

BRI-NTU Joint Seminar

Urban Soundscape & Noise Mitigation

23 Feb 2023 (Thu) | 9.30 am to 1.00 pm
HDB Centre of Building Research (Woodlands)
Pending CPDs



Synopsis

The seminar on urban soundscape and noise mitigation focuses on the acoustic environment experienced and perceived by people in urban areas. Soundscape is defined as the acoustic environment as perceived or experienced and/or understood by a person or people, in context.

The aim is to present new methods of defining acoustic comfort beyond decibel measurements and showcase recent research in Singapore on smart sound sensing, soundscape evaluation and design, and active noise mitigation techniques. The goal is to improve the quality of life for urban residents and enhance the overall urban soundscape.

Through informative presentations, hands-on demonstrations, and interactive panel discussions, this seminar provides a valuable platform for exchanging knowledge and collaborating on the critical issue of urban noise pollution.

Programme

TIME	PROGRAMME	SPEAKERS
09.00 am	Registration	
09.30 am	Welcome Address	Mr. Sze Tiong TAN Group Director HDB Building & Research Institute, Singapore
09.45 am	Keynote Presentation on Soundscape: Recent developments and future challenges	Professor Jian KANG UCL Institute for Environmental Design & Engineering, The Bartlett University College London, UK
10.30 am	Networking Tea break & Demo Showcases a) Active Noise Control Prototype for Heavy Machinery Noise b) Augmenting Urban Soundscapes: Automatic Masker Selection & Playback Platform c) Intelligent Congregation Noise Sensor (ICONS)	Dr. Dongyuan SHI, Mr. Chung Kwan LAI Dr. Bhan LAM, Mr. Zhen Ting ONG, Mr. Trevor WONG Dr. Joseph TAN, Mr. Yee Ching CHEW
11.30 am	Urban Sound Sensing in Singapore	Professor Woon-Seng GAN Professor & Director Smart Nation Lab @ School of EEE, Nanyang Technological University, Singapore

Jointly Organised by:



BRI-NTU Joint Seminar

Urban Soundscape & Noise Mitigation

23 Feb 2023 (Thu) | 9.30 am to 1.00 pm
HDB Centre of Building Research (Woodlands)
Pending CPDs



Programme (con't)

TIME	PROGRAMME	SPEAKERS
11.45 am	Prospects and Opportunities for Soundscape Evaluation and Design in Singapore	Dr. Bhan LAM Research Assistant Professor, Smart Nation Lab, School of Electrical and Electronic Engineering, NTU, Singapore
12.00 pm	Smart Noise Mitigation Technique in Singapore	Dr. Dongyuan SHI Research Assistant Professor, Smart Nation Lab, School of Electrical and Electronic Engineering, NTU, Singapore
12.20 pm	Panel Discussion & Closing Remarks	Mr. Heru Santoso SOEDARSONO (Moderator) All Speakers
13.00 pm	End of Seminar	

Registration

To register, please [click here](#) to provide the particulars of attendees.

For further enquiries, please contact:

- Ms Jessica Lim (Jessica_SL_Lim@hdb.gov.sg)
- Ms. Vanessa Boey (vanessa_KL_Boey@hdb.gov.sg)
- Mr. Tobias Bestari Tjandra (tobias_Bestari_Tjandra@hdb.gov.sg)

Cancellation

The organisers reserve the right to change the seminar venue, cancel or reschedule the seminar if necessary or warranted by circumstances beyond our control.

Please inform us of non-attendance or replacement at least 2 days in advance before commencement of the seminar, to facilitate the set-up of the venue.

Copyright Policies

Copyright © 2023 Housing & Development Board and Nanyang Technological University. All rights reserved. No part of this document may be reproduced, used or transmitted in any form or manner without the prior written consent of the Housing & Development Board and Nanyang Technological University.

Jointly Organised by:



BRI-NTU Joint Seminar

Urban Soundscape & Noise Mitigation

23 Feb 2023 (Thu) | 9.30 am to 1.00 pm
HDB Centre of Building Research (Woodlands)
Pending CPDs



Presentation Abstracts & Biography of Speakers



Professor Jian KANG

Professor of Acoustics & Soundscape
UCL Institute for Environmental Design & Engineering, The Bartlett
University College London, London

Keynote Presentation on Soundscape: Recent Developments & Future Challenges

Soundscape is defined by the ISO as the 'acoustic environment as perceived or experienced and/or understood by a person or people, in context'. Different from conventional noise control engineering, soundscape promotes a holistic approach, regarding sounds as 'resources' rather than just 'wastes'. This talk first briefly reviews the soundscape progress since 1960s, showing that there has been a recognised focus shift from noise control to soundscape creation, and also a step change from soundscape concept to practice. Then the current developments and needs in soundscape are discussed in terms of soundscape understating and exchanging, collecting and documenting, harmonising and standardising, creating and designing, and outreaching. A particular focus is given to the establishment of "soundscape indices" (SSID). By taking psychological, (psycho)acoustical, neural and physiological, and contextual factors into account, SSID will adequately reflect levels of human comfort to integrate (and eventually replace) decibel-based metrics commonly used in existing (international) regulations. Finally, some major future challenges will be explored, considering the new industrial revolution, climate change and changing living styles.

Biography

Professor Jian KANG, FEng, MAE, FIOA, FASA, FIIAV, FASC, obtained his first and master degree from Tsinghua University and his PhD from the University of Cambridge. He is Fellow of Royal Academy of Engineering and Member of Academia Europaea - The Academy of Europe. He has been a full professor since 2003, and worked in the field of architectural and environmental acoustics for 40 years, with 80+ research projects, 800+ publications, 90+ engineering/consultancy projects, and 20+ patents. He is President of the International Institute of Acoustics and Vibration (IIAV), and he also chairs the European Acoustics Association Technical Committee for Noise, and the EU COST Action on Soundscape of European Cities and Landscapes. He is recipient of the Advanced ERC Grant Award, currently working internationally on developing Soundscape Indices (SSID)

Jointly Organised by:



BRI-NTU Joint Seminar

Urban Soundscape & Noise Mitigation

23 Feb 2023 (Thu) | 9.30 am to 1.00 pm
HDB Centre of Building Research (Woodlands)
Pending CPDs



Presentation Abstracts & Biography of Speakers



Woon-Seng Gan
Professor and Director
Smart Nation Lab @
School of EEE,
Nanyang Technological
University, Singapore

Urban Sound Sensing in Singapore

To achieve a holistic understanding of our urban environment, we must rely on intelligent sound sensing that can operate 24/7 and deploy widely under different environmental conditions. These intelligent sound sensors also serve as digital ears to complement and activate the digital eyes of the CCTV cameras. Having complete and big aural sound data allows public agencies to better formulate complete and accurate sound mitigation policies, as has been carried out in many EU countries. Sound pressure level (SPL) readings have been the de facto standard in quantifying our noise environment; however, SPL cannot accurately indicate how humans actually perceive noise; whether they like or dislike the sound even at the same SPL. We showcase some of our work in digital sound sensing that we carried out locally.

Digitization plays a key role in advancing the art of many applications. Integrated with the digitization technique of urban sound and noise, edging computing, and embed artificial intelligence technologies, the low-cost IoT system shows the feasibility of effectively implementing environmental noise sensing, sound sources localization, and urban noise mitigation

Biography

Professor Woon-Seng Gan, FAES, FIET, SMIEEE, received his BEng (1st Class Hons) and Ph.D. degrees, both in Electrical and Electronic Engineering from the University of Strathclyde, the UK in 1989 and 1993, respectively. He is currently a Professor of Audio Engineering and Director of the Smart Nation TRANS (national) Lab in the School of Electrical and Electronic Engineering at Nanyang Technological University, Singapore. Prof. Gan's research has been concerned with the connections between the physical world, signal processing, and sound control, which resulted in the practical demonstration and licensing of spatial audio algorithms, directional sound beams, and active noise control for headphones and open windows. He has published more than 400 international refereed journals and conference papers and has translated his research into 6 granted patents. He is currently the IEEE Signal Processing Society Distinguished Lecturer and the President-elect of the Asia-Pacific Signal and Information Processing Society. He is also a member of the Community Panel Advisory for Neighborhood Noise

Jointly Organised by:



BRI-NTU Joint Seminar

Urban Soundscape & Noise Mitigation

23 Feb 2023 (Thu) | 9.30 am to 1.00 pm
HDB Centre of Building Research (Woodlands)
Pending CPDs



Presentation Abstracts & Biography of Speakers



Dr. Bhan LAM

Research Assistant
Professor, Smart Nation
Lab, School of Electrical
and Electronic
Engineering, NTU,
Singapore

Prospects & Opportunities for Soundscape Evaluation & Design in Singapore

Significant quietening of major urban areas during the COVID-19 lockdowns, physically revealed an extreme scenario of reduced environmental noise in high-density urban areas. As we transition to a post-pandemic norm with increased corporate acceptance of work-from-home arrangements, there has also been greater discussion and awareness of the acoustic environment and its effects on productivity and health.

This renewed awareness of the acoustic environment coincides with the paradigm shift from decibel-centric noise management towards a holistic human-centric approach. This talk highlights the differences between traditional noise monitoring and soundscape through the array of tools, technologies, and international standards. Some insights arising from soundscape studies in Singapore such as in outdoor urban recreational areas, dwellings, and hospitals would be briefly introduced. Finally, future prospects and opportunities to address the labour-intensive soundscape approach – in-situ surveys, acoustic measurements, and laboratory listening experiments – would be discussed.

Biography

Dr. Bhan, Lam received the B.Eng. (Hons.) and Ph.D. degrees both from the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, in 2013 and 2019, respectively. He was awarded the NTU Research Scholarship and EEE Graduate Award to undertake his PhD under the supervision of Prof. Woon-Seng Gan. In 2015, he was a visiting postgrad in the signal processing and control group at the Institute of Sound and Vibration Research, University of Southampton, UK. He was an invited representative at the 2020 Global Young Scientist Summit and an invited tutorial speaker at APSIPA ASC 2020.

He is currently a Research Assistant Professor at the School of Electrical and Electronic Engineering, NTU, Singapore. He has authored more than 60 refereed journal articles and conference papers in the areas of acoustics, soundscape, and signal processing for active control. His work on anti-noise windows has been patented (WO2022055432) and recognised as a top-100 paper in Nature Scientific Reports in 2020. He is currently a guest editor with MDPI Sustainability and served as a special session co-chair in the 2022 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP). He is currently in the National Mirror Committee of ISO TC43/SC1/WG54 on "Perceptual assessment of soundscape quality". His current research interests include active noise control, soundscape, and signal processing for active control.

Jointly Organised by:



BRI-NTU Joint Seminar

Urban Soundscape & Noise Mitigation

23 Feb 2023 (Thu) | 9.30 am to 1.00 pm
HDB Centre of Building Research (Woodlands)
Pending CPDs



Presentation Abstracts & Biography of Speakers



Dr. DongYuan SHI

Research Assistant
Professor, Smart Nation
Lab
School of Electrical and
Electronic Engineering,
NTU, Singapore

Smart Noise Mitigation Technique in Singapore

The effects of urban heat islands (UHI) and noise pollution, particularly in dense cities, on human health are beginning to emerge. In Singapore, air-conditioners and sound barriers are often selected as a solution to fight off the heat and noise. Ironically, air-conditioners are one of the identified causes of UHI in Singapore, as reported by the Urban Redevelopment Authority. In contrast, the sound barriers are costly to build and yet aesthetically unpleasant with limited effectiveness. Moreover, noise travels in waves, not straight lines, and hence, it can go over obstacles. Therefore, even with barriers standing more than 5 meters, homes several blocks away still hear the noise. Also, several studies have highlighted the importance of adequate fresh air ventilation on human health, especially in the current Covid-19 pandemic, where the current study has shown that proper ventilation help in preventing the transmission of Covid-19. Therefore, in this presentation, we will bring in the active noise control (ANC) technique, which depends solely on the loudspeaker producing an anti-noise wave to cancel out unwanted noise. It can be installed and used in many areas owing to its compact size. For instance, the usual window combined with the ANC system can suppress ambient noises in high-density cities, such as traffic noise, train noise, and so on, without affecting natural ventilation. To cope with city machinery noise, we have developed a transportable ANC module to combat machinery noise. It can be positioned around noise sources, such as generators, transformers, and large construction equipment, to minimize their mechanical noise without interfering with their operation. Finally, we will provide an outlook on several breakthrough deep-learning technologies utilized in the field of ANC further to improve its performance in more complex acoustic situations.

Biography

Dr. SHI Dongyuan is currently a Research Assistant Professor in the School of Electrical and Electronic Engineering (EEE) at the Nanyang Technological University (NTU), Singapore. In 2010, and 2013, he received his B.ENG and M.S degrees from the University of Electronic Science and Technology of China (UESTC). From 2013 to 2014, he worked as a research fellow at Nanyang Technology University's Applied Micro-fluidicology Laboratory, designing the cell CMOS image capture system and the framework of the image processing algorithm. He completed his Ph.D. at the Nanyang Technological University in 2020. His research interests include advanced active noise control, deep learning, digital signal processing, adaptive array processing, and high-speed real-time digital system implementation. His work has been published in the Journals such as the journal of Acoustic Society of America (JASA), ACM/IEEE Transaction on Audio, Speech, and Language Processing (TASLP), IEEE transaction on Very Large Scale Integration (VLSI) system, Signal Processing (SP), IEEE Signal Letter (SPL), Mechanical Systems, and Signal Processing (MSSP), and IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP). He is currently a member of the IEEE and Signal Processing Society (SPS). He serves as the associate editor of IEICE Transactions on Fundamentals of Electronics, Communications, and Computer Sciences and the first guest editor of Applied Science, and the first guest editor for the special issue of "active vibration and noise control" in Applied Science.

Jointly Organised by:

