

# MEDIA RESEARCH AND DEVELOPMENT – A GLOBAL VIEW

According to the latest data from UNESCO, the global investment in R & D are estimated at 1.7 trillion dollars. The five countries that invest the most in R&D are, in order, the United States, China, Japan, Germany and South Korea. Together, the 3 Asian countries account for over 36% of all global investment. In relation to GDP, Japan and South Korea are among the countries that invest the most in research. And, not coincidentally, they are among the countries with the largest number of scientists per million inhabitants: 5,328 and 6,856 respectively (Brazil has 881).

In China, the growth of research funding has been exponential. From 13 billion dollars in 1991 reached 410 billion in 2016, ie 30 times more. And it is already speculated that by 2020 it may overtake the United States.

Much of these investments in research done by these Asian countries have gone to the area of ICT – Information and Communications Technology, including therein Broadcasting and Media sector.

Facing this scenario, we invited two eminent researchers Kohei Kambara (NHK – Japan) and Jian Song (Tsinghua University -China) to talk about recent developments in their countries. We also invite our colleague from Rede Globo, Carlos Eduardo Cosme Ribeiro, who will bring us the results of his R&D experience in South Korea.

Chair: **Fernando Bittencourt** - Former President of SET

Co-chair: **Cristiano Akamine** - Professor, Universidade Presbiteriana Mackenzie

## • NKH OPEN HOUSE – "TAKING MEDIA BEYOND THE BOX."

Speaker: **Kohei Kambara** - Senior Researcher Engineer - STRL NHK

NKH OPEN HOUSE is the annual public event featuring broadcasting technologies and services under development at NHK's STRL - Science & Technology Research Laboratories.

These research is based on three major pillars, namely Reality Imaging - technologies that deliver content with more realistic feel and presence, Connected Media - technologies to improve program production and provide better user experience leveraging the internet, and Smart Production -technologies for efficiently producing programs using artificial intelligence (AI)

In this talk we will present some highlights of this exhibition.

## • DIGITAL TELEVISION / TERRESTRIAL MULTIMEDIA BROADCASTING (DTMB) STANDARD AND ITS ADVANCED VERSION

Speaker: **Jian Song** - Director of DTV Technology R&D Center - China

The technical review of Chinese Digital Terrestrial Television Broadcasting Standard named Digital Television Terrestrial Multimedia Broadcasting (DTMB) and its advanced version DTMB-A will be presented. It includes the general description on the physical layer transmission protocol including the frame structure, channel coding and modulation schemes with the highlight on the core technologies. Measurement

results are also provided for the performance validation together with possible extended applications.

• **TV 3.0: ETRI RESEARCH INITIATIVES AND OPPORTUNITIES IN BRAZIL**

Speaker: **Carlos Eduardo Cosme** Ribeiro - Technology Specialist IV R&D - TV Globo

In the first semester of 2019 the speaker visited the ETRI - Electronics and Telecommunications Research Institute, in South Korea, to study research lines on TV3.0 and using ATSC 3.0 format. The lecture will address the experience of visiting the ETRI and the research lines studied with application to the Brazil context.



**Chair: Fernando Bittencourt - Former President of SET**

Fernando Bittencourt is a Former President of SET and a Former General Manager for Engineering at TV Globo. Graduated in Electronic Engineering from the Federal University of Rio de Janeiro (UFRJ) Beginning in 1994, he was Coordinator of the SET/ABERT group created by the ABERT and SET to study and plan the implementation of Digital TV in Brazil. He was a full member of the Council for Social Communication in the Brazilian Senate, as an engineer with renowned knowledge in the field of social communication. Participates in the Deliberative Council of the Forum on the Brazilian Digital TV System. He is also a member of the IEEE, IBC and the SMPTE.



**Co-chair: Cristiano Akamine - Professor, Universidade Presbiteriana Mackenzie**

Cristiano Akamine received the Ph.D. degree in electrical engineering from the State University of Campinas, Brazil, in 2011. He is a Professor with Mackenzie Presbyterian University, where he is a Coordinator of Digital TV Research Laboratory. He is a member of the Board of the Brazilian Digital Terrestrial Television Forum and Society of Brazilian Broadcast Engineers (SET). He works in the ISDB-TB broadcasting standardization and holds several patents, licensing of intellectual property, numerous articles published and has a Brazilian scientific grant of Productivity and Technological Development and Innovative Extension—Level 2 from the National Council of Technological and Scientific Development. He has also served as a reviewer for several periodicals and conferences and has participated as a Guest Editor in the Special Issue Point-to-Multipoint Communications and Broadcasting in 5G of IEEE Communications Magazine and the Special Issue on 5G for Broadband Multimedia Systems and Broadcasting of IEEE Transactions on Broadcasting. He currently serves as an Associate Editor of IEEE Transactions on Broadcasting. His research currently focuses on digital terrestrial broadcasting, software-defined radio, channel codes, embedded systems, and 5G.



**Kohei Kambara - Senior Researcher Engineer - STRL NHK**

Kohei Kambara started working as an engineer of NHK in 2001. Since then, he has been engaged in the research works of ISDB-T system at NHK's Science & Technology Research Laboratories (STRL). From 2009-2019, he worked at several NHK's regional broadcast stations to construct local terrestrial transmitting station sites. In between those works, he has participated in ITU-R SG6 meetings and contributed his technical knowledge and experiment to the related ITU-R Recommendations or Reports. He is now working on next generation terrestrial broadcasting system at STRL as a senior researcher engineer of the advanced transmission systems research division.



**Jian Song - Director of DTV Technology R&D Center – China**

Dr. Jian Song received his B. Eng. and PhD degrees from Electronic Engineering Department, Tsinghua University, China, and conducted Postdoctoral research work in Hong Kong and Canada in 1996 and 1997, respectively. He worked in USA for seven years, and joined Tsinghua University in 2005 as a full professor. He is now Director of DTV Technology R&D Center, one of major technical contributors for Chinese DTV standard. He is vice chairman of WP6A of International Telecommunication Union (ITU) and the founding Editor-in-Chief of ITU academic Journal, ICT Discoveries. He is the

Associate Editor of IEEE Transaction on Broadcasting. Dr. Song's current research interest includes digital broadcasting, network convergence, and integration of visible light and powerline communications. He is the recipient of the Best Paper Award of IEEE Transactions on Broadcasting in 2015, and also the recipient of several national and provincial/ministry level awards. Dr. Song has published over 260 peer-reviewed journal and conference papers with good citations. Dr. Song is the Fellow of IEEE, IET, and Chinese Institute of Electronics.



**Carlos Eduardo Cosme Ribeiro - Technology Specialist IV R&D - TV Globo**

Carlos Eduardo has a degree in Electrical Engineering Enf. Telecom, UNESA. He has a postgraduate degree in Control and Automation Engineering, UGF and in Computer Network Specialization, PUC Rio. He has been in Globo network since 1999. He is currently Specialist in the area of Transmission Technologies. Among its main activities are the planning and control of preventive, predictive and corrective maintenance in RF (terrestrial and satellite) and optical fiber audio, video and data transport systems. Developer and responsible for Network Management System (NMS) for monitoring transport systems.audio, video and data.