Electrical Engineering journal

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On behalf of AIMS Press and the editorial board it gives me great pleasure to welcome you to the first issue of our new journal AIMS Electronics and Electrical Engineering. This is the first AIMS publication entirely dedicated to this remarkable field, and we predict an exciting future for our journal. The field of electronics and electrical engineering has been an enabling factor for the second as well as the third industrial revolution, and is expected to take a similar role in the fourth industrial revolution.

An industrial revolution is a term referring to a major change, of disruptive nature, in technology and socio-economy. The First Industrial revolution of the 18th century, was characterized by a transition from an agrarian based economy to an industrial one. A major enabling factor for the First Industrial Revolution was the use of steam power triggered by the invention of a practical steam engine. The Second Industrial Revolution began in the middle of the 19th century and is termed as a “revolution of inventions”. Among many inventions, the beginning of the second industrial revolution is characterized by the use of electricity that fundamentally changed technology and culture. Then, the discovery of electromagnetic waves raised a significant interest in using this phenomenon for wireless communication over large distances, resulting in the invention of radio-telegraphy. The progression of innovations in Electronics and Electrical technology culminated with the invention of the transistor by John Bardeen and Walter Houser Brattain, and its theory of operation formulated by William Bradford Shokley in 1948, for which all three shared the 1956 Nobel Prize. The transistor quickly became a crucial component in systems such as radio and TV sets, and enabled the development of electronic equipment for medical use. A revolutionary application of the transistor was in the production of commercial computers. In 1954 IBM demonstrated the IBM 608 that was the first computing machine entirely based on transistors. Along the lines of the

transistor, in 1958 Jack Kilby invented the integrated circuit as a solution to the problem of the large number of transistors required to implement advanced systems that emerged after the Second World War. Among many uses, integrated circuits made possible the development of powerful and economically viable computers for a variety of applications. One application was in computer communication systems, such as the ARPANET in 1971, becoming the Internet in 1989. The Internet combined with advances in digital technology and artificial intelligence are at the core of the Third Industrial Revolution.

The Third Industrial Revolution uses electronics and information technology as building blocks for a profound transformation in technology, socio-economy and culture. Many define the Third Industrial Revolution as the “Information Technology Revolution”, triggered by Claude Shannon’s introduction of Information Theory in 1948, Alan Turing’s introduction of Artificial Intelligence in 1950, and the invention of the transistor in 1948 that made possible the actual realization of innovative systems. Shannon’s work made it possible to quantify the notion of information and its transmission limits. Over the years these concepts have provided the foundations for the design of communication systems, such as cell phones, satellite communication, computer networks, that have come to form an essential part of our lives. Turing’s work essentially defined what an intelligent machine is, forming the foundations for robotics and intelligent systems. Information theory and artificial intelligence could not be used in practical applications without the invention of the transistor and microelectronics technology. The transformative process embodied by the Third Industrial Revolution will come to a climax in the form of the Internet-of-Things that will trigger a Fourth Industrial Revolution.

The Internet-of-Things is a generic term referring to a further development of the Internet that will enable networking of various devices, and not only computers. Consumer products, vehicles, utility components, industrial systems, sensors, medical devices, security systems, and much more, will be connected to a future form of the Internet, enabling these objects to generate, consume and exchange information with very little human intervention. The Internet-of-Things will offer a connected intelligent world, with an integrated relationship between people, objects and the environment. The Internet-of-Things will also induce a disruptive change to the manufacturing processes allowing smart factories to adapt quickly to the ever changing consumer needs. Furthermore, such smart factories will allow working patterns that will optimize productivity and safety, while addressing the individual worker’s needs. This process will trigger the Fourth Industrial Revolution (Industry 4.0), that already now attracts much attention from the research community. The Internet-of-Things vision relies on the belief that the advances in microelectronics, communications and information technology, we have experienced since the end of the 20st century, will continue in the future. This belief is based on the present phenomenon of declining prices and energy consumption, allowing processors and other electronic components to be integrated into everyday objects, transforming them into intelligent devices that can be networked. Research areas that address the subject of the Internet-of-Things include: wireless sensor networks, broadband communication, cloud computing, big data, cyber-physical systems, embedded systems, nanotechnology, sustainable power generation, artificial intelligence, machine learning, robotics, smart cities and smart homes. Such a diverse set of topics create an interdisciplinary research environment, encouraging collaboration and timely dissemination of results. This is where our new journal, AIMS Electronics and Electrical Engineering, will play an important role.

The new AIMS Electronics and Electrical Engineering journal will provide researchers with an

avenue for sharing the results of their work in an open access indexed publication, ensuring maximal dissemination in a timely manner. Indexation of our journal will ensure it is widely available, and will be an indication it became an authoritative source of information. The evolution of the Internet in the 21st century, allowing convenient and wide public access, also enabled the open access approach for scholarly publications. Many governmental organizations made open access mandatory for publications based on publicly funded research. In 2013, a bill on Fair Access to Science and Technology Research was introduced into both houses of the US Congress. The major Canadian research funding agencies, Canadian Institute of Health Research, National Science and Engineering Council, Social Science and Humanities Research, announced in 2015 the “Tri-Agency Open Access Policy” requiring publications based on research funded from public sources be made freely available within 12 months of release. The European Commission (EC) recommended in 2006 that research funding agencies should establish an European policy mandating published articles resulting from EC-funded research be available after a certain time in open access archives, resulting in the project “Open Access Infrastructure for Research in Europe” (OpenAIRE). Also, many universities mandated open access: Massachusetts Institute of Technology, Harvard University, ETH, University College London, and University of Liege. In the future the open access publication movement will gain even more strength, creating a bigger demand for journals such as ours.

I envisage the AIMS Electronics and Electrical Engineering journal will become an indexed open access platform for high quality publications on a wide set of topics in this field. I expect that it will have a significant interdisciplinary flavor to encourage collaboration among researchers, while offering a superior experience to authors and readers. We have a dedicated Editorial Board, whose members are internationally renowned in their areas. We will ensure not only a professional and timely review but also mentorship when needed. We plan to begin the indexation process of our journal as soon as it establishes a track record of timely publication of high quality content. Furthermore, with the cooperation of our publisher AIMS Press, I hope our journal will also become a pioneer in the development and use of new technologies for scientific publication based on the possibilities offered by the Internet-of-Things revolution.

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AIMS Press

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