

# **Annual Conference of the Australian Acoustical Society 2019**

Acoustics 2019: Moving  
Forward with Acoustics

Cape Schanck, Australia  
10-13 November 2019

**Editors:**

**Marc Buret  
Andrew Mitchell**

ISBN: 978-1-7138-0631-8

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2019) by Australian Acoustical Society  
All rights reserved.

Printed with permission by Curran Associates, Inc. (2020)

For permission requests, please contact Australian Acoustical Society  
at the address below.

Australian Acoustical Society  
P. O. Box 1843  
Toowong DC QLD 4066  
Australia

Phone: 0431 970 049

[GeneralSecretary@acoustics.asn.au](mailto:GeneralSecretary@acoustics.asn.au)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: curran@proceedings.com  
Web: www.proceedings.com

# TABLE OF CONTENTS

## **D1-AM1-PLENARY**

UPDATE OF THE WHO EVIDENCE REVIEWS AND THEIR IMPLICATIONS FOR POLICY AND RESEARCH .....	1
<i>Irene van Kamp</i>	

## **D1-AM2-KEYNOTE**

NOISE IN PLANNING AND ENVIRONMENTAL IMPACT ASSESSMENT IN AUSTRALIA.....	15
<i>Nick Wimbush</i>	

## **D1-AM2-S1: POLICY, REGULATIONS & STANDARDS**

EXPECTED AMBIENT NOISE LEVELS IN DIFFERENT LAND-USE AREAS.....	23
<i>Robert John Fitzell</i>	
ROAD TRAFFIC NOISE IMPACTS AND PROPERTY TURNOVER.....	33
<i>Benjamin Hinze, Laurence Nicol</i>	
NOISE FROM AMPLIFIED ENTERTAINMENT VENUES.....	37
<i>Ross Palmer</i>	
THE RELEVANCE OF THE 2018 WHO NOISE GUIDELINES TO AUSTRALASIAN ROAD TRAFFIC NOISE OBJECTIVES. ....	41
<i>Jeffrey Parnell, Jeffrey Peng</i>	
AS 1055: 2018 REVISION .....	50
<i>Colin Tickell</i>	

## **D1-AM2-S2: UNDERWATER ACOUSTICS 1**

ACOUSTIC PROPAGATION IN REALISTIC 3D NONLINEAR INTERNAL WAVES.....	60
<i>Alec Duncan, Iain Parnum, Kenji Shimizu, Rod MacLeod, Steve J Buchan</i>	
LONG-RANGE AVERAGE REVERBERATION INTENSITY ATTENUATION CHARACTERISTICS IN SHALLOW WATER.....	68
<i>Jinrong Wu, Li Ma, Qiannan Hou</i>	
ESTIMATES OF COHERENT LEAKAGE OF SOUND FROM OCEAN SURFACE DUCTS FOR FIRST AND HIGHER ORDER MODES .....	76
<i>Adrian D. Jones, Alec Duncan, Alex Zinoviev, Zhi Yong Zhang</i>	
SEDIMENT CHARACTERIZATION FROM ACOUSTIC ECHO SOUNDING USING AN ARTIFICIAL NEURAL NETWORK.....	80
<i>Haiyan Ni, Li Ma, Licheng Lu, Qunran Ren, Wenbo Wang</i>	
INTERCHANGEABILITY OF TWO EXISTING FORMULATIONS OF SOUND PROPAGATION IN ISOTHERMAL SURFACE DUCTS .....	88
<i>Alex Zinoviev</i>	

## **D1-PM1-KEYNOTE**

ACOUSTIC SIGNATURE CONTROL ON MARITIME PLATFORMS.....	93
<i>Stephen Moore</i>	

## **D1-PM1-S1: ENVIRONMENTAL NOISE**

NOISE IN A BIG CITY - IS JERUSALEM DIFFERENT? .....	105
<i>Norm Broner</i>	
NOISE IMPACT AND ITS MAGNITUDE.....	113
<i>Robert John Fitzell</i>	
REMOTELY PILOTED AIRCRAFT SYSTEMS (RPAS) NOISE IN AN URBAN ENVIRONMENT.....	123
<i>Belinda Fenner, Clyton Moyo, Mark Latimore, Paul Zissermann</i>	
THE USE OF PROBABILISTIC NOISE MODELLING IN THE DESIGN OF OPEN CUT MINES .....	133
<i>A. Lex Brown, Tim Procter</i>	
INDISCERNIBLE NOISE - A REVIEW OF ACOUSTIC CRITERIA FOR IMPULSIVE NOISE EVENT IN PRESENCE OF BACKGROUND NOISE .....	141
<i>Craig Evenden, Mahbub Sheikh, Matthew Terlich</i>	

## **D1-PM1-S2: UNDERWATER ACOUSTICS 2**

AN IMPROVED CORRELATION OF BUBBLE SIZE DISTRIBUTION WITH THE MEASURED ACOUSTIC SPECTRUM FOR A TURBULENT BUBBLE PLUME .....	151
<i>Li Chen</i>	
ACOUSTIC VELOCITY SIGNATURES OF AIRGUNS - PRELIMINARY RESULTS .....	159
<i>Alec Duncan, Damien Killeen</i>	
INVESTIGATION OF TEMPORAL COHERENCE AND RELATED ISSUES DURING THE LITTORAL CONTINUOUS ACTIVE SONAR 2016 TRIAL .....	164
<i>James Lau, Simon Lourey</i>	
EXPLORING THE CLASSIFICATION OF ACOUSTIC TRANSIENTS WITH MACHINE LEARNING.....	175
<i>Nicholas Padfield</i>	

## **D1-PM2-S1: TRANSPORTATION NOISE 1 - ROAD TRAFFIC NOISE**

RONDA CPX TRAILER MEASUREMENTS IN QUEENSLAND .....	180
<i>Benjamin Hinze, David Kim, Michael Chung, Neil Macabenta</i>	
INVESTIGATION OF UNIFORM AND NON-UNIFORM TRAFFIC DISTRIBUTION ON ROAD TRAFFIC NOISE PREDICTION FOR MULTI-LANE ROADWAYS .....	190
<i>Jeffrey Parnell, Jeffrey Peng, John Wassermann, Nic Hall</i>	
LONG TERM ACOUSTIC PERFORMANCE OF DIFFERENT ASPHALT CONFIGURATIONS.....	200
<i>Felice Wong, James McIntosh, Marc Buret, Pascal Macha</i>	

COMPARISON OF EQUIVALENT CONTINUOUS NOISE LEVELS AND DAY-EVENING-NIGHT COMPOSITE NOISE INDICATORS FOR ASSESSMENT OF ROAD TRAFFIC NOISE .....	210
<i>Jeffrey Parnell, Jeffrey Peng, Nicole Kessissoglou</i>	

### **D1-PM2-S2: UNDERWATER ACOUSTICS 3**

SURFACE GENERATED UNDERWATER NOISE IN OPEN AND ENCLOSED WATERS.....	216
<i>Douglas H Cato</i>	
SIGNATURE WHISTLES OF INDO-PACIFIC BOTTLENOSE DOLPHINS (TURSIOPS ADUNCUS) IN THE FREMANTLE INNER HARBOUR, WESTERN AUSTRALIA .....	223
<i>Chandra Salgado-Kent, Christine Erbe, Rhianne Ward, Sarah Marley, Simone Winter</i>	
A PASSIVE ACOUSTIC SURVEY FOR MARINE MAMMALS CONDUCTED DURING THE 2019 ANTARCTIC VOYAGE ON EUPHAUSIIDS AND NUTRIENT RECYCLING IN CETACEAN HOTSPOTS (ENRICH) .....	226
<i>Ana Širović, Brian S. Miller, Elanor Bell, Elanor Miller, Kathleen M. Stafford, Michael C. Double, Susannah Calderan</i>	
ICEBERGS AND STORMS IN THE SOUTHERN OCEAN AS SOURCES OF LOW FREQUENCY NOISE ALONG AUSTRALIAN SOUTHERN COASTS.....	236
<i>Alexander Gavrilov, Zhi Yong Zhang</i>	

### **D2-AM1-PLENARY**

URBAN SOUND PLANNING - A SOUNDSCAPE APPROACH.....	246
<i>Jian Kang</i>	

### **D2-AM2-KEYNOTE**

STRUCTURAL CONNECTIONS AND THE SOUND INSULATION OF CAVITY WALLS AND DOUBLE GLAZING .....	252
<i>Laurence Davy John</i>	

### **D2-AM2-S1: TRANSPORTATION NOISE 2 - AIRCRAFT NOISE**

COMPETING CONSIDERATIONS FOR AIRCRAFT NOISE MONITOR PLACEMENTS.....	259
<i>Belinda Fenner, Clyton Moyo, Mark Latimore, Paul Zissermann</i>	
CITYWIDE NOISE MAPPING FOR ANEF CONTOURS .....	265
<i>Benjamin Hinze, Janos Tsakiris, Jessica Zhao, Wei Tang</i>	
BENCHMARKING A QUASI-STEADY METHOD FOR PREDICTING PROPELLER UNSTEADY LOADS .....	269
<i>Alex Skvortsov, Paul Croaker, Paul Dylejko, Richard Howell</i>	
EXPERIMENTAL INVESTIGATION OF CONTRA-ROTATING MULTI-ROTOR UAV PROPELLER NOISE.....	277
<i>Michael Kingan, Robin Go, Ryan McKay</i>	
ASSESSING THE ENVIRONMENTAL IMPACTS OF AIRCRAFT NOISE .....	287
<i>Belinda Fenner, Clyton Moyo, Mark Latimore, Paul Zissermann</i>	

## **D2-AM2-S2: BUILDING ACOUSTICS & VIBRATION**

MASS-AIR-MASS RESONANCE CAVITY SUPPRESSION USING HELMHOLTZ RESONATORS .....	294
<i>Andrew Hall, George Dodd, Gian Schmid</i>	
ACOUSTICS BEHAVIOUR OF CLT STRUCTURE: TRANSMISSION LOSS, IMPACT NOISE INSULATION AND FLANKING TRANSMISSION EVALUATIONS.....	305
<i>Antonino Di Bella, Fabio Loriggiola, Luca Dall'Acqua d'Industria, Nicola Granzotto</i>	
THE EFFECTS OF MASS-AIR-MASS RESONANCE ON THE $R_W + C_{TR}$ PERFORMANCE OF WALL SYSTEMS .....	312
<i>Peter Pirozek</i>	
EFFECTIVENESS OF THE RUBBER BALL COMPARED TO THE TAPPING MACHINE AS THE IMPACT SOURCE TO MEASURE THE IMPACT SOUND INSULATION PROPERTIES .....	322
<i>Hasitha-Nayanajith Polwaththe-Gallage, Hawkins Roger, Huang Eric, Ross H Palmer</i>	
A PRACTICAL APPROACH TO BUILDING ISOLATION .....	329
<i>Douglas G. Valerio</i>	

## **D2-AM2-S3: UNDERWATER ACOUSTICS 4**

LOW-FREQUENCY UNDERWATER ACOUSTICS SENSITIVITY CALIBRATION IN A CHAMBER .....	336
<i>Peng Li, Yilong Yin</i>	
INVESTIGATION OF UNDERWATER HULL RADIATION DUE TO MACHINE NOISE .....	343
<i>Daniel Wilkes, James Forrest, Xia Pan</i>	
THE SOUNDS OF ELECTRIC FERRIES .....	354
<i>Alec Duncan, Christine Erbe, James Parsons Miles, Karin Parsons Sylvia</i>	

## **D2-PM1-KEYNOTE**

ACOUSTIC DESIGN FOR THE MELBOURNE METRO TUNNEL PROJECT .....	357
<i>Derek Thompson, Joseph Digerness, Ken-Yi Fong, Kym Burgemeister, Philip Setton</i>	

## **D2-PM1-S1: TRANSPORTATION NOISE 3 - RAIL NOISE & VIBRATION**

GROUND-BORNE NOISE & VIBRATION PROPAGATION MEASUREMENTS AND PREDICTION VALIDATIONS FROM A RAILWAY TUNNEL PROJECT .....	372
<i>Conrad Weber, Peter Karantonis, Puckeridge Hayden</i>	
CURVING NOISE FROM THE WESTERN AUSTRALIAN FREIGHT RAIL NETWORK: WAYSIDE MONITORING AND MECHANISM ANALYSIS.....	380
<i>Binghui Li, Luke Zoontjens</i>	
COMPARISON OF RAIL NOISE MODELLING WITH CADNAA AND SOUNDPLAN .....	385
<i>Hayden Puckeridge, Timothy Braunstein, Weber Conrad</i>	

THE EFFECT OF TRACK DECAY RATE ON IN-CARRIAGE NOISE FOR RESILIENT TRACK FIXINGS.....	394
<i>Joseph Digerness, Ken-Yi Fong, Kym Burgemeister, Nick Wedd, Philip Setton</i>	

## **D2-PM1-S2: ROOM ACOUSTICS 1 - DESIGN & METHODS**

RAY-TRACING COMPUTER-AIDED-DESIGN TOOLS IN AUDITORIA DESIGN - PAST AND FUTURE.....	404
<i>Peter Fearnside, Yuxiao Chen</i>	

USING ACOUSTIC CAMERAS WITH 3D MODELLING TO VISUALISE ROOM REFLECTIONS .....	413
<i>Derek Thompson, Lily Harkom</i>	

LATERAL REFLECTIONS IN THE SYDNEY TOWN HALL; PRESERVATION OF ROOM ACOUSTICS IN A HISTORICALLY SIGNIFICANT VENUE.....	420
<i>Matthew Ottley</i>	

IMPROVING SHAPE DESIGN OF AUDITORIUMS WITH REAL-TIME FEEDBACK BASED ON PARAMETRIC MODELING, SIMULATION AND MACHINE LEARNING .....	434
<i>Chunxiao Wang, Shuai Lu</i>	

## **D2-PM1-S3: SIGNAL PROCESSING**

USE OF ROBUST CAPON BEAMFORMER FOR EXTRACTING AUDIO SIGNALS.....	440
<i>Chaoying Bao, Jie Pan, Ling Jia</i>	

USE OF A DEEP CONVOLUTIONAL NEURAL NETWORK AND BEAMFORMING FOR LOCALISATION AND DIAGNOSIS OF INDUSTRY NOISE SOURCES .....	447
<i>Chaoying Bao, David Matthews, Gareth Capon, Hao Chen, Hongmei Sun, Jie Pan</i>	

2D TOMOGRAPHIC IMAGING OF ACTIVE SONAR ECHOES USING A NON-UNIFORM FFT TECHNIQUE .....	457
<i>Binh Nguyen, Hai-Tan Tran, Shane Wood</i>	

CEPSTRAL COEFFICIENT FEATURE EXTRACTION FOR ACTIVE SONAR CLASSIFICATION.....	467
<i>Binh Nguyen, Boaz Suranyi</i>	

## **D2-PM2-S1: WIND TURBINE NOISE**

COMPARISON BETWEEN PERCEPTUAL RESPONSES TO TRAFFIC NOISE AND WIND FARM NOISE IN A NON-FOCUSED LISTENING TEST.....	477
<i>Bastien Lechat, Branko Zajamsek, Gorica Micic, Kristy Hansen, Mahmoud Alamir, Peter Catcheside, Phuc Nguyen</i>	

WIND FARM INFRASOUND DETECTABILITY AND ITS EFFECTS ON THE PERCEPTION OF WIND FARM NOISE AMPLITUDE MODULATION .....	487
<i>Branko Zajamsek, Gora Micic, Kristy Hansen, Peter Catcheside, Phuc Nguyen Duc</i>	

## **D2-PM2-S2: ROOM ACOUSTICS 2 - MATERIALS**

WALK-THROUGH AURALIZATION FRAMEWORK FOR VIRTUAL REALITY ENVIRONMENTS POWERED BY GAME ENGINE ARCHITECTURES, PART II .....	495
<i>André Verstappen, Daniel Castro, Samuel Platt</i>	
20 YEARS OF MICRO-PERFORATED (TRANSPARENT) SOUND ABSORBERS .....	506
<i>Christian Nocke</i>	

## **D3-AM1-S1: COGNITION & INDOOR ENVIRONMENT**

LEARNED HELPLESSNESS: EFFECT ON FUTURE PERFORMANCE FROM NOISE AND NEGATIVE PAST PERFORMANCE.....	514
<i>Brett R.C. Molesworth, Marion Burgess</i>	
IMPROVING SPEECH PRIVACY AND ACOUSTIC COMFORT IN OFFICES .....	517
<i>Alex Boudreau, André L'Espérance, François Gariépy, Louis-Alexis Boudreault, Roderick Mackenzie</i>	
CO-TEACHING IN (REFURBISHED) FLEXIBLE LEARNING SPACES: PROMOTING QUALITY ACOUSTICS FOR LEARNING AND COLLABORATION.....	526
<i>Amanda Robinson, Anne Bellert</i>	
RESTAURANT ACOUSTIC COMFORT ASSESSMENT METHODS .....	535
<i>Colin Tickell, Stephen Collings</i>	

## **D3-AM1-S2: NOISE CONTROL 1**

THE EFFECT OF HEMISPHERICAL SURFACE ON NOISE SUPPRESSION OF A SUPERSONIC JET .....	543
<i>Anthony Zander, Jesse Coombs, Tyler Schembri</i>	
MODELLING THE VIBRO-ACOUSTIC BEHAVIOUR OF EXPANSION CHAMBER SILENCERS FOR FLUID-FILLED PIPE SYSTEMS .....	553
<i>Alex Skvortsov, Ian MacGillivray, Stephen Moore, Steven De Candia</i>	
ANALYTICAL MODELS OF ACOUSTIC SCATTERING BY AN INFINITE AIR-FILLED STEEL CYLINDRICAL SHELL IN WATER UNDER PLANE-WAVE EXCITATION.....	564
<i>Marshall V. Hall</i>	
TRANSMISSION, REFLECTION AND ENERGY EXCHANGES FOR WAVES IN FINITE ONE-DIMENSIONAL PT-SYMMETRIC PERIODIC STRUCTURES.....	572
<i>Darryl McMahon</i>	

## **D3-AM2-S1: AEROACOUSTICS**

PREDICTION OF SMALL-SCALE ROTOR NOISE USING A LOW-FIDELITY-MODEL-BASED FRAMEWORK .....	582
<i>Li Chen, Matteo Giacobello, Ronny Wajaja, Trevor Batty</i>	
THE INFLUENCE OF FLEXIBLE TABS ON HIGH SPEED JET NOISE .....	590
<i>Anthony Zander, Jesse Coombs, Tyler Schembri</i>	



EMBEDDED LARGE EDDY SIMULATION METHOD FOR PREDICTING FLOW-INDUCED NOISE .....	597
<i>Graeme Lane, Paul Croaker, Yan Ding</i>	

**D3-AM2-S2: NOISE CONTROL 2**

LIGHTWEIGHT NOISE BARRIERS: THE REAL-WORLD EFFECTS OF PANEL SURFACE MASS AND ABSORPTION ON ACOUSTIC PERFORMANCE.....	607
<i>Kanvin Chen, Timothy Beresford</i>	

CASE STUDIES OF INNOVATIVE WINDOW AND BALCONY DESIGN FOR TRAFFIC NOISE MITIGATION .....	615
<i>Andy K.Y. Lai, Frank S.M. Cheung, Henry C.K. Chan, Leo Y.C. Li</i>	

STATIC INSERTION LOSS, TRANSMISSION LOSS AND NOISE REDUCTION TESTING OF AN ACOUSTIC LOUVRE .....	625
<i>David J. Mee, Dexter Tan, Michael Hayne, Richard Devereux</i>	

**Author Index**