BIT's 2nd Annual World Congress of
Smart Materials-2016
Date: March 4-6, 2016 Place: Singapore

Invitation Letter

Ikhwana Elfitri
Andalas University, Indonesia
Dear Dr. Elfitri,

With the theme of *"Develop New Path of Smartness"*, the 2nd Annual World Congress of Smart Materials-2016 (WCSM-2016) will be held during March 4-6, 2016 in Singapore. On behalf of the Organizing Committee, we would be honored to invite you as a Speaker under ***Focus 103: Smart Actuators, Sensors and Smart Material Systems***. We sincerely wish you can accept our invitation and join us in Singapore!

Depending on the great help and huge support from our participants, the 1st Annual World Congress of Smart Material-2015 was successfully held in Busan, Republic of Korea, during Mar 23-25, 2015. During the Congress, more than 250 speakers and 40+ poster attendees had presented their up-to-date research and made a fulfill communication on timely issues in the field of smart materials. With the kindly praise and suggestions from our participants, we believe WCSM-2016 will be the perfect opportunity and platform to establish a high profile international communication both in academic research and business activities.
Base on the success of WCSM-2015, the 2nd Smart Materials Congress is not only aimed to gather the leading scientists, world-renowned experts, academicians, industry executives and project leaders to exchange state-of-the-art research and development and identify research needs and opportunities in this emerging field, but also plan to shoot for 200+ oral presentations in Adaptive Structures and Intelligent Systems, Structural Materials, Smart Nanomaterials, Optical and Electronic Materials, Smart Biomaterials, Development of Multifunctional and Smart Materials, Characterization of Multifunctional and Smart Materials, Smart Materials in Industrial Application.
(For more details: http://www.bitcongress.com/wcsm2016/ScientificProgramme.asp).

Sincerely Yours,

Ada Sun (Coordinator)

Organizing Commission of WCSM-2016
East Wing, 11F, Dalian Ascendas IT Park,
No. 1 Hui Xian Yuan,
Dalian Hi-tech Industrial Zone,
LN 116025, P. R. China
Tel: 0086-411-84799609-814
Email: ada@wcsm-con.com

BIT CONGRESS INC.
百奥泰国际会议组委会
ORGANIZING COMMITTEE

Gmail

Ikhwana Elfitri <ikhwana08@gmail.com>

Thanks letter from WCSM-2016 committee

1 pesan

Ada Sun of WCSM-2016 <Ada@wcsm-con.com> 18 Maret 2016 08.53
Kepada: Elfitri <ikhwana@ft.unand.ac.id>

Dear Dr. Elfitri,

Thanks very much for joining us at WCSM-2016 in Singapore! We appreciate your enthusiastic participation and support during the conference.

Please accept our sincere gratitude. And we should admit that there must have been many things we had not done well and we would greatly appreciate if you would share us your suggestions. We believe that your kind suggestions will make our WCSM-2017 Conference more successful. The photo galary can be seen in http://www.bitcongress.com/wcsm2016/groupphoto.asp .

Next year, our WCSM-2017conference will be held in **Bangkok, Thailand** during Mar 16-18, 2016. If you have any suggestions about the scientific program, would like to co-organize a session, or make a presentation during our conference. Please don't hesitate to let me know. (WCSM-2017 website can be seen in http://www.bitcongress.com/wcsm2017/default.asp)

Meanwhile if you are interested in our Advanced Materials conference in China please take a look at http://www.bitcongress.com/wcam2016/ .

Wish you a great success and we look forward to meeting you again in WCSM-2017.

Best Regards,
Ada Sun

Ada Sun

Boarding Pass

IKHWANA ELFITRI

Depart
Kuala Lumpur - klia2 (KUL)

Arrive
Singapore - T1 (SIN)

Booking no.
KHPMWQ

Seq no.
5

Add-ons

Flight no.	**AK 711**
Date	**03 Mar 16**
Boarding time	**12:00**
Gate no.	
Seat no.	**6C**

Airport Guide for Kuala Lumpur - klia2 : 4 easy steps!

STEP 1	OR		STEP 2	STEP 3	STEP 4
With checked baggage		**Without checked baggage**	**Security**	**Boarding**	**Gate closing time**
Drop your bags at the Baggage Drop Counter before **11:40**		Proceed straight to Security or Immigration	Clear security or immigration early otherwise you might be left behind	Are you at the right boarding gate?	Gate closes at **12:20**. If you arrive after this time you will be denied boarding.

At anytime after you have checked-in, we may change our schedule and/or cancel, terminate, divert, postpone, reschedule or delay any flight where we reasonably consider this to be justified by circumstances beyond our control or for reasons of safety or commercial reasons.

Please fold here - DO NOT TEAR

Airline copy

IKHWANA ELFITRI

Arrive	**Singapore - T1 (SIN)**
Booking no.	**KHPMWQ**
Passport no.	**A9560478**
Expiry date	**08 Jan 20**
Nationality	**Indonesia**

Flight no.	**AK 711**
Date	**03 Mar 16**
Seat no.	**6C**
Seq no.	**5**

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Ms. Ada Sun, Ms. Snowy Liang, Ms. Amy Guo, Ms. Allison Wang, Ms. Alex Jiang

Review on 3D Audio Technology for UHDTV as Future TV Broadcasting

Presented by: Ikhwana Elfitri

Senior Lecturer, Andalas University, Indonesia

World Congress on Smart Materials (WCSM) 2016

Grand Copthorne Hotel, Singapore, 4-6 March 2016

Contents

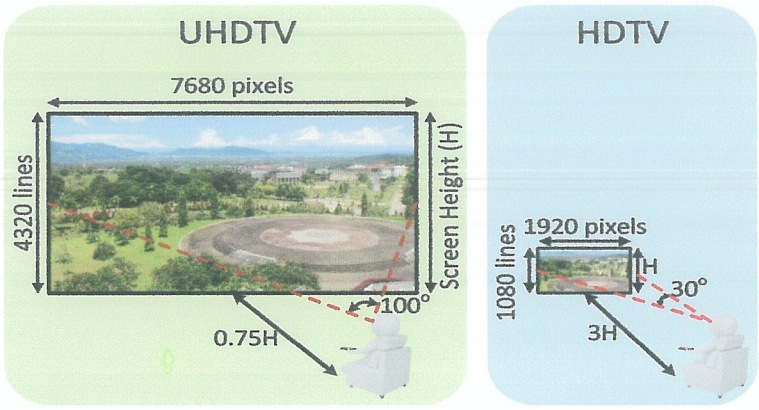
Video format: Ultra High Definition TV (UHDTV)

- It was aimed at enhancing visual experience thereby increasing the sense of realness
- Main applications: TV broadcasting, Theatre, Sports Venue, etc.
- Developed by NHK, Japan
- Widely known as Super High Vision (SHV)
- The ITU-R Recommendation BT.2020 "Parameter values for UHDTV Systems for production and international program exchange" released in October 2015

Ultra HDTV (SHV) vs HDTV

(T. Ito, 2010)

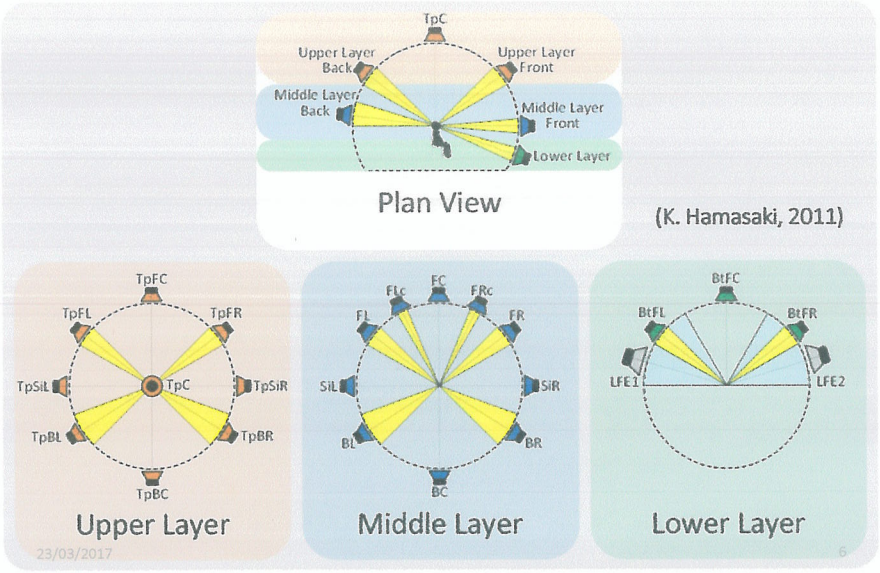
Video Format	Number of Pixels	Bit Rate of Original Video Signal	Bit Rate of Compressed Video Signal for Transmission
UHDTV	7680 x 4320	72 Gb/s	200 Mb/s (target)
HDTV	1920 x 1080	1.5 Gb/s	12-24 Mb/s (MPEG-2)



22.2 Multichannel Audio for UHDTV

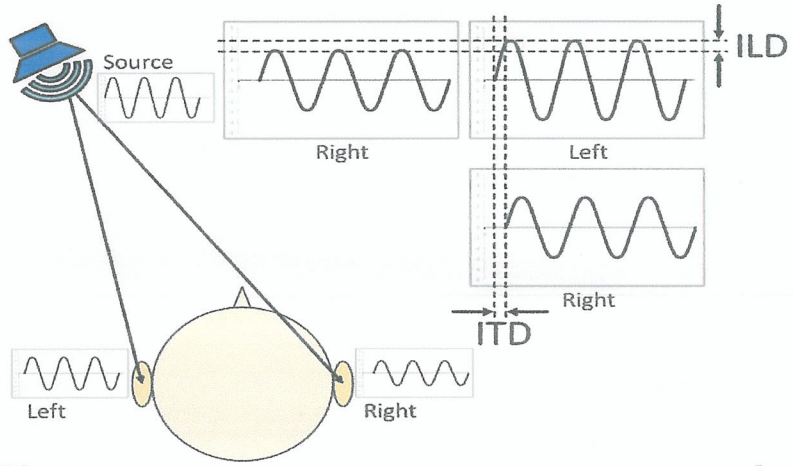
- The goal is to provide a true three dimensional (3D) audio experience
- Applications: TV Broadcasting, wide and big screen video display
- It was also developed by NHK, Japan
- Consist of: 9 upper layer, 10 middle layer, and 3 lower layer, 2 LFE
- For audio reproduction, it is projected to use a larger number of loudspeaker i.e. the 22.2 multichannel system, The ITU-R Report BS.2159-4, dated May 2012

22.2 Multichannel Audio for UHDTV



Spatial Hearing:

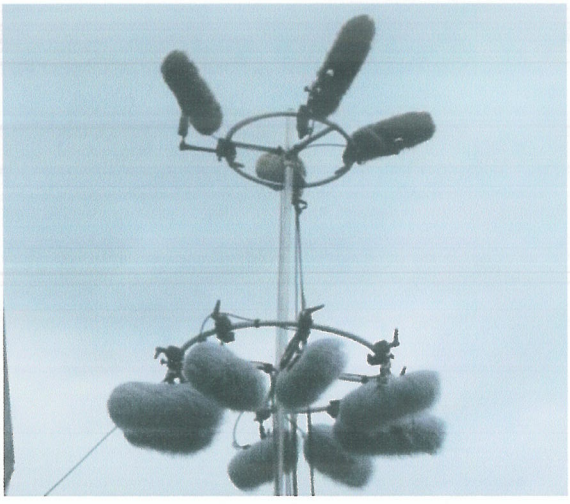
Spatial cues: Inter-aural Time Differences (ITD),
Inter-aural Level Differences (ILD)



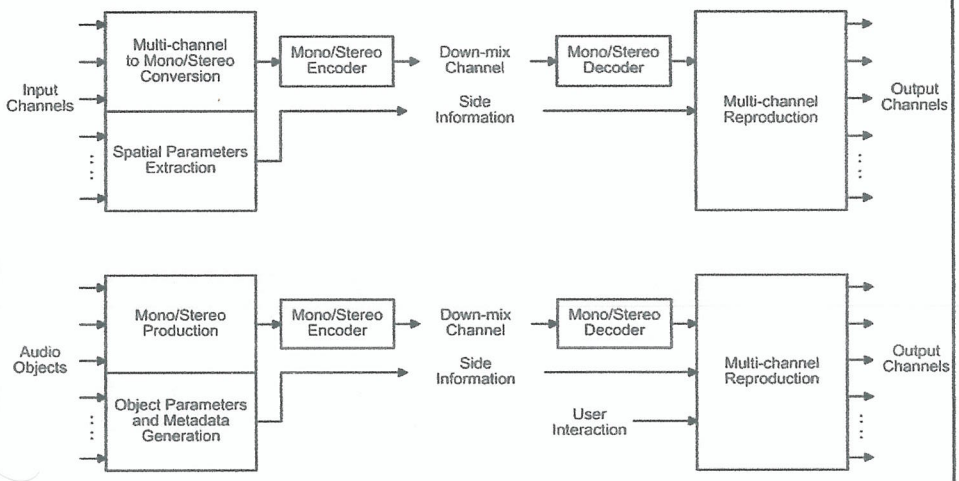
Stand-alone Microphone Array

(ITU-R BS.2159-4)

- Consist of multiple single-microphone
- Easy to install as it is a stand-alone equipment
- It does not suit to a very large massive-sources environment such as a football stadium



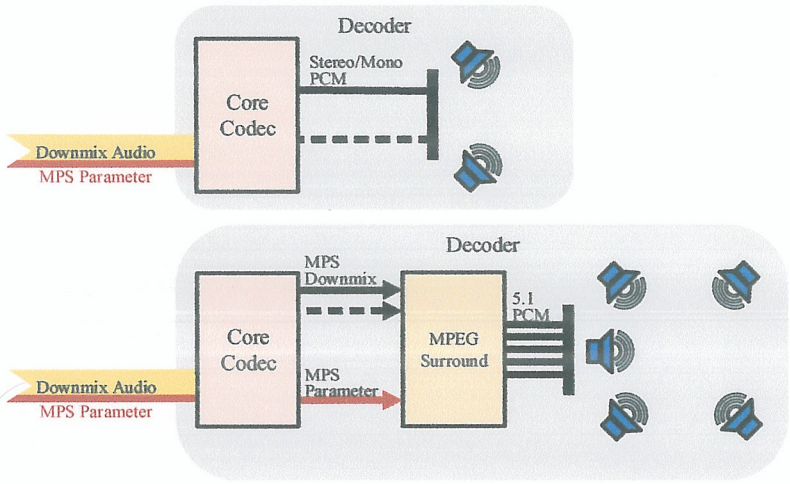
Teknologi Representasi Audio: Berbasis Kanal vs Objek



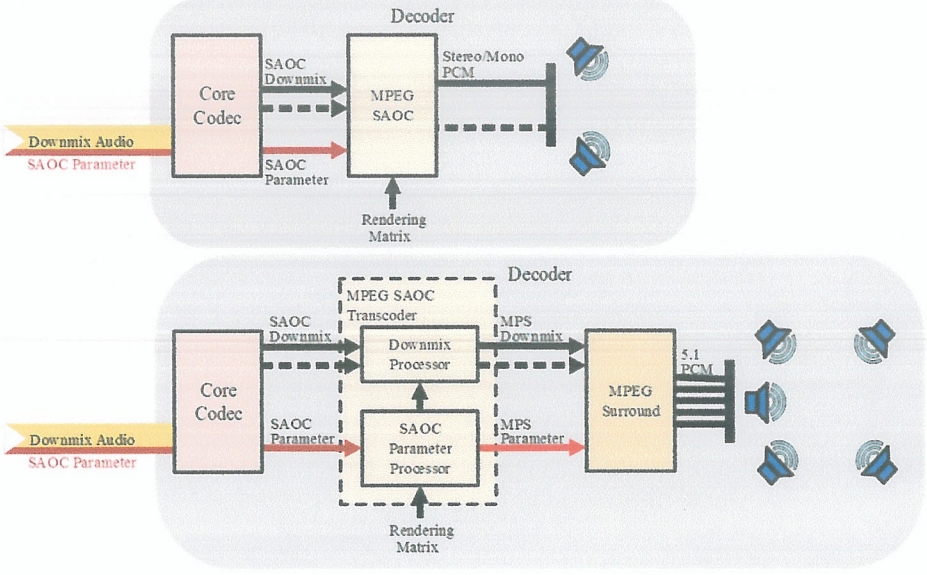
Comparison of MPEG Standard

No	Standard	Mode of Representation	Main Applications
1	MPEG Surround	Channel-based	TV and Radio Broadcasting Teleconference
2	MPEG Spatial Audio Object Coding (SAOC)	Object-based	Music re-composition Karaoke Games
3	MPEG-H 3D Audio	Both channel and object-based	Ultra HDTV Broadcasting

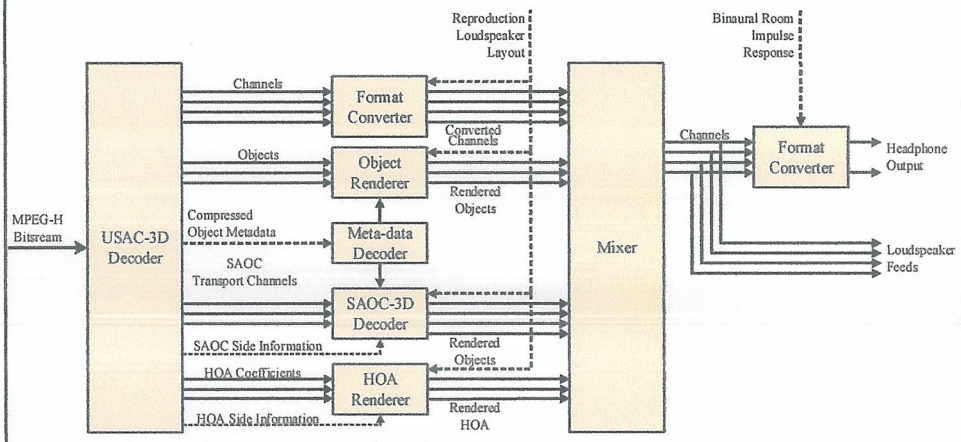
MPEG Surround (MPS)



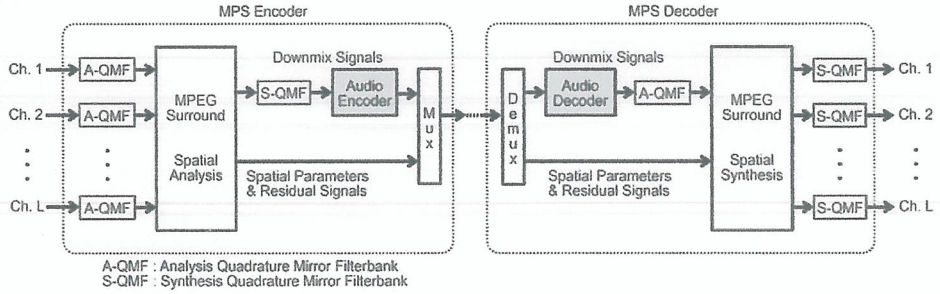
MPEG Spatial Audio Object Coding (SAOC)



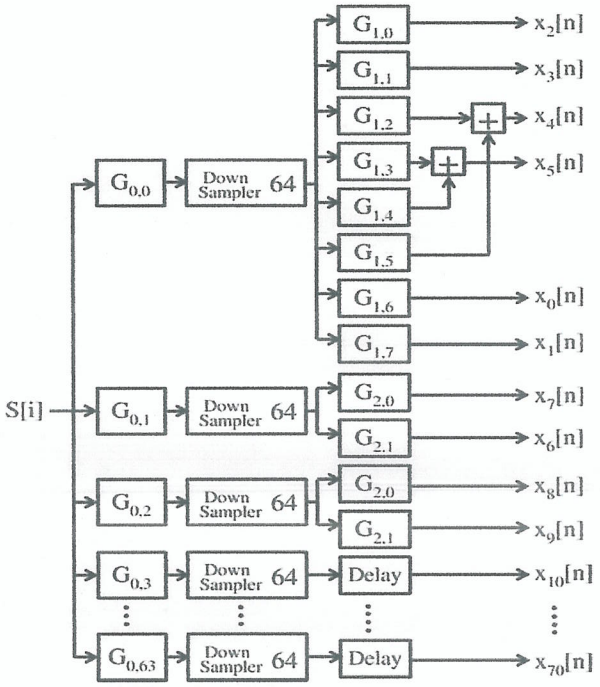
MPEG-H 3D Audio Coding Standard



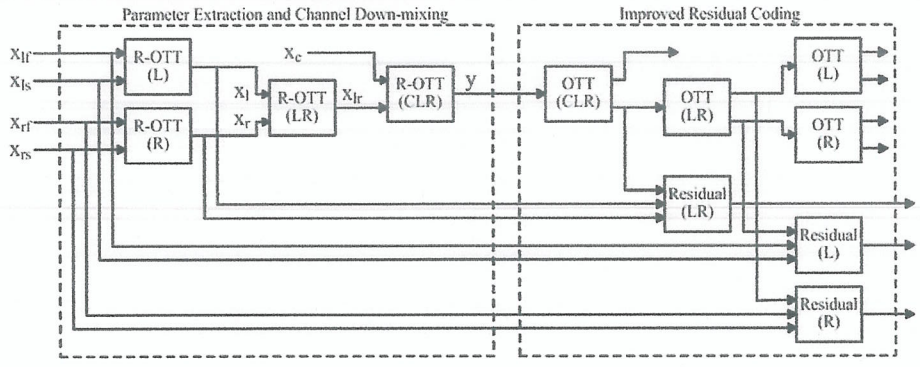
MPEG Surround Encoder-Decoder



QMF Filterbank



MPS with Improved Residual Coding



Research Projects and Labs in 3D Audio

- S3A Future Spatial Audio for an Immersive Listener Experience at Home, EPSRC funded projects 2013-2018 by Univ. of Surrey, Univ. of Salford, Univ. of Southampton, and BBC. Link: http://www.s3a-spatialaudio.org
- 3D Audio in FASCINATE (Format-Agnostic SCript-based INterAcTive Experience), funded by FP7 European Commission 2010-2013. Link: http://www.fascinate-project.eu/index.php/tech-section/audio/
- 3D Audio and Applied Acoustics Lab, Princeton University Link: https://www.princeton.edu/3D3A/
- International Audio Labs, Erlangen https://www.audiolabs-erlangen.de/research/3d-audio

Experience the 3D Audio

- Virtual barber shop hair cut https://www.youtube.com/watch?v=8IXm6SuUigI
- Interrogation Chamber https://www.youtube.com/watch?v=u163wC6mP2A
- Brain tricks https://www.youtube.com/watch?v=pvr3gr8BzA0
- Asmr ear cleaning and relaxing ear massage https://www.youtube.com/watch?v=EKRkcQoN7jk
- 3D head massage https://www.youtube.com/watch?v=vVn4c0woig0

Conclusion

- UHDTV with 3D audio system have been introduced
- There are 3 MPEG standard are currently available for audio compression
- MPS with Improved Residual Coding has been proposed

Acknowledgment

- Prof. Ahmet Kondoz, previously a Professor in the University of Surrey, Loughborough University in London
- Dr. Banu Gunel, currently with METU, Turkey
- ROMEO FP7 Project
- Ministry of Research, Technology, and Higher Education, the Republic of Indonesia for a grant under the scheme of Higher Education Excellent Research (Penelitian Unggulan Perguruan Tinggi) with contract no. 50/UN.16/UPT/LPPM/2015.

Many thanks for your attention

Ikhwana Elfitri
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★ Scientific Programme

BIT's 2nd Annual World Congress of

Smart Materials-2016

Theme: Develop New Path of Smartness

Time: March 4-6, 2016

Place: Grand Copthorne Waterfront Hotel, Singapore

Scientific Program

Plenary	Symposium 1	Symposium 2	Symposium 3	Symposium 4
Symposium 5	Symposium 6	Symposium 7	Symposium 8	Symposium 9

Symposium 1: Adaptive Structures and Intelligent Systems

Event Title: Focus 101: Breaking Research of Smart Materials Science and Technologies

Day 1: Afternoon, Friday, March 4, 2016

13:30-18:30

Place: Riverfront 1 (2F), Grand Copthorne Waterfront Hotel, Singapore

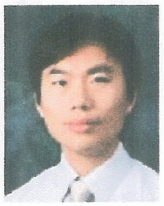
News Updates

now being accepted, submit the abstract right now!

- Online Registration is Open.
- Session programme has been released.
- Speaking proposals are now being accepted, submit the abstract right now!

Download

- WCSM Student Tikcet
- Abstract Format
- Sponsorship Application
- Exhibition Application
- WCSM-2016 Brochure
- Singapore Tour Options
- Thumbnail Photos

15:55-16:20		***Dr. Kok Swee Leong,*** Senior Lecturer, University of Technical Malaysia Melaka, Malaysia	
16:20-16:45		***Title:*** *Organolithium Chemistry Using Flow Microreactors* ***Dr. Aiichiro Nagaki,*** Associate Professor, Kyoto Unversity, Japan	Your Logo Here
16:45-17:10		***Title:*** *Impedimetric Quantification of Cellular Responses in Microfluidic Systems* ***Dr. Kin-Fong Lei,*** Associate Professor, Chang Gung University, Taiwan	

Event Title: Focus 103: Smart Actuators, Sensors and Smart Material Systems

Day 2: Morning, Saturday, March 5, 2016

08:30-12:10

Place: Waterfront 1 (2F), Grand Copthorne Waterfront Hotel, Singapore

Chair: ***Mr. Sergio Nicoletti,*** Optical Sensors Business Development Manager, CEA, France

Co-Chair: ***Dr. Tsuyoshi Uchiyama,*** Associate Professor, Nagoya University, Japan

Time	FaceOn	Speeches and Speakers	Org. Logo
08:30-08:50		***Title:*** *Distributed Fiber Sensing Technology for Structural Health Monitoring* ***Dr. Xiaoyi Bao,*** Professor, University of Ottawa, Canada	

08:50-09:10		***Title:*** *Lab-on-a-Chip Photoacoustic Gas Sensor fully integrated on Si – Challenges and Opportunities* ***Mr. Sergio Nicoletti,*** Optical Sensors Business Development Manager, CEA, France	
09:10-09:30		***Title:*** *1700 nm Band Light Sources And Their Application to Infrared Spectroscopy* ***Dr. Makoto Yamada,*** Professor, Osaka Prefecture University, Japan	
09:30-09:50		***Title:*** *Trend of Sensors Technology and Their Application* ***Dr. Eung-Soo Kim,*** Professor, Busan University of Foreign Studies, South Korea	
09:50-10:10		***Title:*** *Review on 3D Audio Technology for UHDTV Standard as Future TV Broadcasting* ***Dr. Ikhwana Elfitri,*** Senior Lecturer, Andalas University, Indonesia	
10:10-10:30		***Title:*** *Highly Sensitive Magneto-Impedance Sensor Based on Time Analogue to Digital Converter (TAD) for Compact Bio-magnetic Field Measurement Device* ***Dr. Tsuyoshi Uchiyama,*** Associate Professor, Nagoya University, Japan	Your Logo Here
10:30-10:50		***Title:*** *Micro Optical Fiber Sensors for Healthcare: an Overview of Emerging Applications* ***Dr. Daniele Tosi,*** *Assistant Professor, Nazarbayev University in Astana, Kazakhstan*	

Table of Content

Title: Review on 3D Audio Technology for UHDTV Standard as Future TV Broadcasting

Dr. Ikhwana Elfitri
Interactive Spatial Audio Reproduction
Andalas University
Indonesia

Abstract

Ultra High Definition Television (UHDTV), which is also widely known as Super Hi-Vision, has been ratified as a standard for future TV broadcasting. For audio reproduction a 22.2 multichannel audio system, which is capable of recreating much more realistic and impressive three dimensional (3D) audio scene, is specified in the standard. In this tutorial-like talk, a comprehensive review on the implementation of 3D audio technology will be presented. Fundamental concept on digital audio that include psychoacoustic, time-frequency transformation as well as spatial hearing will be discussed first, followed by advance techniques such as recent MPEG standards, object-based audio and 3D audio reproduction systems. At the end of the talk the feasibility and challenges of UHDTV implementation will be elaborated.

Biography

Dr. Ikhwana Elfitri is a Senior Lecturer at Andalas University, Padang, Indonesia, teaching and supervising thesis at both undergraduate and postgraduate levels. He is currently the Head of Telecommunication Laboratory, the Head of a research project on Scalable and Interactive Spatial Audio Reproduction with funding of IDR 200 Million from the Ministry of Research, Technology, and Higher Education, Republic of Indonesia as well as a member of Academic Senate at Andalas University. Dr. Elfitri was awarded a PhD degree from the University of Surrey, a top university in the United Kingdom. He was the first author of an invited paper published in 2011 in the prestigious journal, Proceedings of the IEEE. His work on spatial audio coding has been patented in the UK in 2012. Moreover, Dr. Elfitri was an invited speaker at the 2015 CMOSETR Symposium, Vancouver, British Columbia, Canada. Since 2011 he has been actively invited to review papers in a number of scientific journals which include IEEE Transaction on Multimedia and IET Signal Processing.