

## SELECTED PAPERS FROM THE ELEVENTH ITU KALEIDOSCOPE ACADEMIC CONFERENCE



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This special section contains two updated papers, originally presented at the eleventh International Telecommunication Union's (ITU) Kaleidoscope academic conference. The title of the conference was "ICT for Health: Networks, Standards and Innovation," and took place in the United States, specifically in Atlanta, Georgia from 4-6 December 2019. The host was the Georgia Tech Research Institute with the collaboration of the World Health Organization (WHO). There were nearly 100 participants: 70 physically at the venue coming from 16 countries and over 30 on the web. The proceedings are available on the ITU website at <https://www.itu.int/pub/T-PROC-KALEI-2018>, and from the IEEE Xplore Digital Library. Pictorial highlights from the conference are available at <https://www.flickr.com/photos/itupictures/with/49237161532/>.

The topic of the next conference is "Industry-Driven Digital Transformation." It was originally scheduled for 7-9 September 2020 in Hanoi, Viet Nam, in conjunction with the ITU Digital World 2020. However, due to the Covid-19 pandemic, it is now an online conference from 7-11 December 2020 running four hours per day to accommodate the various time zones. To access the conference, check its main page at <https://www.itu.int/en/ITU-T/academia/kaleidoscope/2020>.

The ITU Kaleidoscope series of academic conferences started in 2008 to provide an interdisciplinary forum for the discussion of Information and Communication Technologies (ICTs) relevant to future telecommunication standards. Participants typically include researchers, academics, students, engineers, policymakers, regulators as well as futurists.

The first article in this issue deals with Machine Learning (ML) and Artificial Intelligence (AI) in medicine. The main challenge is that, because of the wide variety of patients and clinical conditions, ML/AI models must produce results that practitioners can rely on even when the algorithms process previously unseen data. Another difficulty is that these algorithms are black boxes because their exact workings are unknown. Some bioethicists have suggested that applying trust to AI is a corruption of language that can corrupt thought because it is "a category error, mistakenly assuming that AI belongs to a category of things that

can be trusted" [1]. This is why international cooperation is indispensable because it allows substantial synergies in the selection of the training and test data sets as well as the validation of the software, from both engineering and clinical viewpoints. This invited article from the Fraunhofer Heinrich Hertz Institute and the Technische Universität Berlin, titled "Toward Global Validation Standards for Health AI," covers these aspects. The authors, Markus A. Wenzel and Thomas Wiegand, present an overview of the work being carried out under the joint auspices of the ITU-T and WHO to address the use of machine learning and artificial intelligence in healthcare, and highlight what has been achieved in terms of guidelines. On the regulatory side, they mention the contributions of the National Health Service in the UK and the International Medical Device Regulators Forum. On the standardization side, they list activities by a variety of organizations such as the U.S. National Institute of Standards and Technology (NIST), the Chinese Electronics Standards Institute, the European Union High-Level Expert Group on AI, the German Deutsches Institut für Normung (DIN), the IEEE, and the International Organization for Standardization (ISO).

The second article, "Converged Internet of Lights Network for Telecommunication, Positioning, Illumination and Medical Therapy," is a joint contribution from several Chinese and British universities and research institutions. The authors are Jian Song, Xiaofei Wang, Jintao Wang, Hongming Zhang, Changyong Pan, Yue Zhang, and John Cosmas. They focus on the spectrum of the visible light from 380nm to 850nm, which is nearly one thousand times broader than the Radio Frequency (RF) spectrum. This is because Light Emitting Diodes (LEDs) can be deployed to modulate visible light for Visible Light Communication (VLC). Accordingly, lighting systems can be designed to combine information services using a network of LEDs integrated with sensors. This would constitute what the authors call the Internet of Lights (IoL). IoL, however, can have both positive and negative impact on human beings (as well as other animals), because of its effect on the circadian rhythms and hence body functions. On the positive side, it can be used as a non-intrusive intervention therapy to alleviate degenerative neurological diseases such as

Alzheimer's disease. On the negative side, it opens the way to control and manipulate human emotions. Given that VLC is a serious candidate for the sixth generation (6G) of wireless technology, the authors raise an urgent call for a thorough study of the various consequences of high-speed, high accuracy, localized and broad range VLC. We concur with this recommendation because there are many subtle and unknown factors that influence human health. For example, an examination of mortality rates in the UK between 2001 and 2010 concluded that the death rate spikes in the "gibbous" phase of the lunar cycle, i.e., when the crescent moon is more than half but not all of the apparent disk [2].

In closing, the editors would like to express their gratitude to the reviewers listed below in alphabetical order, for their assistance in making the selections and for their generous advice to the prospective authors.

#### List of reviewers

Chowdhury, Mostafa Zaman  
Khulna University of Engineering and Technology, Bangladesh

DeCamp, Matthew  
University of Colorado, Colorado, USA

Holzinger, Andreas T.  
Medical University of Graz, Austria

Li, Xun  
Hangzhou Dianzi University, People's Republic of China

Morley, Jessica  
University of Oxford, Oxford Internet Institute, UK

Raji, C. G.  
MEA Engineering College, Kerala, India

Zhang, Xun  
ISEP, France

#### REFERENCES

- [1] M. DeCamp and J. C. Tilburt, "Why We Cannot Trust Artificial Intelligence in Medicine," *The Lancet, Digital-Health*, vol. 1, no. 8, E380, Dec. 2019; DOI: [https://doi.org/10.1016/S2589-7500\(19\)30197-9](https://doi.org/10.1016/S2589-7500(19)30197-9).
- [2] *Financial Times*, Weekly Review of The Fund Management Industry, Nov. 5, 2012, p. 1.

#### BIOGRAPHIES

MOSTAFA HASHEM SHERIF retired from AT&T in 2017. He has a Ph.D. from the University of California, Los Angeles, and an M.S. in the Management of Technology from Stevens Institute of Technology, NJ, and is a certified project manager from the Project Management Institute (PMI). Among the books he has authored are: *Protocols for Secure Electronic Commerce*, CRC Press, 3rd ed., 2016; *Paievements électroniques sécurisés*, Presses Polytechniques et Universitaires Romandes, 2006; and *Managing Projects in Telecommunication Services*, John Wiley and Sons, 2006.

KAI JAKOBS joined RWTH Aachen University's Computer Science Department in 1985. He holds a Ph.D. in computer science from the University of Edinburgh and he is a Certified Standards Professional. His research interests focus on ICT standards and the underlying standardization process. Over time, he has (co-)authored/edited 30+ books and published 200+ papers. He is Vice President of the European Academy for Standardisation (EURAS) and founder of the *International Journal on Standardization Research*.

CHRISTOPH DOSCH is a senior expert in terrestrial, cable and satellite broadcasting. He graduated from the Technical University Munich in 1976. In 2014, he retired as General Manager Collaborative Research with the IRT ([www.irt.de](http://www.irt.de)) but has continued working with this institute as liaison officer to the ITU. He is Vice Chairman of the ITU Study Group on broadcasting service and especially active in spectrum management, multimedia applications and access services for people with special needs.

ALESSIA MAGLIARDITI is the ITU-T Academia Coordinator in the Telecommunication Standardization Policy Department of the ITU Telecommunication Standardization Bureau (TSB). She leads the TSB Academia team and coordinates various ITU academic initiatives, including the ITU Kaleidoscope academic conferences, the main ITU interface with universities and research institutions. She also acts as Manager of the ITU Journal on Future and Evolving Technologies (ITU J-FET) which provides complete coverage of all communications and networking paradigms, free of charge for both readers and authors. She holds an M.A. in social sciences from the University "La Sapienza" of Rome, and an M.A. in International Relations and Diplomatic Studies from "LUMSA" University of Rome.

YOSHITOSHI MURATA received his M.E. from Nagoya University, Japan. He received his Ph.D. from Shizuoka University, Japan. From 1979 to 2006, he was with NTT DoCoMo, developing mobile communication systems, mobile terminals and services. He is a professor emeritus of Iwate Prefectural University. He was awarded the best paper of the ITU-T "Innovations in NGN" Kaleidoscope Academic Conference 2008. His research interests include mobile communication, sensor network, sensor database, and integrated media communication. He is a member of IEEE.