

AUDITORIUM ACOUSTICS 2008

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# Auditorium Acoustics – Oslo, Norway

3rd - 5th October 2008 Thon Hotel Opera, Oslo, Norway



Organised by the Institute of Acoustics in collaboration with the  
Norwegian Acoustical Society and EAA

# Auditorium Acoustics

## FRIDAY 3RD OCTOBER

08.00	Registration and coffee	12.10	Lunch
08.45	Welcome	13.00	<b>The acoustic subjective assessment of spaces for performers</b> <i>Maria Giovannini &amp; A Astolfi, Politecnico of Torino, Italy</i>
09.00	<b>Auditoria in Norway – an overview</b> <i>Tor Halmrast, Statsbygg, Norway</i>	13.20	<b>Simplified room acoustic measurements</b> <i>Tor Halmrast, Statsbygg, Anders Buen, Brekke &amp; Strand, Norway</i>
09.20	<b>The acoustic design of the new Drama House for the Royal Theatre in Copenhagen</b> <i>Anders Gade &amp; Bo Mortensen, Gade &amp; Mortensen Akustik, Denmark</i>	13.40	<b>On the extended theory of sound fields in auditoria</b> <i>Nicola Prodi, University of Ferrara, Italy</i>
09.40	<b>Kilden – design for a contemporary shoebox concert hall in Kristiansand</b> <i>Helen Butcher &amp; Rob Harris, Arup Acoustics</i>	14.00	<b>Objective assessment of concert hall acoustics</b> <i>Mike Barron, University of Bath</i>
10.00	<b>The new Stavanger Konserthus</b> <i>Eckhard Kahle, Kahle Acoustics Belgium, Tønnes Ognedal, Sinus, Norway &amp; Henrik Möller, Akukon, Finland</i>	14.20	Tea and Poster Session <i>(see right page)</i>
10.20	Coffee and Posters <i>(see right page)</i>	15.50	<b>Will pure acoustical concerts and opera performances survive?</b> <i>Asbjørn Krokstad, NTNU, Norway</i>
10.50	<b>Renovation of the concert hall The Doelen</b> <i>Magriet Lautenbach, Peutz, Holland</i>	16.10	<b>Converting movie theatres into multipurpose concert halls</b> <i>Attila Nagy, Andras Kotschy &amp; Ferenc Tamas, Hungary</i>
11.20	<b>Concert hall stage acoustics from the perspectives of the performers and physical reality</b> <i>Jens Jørgen Dammerud &amp; Mike Barron, University of Bath</i>	16.30	<b>How acoustical engineering compels architects to creativity</b> <i>Michel Retbi, ENSAPVS, Paris, France &amp; Jean-Dominique Polack, UPMC, France</i>
11.30	<b>An in-depth analysis of the double bass-stage floor contact</b> <i>Knut Guettler, Norwegian Academy of Music, Anders Buen, Brekke &amp; Strand, Norway, Anders Askenfelt, Royal Institute of Technology, Sweden</i>	16.50	Close
11.50	<b>A loudspeaker orchestra for concert hall studies</b> <i>Jukka Pätynen, Saraki Tervo &amp; Tapio Lokki, Helsinki University of Technology, Finland</i>	19.00	Reception
		19.30	Conference Dinner

## POSTER SESSIONS

### The importance of bass clarity in pop, rock and multi-purpose venues

*Niels Adelman-Larsen, Flex Acoustics, Denmark*

### Ali Qapu: Persian historical music room

*Hassan Azad, University of Tehran*

### Refurbishing the 18th century theatre "de la Sena" (scenery)

*Cesarion Bordone, Modulo Uno, Italy*

### Telepresence room acoustics

*Øystein Bredvei, Tron V Tronstad & Johan L Nielsen, Tandberg, Norway*

### How dry does the recording for auralizations need to be?

*Anders Buen, Brekke & Strand, Norway*

### Suspended absorbed elements to control acoustic environment inside an ancient building

*Andrea Vallati & M Coppi, University of Rome*

### Characterizing sound sources for room-acoustical measurements

*Guillaume Defrance, Laurent Daudet & Jean-Dominique Polack, UPMC, France*

### How to describe good podium acoustics

*Jan-Inge Gustafsson, Akustikon & Malin Cederlof, Ingemansson Sweden*

### The auditorium of the Morgan Library, computer aided design and post-construction results

*Brian Katz, LIMSI-CNRS, France & Eckhard Kahle, Kahle Acoustics, Belgium*

### Investigating diffuser profiles for concert hall acoustics

*Jae Ho Kim, Yong Hee Kim & Jin Jeon, Hanyang University, Korea*

### Measuring absorption coefficients of open ceilings in multi-purpose halls

*Yong Hee Kim & Jin Jeon, Hanyang University, Korea*

### Acoustic design of rehearsal spaces and concert halls

*Maarten Luykx & M Vercaemmen, Peutz Consultants, The Netherlands*

### Time domain boundary element methods for acoustic scattering from curved surfaces

*Georgios Natsiopoulos, Akustikon AB, Sweden*

### Design of public address systems for demanding acoustical conditions in halls

*Lars Ødemark & Bård Støfringsdal, COWI, Norway*

### Studio Acusticum – a concert hall with variable volume

*Rikard Ökvist, University of Luleå, Sweden*

### Acoustics and sound insulation in rooms for music purposes – Council for Music Organisations in Norway and their work for practice rooms and concert facilities in Norway

*Jon Olsen, Council for Music Organisations in Norway*

### Sound insulation of lightweight structures and their design implications – a case in point

*Daryl Prasad, Capita Symonds*

### Reflector arrays and their frequency limits – a status report

*Magne Skålevik, Brekke & Strand, Norway*

### Diffusivity and its significance to effective seat absorption in concert halls

*Magne Skålevik, Brekke & Strand, Norway*

### Acoustics evaluation of typical errors in the design of modern lectures theatres

*Alexandre Sotiropoulou, G Poulakos, G Kabourakis, Technical University of Athens*

### On the influence of ceiling and audience profile on the reverberation time and other room acoustical parameters

*Uwe Stephenson, HafenCity University, Germany*

### Speech intelligibility and activity noise in open plan education spaces

*Bård Støfringsdal, COWI, Norway*

### Artistic contributions to room acoustic sound design

*Jan Tro, Norwegian University of Science & Technology*

### Classroom soundfield equalisation – universal design

*Arne Vik, University of Trondheim, Norway*

### Recreating performing environment for poly-choral music

*Wei-Chun Wang, St John's University, Taiwan*

### An approach to orchestral canopy design optimisation

*Michael Whitcroft, Sandy Brown Associates*

### Renovation of the ex-theatre Puccini in Milan. Prediction of acoustic quality of three rooms

*Giovanni Zambon, Simone Radaelli, University of Milan, Italy*

### Measurements and study on variable acoustics in performance spaces

*Oskar Lindfors & Henrik Möller, Akukon Consulting Engineers, Finland*

# Auditorium Acoustics

## SATURDAY 4TH OCTOBER

09.00	<p>Proceed to Opera House An overview of the acoustics of the Oslo Opera House</p> <p><i>Lars Strand, Brekke &amp; Strand, Norway</i></p>
	<p>The achieved acoustics of the Store Sal in the Oslo Opera House</p> <p><i>Rob Harris &amp; Jeremy Newton, Arup Acoustics</i></p>
	<p>Room acoustics in the Scene II in the new Oslo Opera and the Ridehuset – two variable acoustics coupled space venues</p> <p><i>Anders Buen &amp; Lars Strand, Brekke &amp; Strand, Norway</i></p>
11.00	Group tours of the Opera House
12.30	Lunch
13.30	<p>Design development of the opera houses in Oslo, Linz and Suzhou (opening between 2007 &amp; 2011)</p> <p><i>Mark Stroomer, Theatre Projects</i></p>
13.50	<p>Experiences of a musician of the Oslo Opera</p> <p><i>Gunnar Ihlen, DNO&amp;B Orchestra, Norway</i></p>
14.10	<p>Electro-acoustics systems for the new Opera House in Oslo Norway</p> <p><i>Alf Berntson, Artifon, Sweden &amp; Frode Bye, Cowi, Norway</i></p>
14.30	<p>Performance Hall Acoustics from the point of view of the solo singer</p> <p><i>Peter Klaveness, Multiconsult, Opera Singer, Norway</i></p>
14.50	Tea and Posters
15.10	<p>Design of modern theatres in Brazil</p> <p><i>José Nepomuceno, Acustica &amp; Sonica, Brazil</i></p>
15.30	<p>The acoustic design of the Elizabeth Murdoch Hall, Melbourne, Australia</p> <p><i>Raf Orłowski, Arup Acoustics</i></p>
15.50	<p>Acoustic design of theatres for natural speech</p> <p><i>Martijn Vercammen &amp; M Luykx, Peutz Consultants BV, The Netherlands</i></p>
16.10	<p>Subjective evaluation of the Beijing National Grand Theatre of China</p> <p><i>Isabelle Schmich, C Rougier, CSTB, France, Z Xiangdong, Y Xiang, L Guo-Qi, The National Grand Theatre</i></p>
16.30	Dinner
17.30	Arrive at Opera House for 'Don Carlos' start at 18.00

## SUNDAY 5TH OCTOBER

09.00	<p>The St Michaelis Church in Lüneburg – an example for changing room acoustics</p> <p><i>Jürgen Meyer, Consultant, Germany</i></p>
09.20	<p>The acoustical survival of San Vitale, Ravenna, Italy, through two millennia</p> <p><i>Lamberto Tronchin, University of Bologna, Italy &amp; David Knight, University of Southampton</i></p>
09.40	<p>Acoustics of traditional Chinese Theatres</p> <p><i>Wei-Hwa Chiang, National Taiwan University of Science &amp; Technology &amp; Yen-Kun Hsu, Tung-Fang Institute of Technology, Taiwan</i></p>
10.00	<p>Room acoustic parameters and their distribution over concert hall seats</p> <p><i>Magne Skålevik, Brekke &amp; Strand, Norway</i></p>
10.20	<p>Subjective evaluation of the acoustics of jazz music auditoria: multi dimensional description of evaluations</p> <p><i>Alexandra Sotiropoulou, G Poulakos, J Karayannis, J Tzouvadakis, Technical University of Athens</i></p>
10.40	<p>Auralisation of concert halls using multi-source representation of a symphony orchestra</p> <p><i>Jens Holger Rindel &amp; Claus Lyng Christensen, Odeon, Denmark</i></p>
11.00	Coffee
11.30	<p>Acoustics of the new Poitiers Cultural Facility (France): Concert hall and opera theatre</p> <p><i>Daniel Commins, Commins Acoustics Workshop, France</i></p>
11.50	<p>Volumetric diffusers inspired by percolation fractals</p> <p><i>Trevor Cox, R J Hughes, J A S Angus, University of Salford &amp; G A Gehring, D M Whittaker, M Pogson, University to Sheffield</i></p>
12.10	<p>Diffuser design for the new IFEZ Arts Center concert hall using scale models</p> <p><i>Jin Jeon &amp; Yong Hee Kim, Hanyang University, Korea</i></p>
12.30	<p>The acoustics of the new Symphonic Hall in Aarhus, Denmark</p> <p><i>Ditte Kleener, Richard M Ballinger &amp; Carsten Lemvig Fog, COWI, Denmark</i></p>
	Close
13.00	Lunch

# REGISTRATION FORM

**Auditorium Acoustics, Oslo 2008** – 3rd - 5th October 2008

Name:	<input type="text"/>		
Business:	<input type="text"/>		
Address:	<input type="text"/>		
	<input type="text"/>	Postcode:	<input type="text"/>
Country:	<input type="text"/>	E-mail:	<input type="text"/>
Telephone:	<input type="text"/>	Fax:	<input type="text"/>

Please register me as a delegate:

**Delegate Fees:** *Covers participation in the conference activities, the Conference CD Proceedings, refreshments and lunch on Friday, Saturday and Sunday. Dinner on Friday and Saturday, tour of the Opera House and one ticket for the Opera*

- |   |          |
|---|----------|
| <input type="checkbox"/> Fee for speakers   | £ 245.00 |
| <input type="checkbox"/> Fee for IOA/NAS/EAA Members and other authors                      | £ 470.00 |
| <input type="checkbox"/> Fee for non members  | £ 535.00 |
| <input type="checkbox"/> Fee for Students: <i>(does not include dinner or Opera ticket)</i> | £ 120.00 |
| <input type="checkbox"/> I would like vegetarian meals                                      |          |

**Day Rates:** *Does not include dinners or Opera ticket*

- |              |                                 |                                   |                                 |          |
|--------------|---------------------------------|-----------------------------------|---------------------------------|----------|
| Members:     | <input type="checkbox"/> Friday | <input type="checkbox"/> Saturday | <input type="checkbox"/> Sunday | £ 215.00 |
| Non members: | <input type="checkbox"/> Friday | <input type="checkbox"/> Saturday | <input type="checkbox"/> Sunday | £ 245.00 |
| Students:    | <input type="checkbox"/> Friday | <input type="checkbox"/> Saturday | <input type="checkbox"/> Sunday | £ 60.00  |

**Extra tickets:**

<input type="checkbox"/> Friday Conference dinner	£ 45.00
<input type="checkbox"/> Saturday dinner	£ 35.00
<input type="checkbox"/> Opera tickets <i>(only one extra ticket per delegate)</i>	£ 60.00

**Accommodation:** *Accommodation should be booked directly with the hotel, alternative hotel details are available on the Institute website events page: [www.ioa.org.uk](http://www.ioa.org.uk)*

Thon Hotel Opera, Christian Frederiksplass 5, Postboks 397 Sentrum, 0103 Oslo, Norway  
Tel: +47 24 103000 Email: [opera@thonhotels.no](mailto:opera@thonhotels.no)  
Standard room NOK 1350 (£133.76) per room per night  
Economy room NOK 1050 (£104.00) per room per night (£may vary)

**Exhibition fee:** *Additional exhibitors should register at members' rate. Limited space available.*

- |   |          |
|---|----------|
| <input type="checkbox"/> Covers one person registered as a delegate, exhibition space | £ 600.00 |
|---|----------|

**Proceedings:** *I am unable to attend the conference. Please send me a copy of the Conference CD proceedings.*

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|--|--|
| <input type="checkbox"/> Members £ 20.00 | <input type="checkbox"/> Non-Members £ 30.00 |
|--|--|

**Payment instructions:**

Total: £

There are four ways to pay. Please indicate your chosen method: (CANCELLATIONS ARE PAYABLE IN FULL)

- 1. Cheques:** Payable to **Institute of Acoustics** (in £ Sterling drawn on UK bank account)
- 2. Direct to Bank:** BACS: Account No: 00375204 Sort Code: 30 94 81  
Bank Transfer: SWIFT LOYDGB21024 IBAN GB27LOYD30948100375204  
Bank Address: Lloyds TSB Knightsbridge Branch, PO Box 663, 79-81 Brompton Road, London SW1 1DD  
*A copy of the instructions to the bank should be attached with the registration form.  
Please quote 'Oslo' and the name of the delegate registered.*

- 3. Invoice:** *Please supply purchase order number:*

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Card holders name: <i>(if different from above)</i>
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Postcode: