RASD 2019

Recent Advances in Structural Dynamics

Programme

15-17 April 2019

Lyon, France
Welcome to Lyon and to RASD2019

On behalf of the Organising Committee, it is a pleasure to welcome you to Lyon for the XIIIth International Conference on Recent Advances in Structural Dynamics (RASD2019). Lyon is a beautiful city with universities renowned in the field of acoustics and structural dynamics, so we really hope that bringing RASD2019 to Lyon will be stimulating and that all of you will have an enjoyable conference!

The conference is devoted to theoretical, numerical and experimental developments in structural dynamics and their application to all types of structures and dynamical systems. The conference will reflect the state-of-the-art structural dynamics and dynamical systems in science and engineering practice and is an opportunity to exchange scientific, technical and experimental ideas. The Conference Proceedings include 101 papers by authors from over 24 countries and are contained on a USB memory stick included in your conference pack. At the end of the conference, a special award will be assigned to the best presentation, so remember to vote!

The conference will be held at the conference centre Valpré Lyon (1 chemin de Chalin, 69130 Ecully, Lyon, France, en.valpre.com). Registration will take place from 08:00 on Monday 15 April in the main reception (RASD2019 registration desk, tel: +33 (0) 4 72 18 05 05).

The three lecture theatres being used are the Amphitheatre, Room 1 Valoise, and Room 2 Ecureuils. To locate the lecture theatres refer to the floor plan of the Valpré Lyon on the last page of this programme. Refreshments will be served on the ground floor in the morning and between the two technical sessions in the afternoon, with lunch being served in the same area.

Following the afternoon session on Monday, there will be a reception at the Valpré Lyon; this is for all delegates and accompanying persons. On Tuesday evening, there will be a conference dinner in Lyon city centre at the Brasserie Georges (30 Cours de Verdun Perrache, 69002 Lyon, France, www.brasseriegeorges.com). This is within walking distance from the Place Bellecour and we will gather there before walking all together to the restaurant.

I would like to thank the members of the Organising Committee and the Conference Secretariat for their considerable help. In particular I would like to thank the Laboratory of Vibration and Acoustics of INSA Lyon for hosting this conference.

I hope you will all have an interesting and exciting meeting, and a pleasant stay in Lyon.

Emiliano Rustighi, Conference Chair
Conference Outline

Monday 15 April 2019

08:00 – 12:00  Registration
08:45 – 09:00  Opening Ceremony
09:00 – 10:00  Plenary Session 1
10:00 – 10:30  Refreshments
10:30 – 12:30  Technical Sessions
12:30 – 13:40  Lunch
13:40 – 14:40  Plenary Session 2
14:50 – 16:10  Technical Sessions
16:10 – 16:40  Refreshments
16:40 – 18:00  Technical Sessions
18:30 – 20:00  Conference Reception, Valpré

Tuesday 16 April 2019

09:00 – 10:00  Plenary Session 3
10:00 – 10:30  Refreshments
10:30 – 12:30  Technical Sessions
12:30 – 13:40  Lunch
13:40 – 14:40  Plenary Session 4
14:50 – 16:10  Technical Sessions
16:10 – 16:40  Refreshments
16:40 – 18:00  Technical Sessions
19:30  Conference Dinner, Brasserie Georges

Wednesday 17 April 2019

09:00 – 10:00  Plenary Session 5
10:00 – 10:30  Refreshments
10:30 – 12:30  Technical Sessions
12:30 – 12:45  Closure Session and Best Presentation Award
12:45  Lunch
15:00  Tour of the Laboratory of Vibration and Acoustics, and the Contact and Structure Mechanics Laboratory, INSA Lyon (optional)
## Monday 15 April 2019

### 08:45 Opening Ceremony
Amphitheatre

**Professor Nicolas Rivière**, *Deputy Director of Research: Environment, INSA, France*

**Dr Neil Ferguson**, *Institute of Sound and Vibration Research, University of Southampton, UK*

### 09:00 Plenary Session 1
Amphitheatre
Chair: Q. Leclère

**Professor Li Cheng**, “Structural Wave Manipulation through Acoustic Black Holes”, *Hong Kong Polytechnic University, Hong Kong*

### 10:00 Refreshments

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<thead>
<tr>
<th><strong>AMPHITHEATRE</strong></th>
<th><strong>ROOM 1 VALOISE</strong></th>
<th><strong>ROOM 2 ECUUREILS</strong></th>
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<tbody>
<tr>
<td><strong>Active Vibration Control and Smart Structures I</strong> Chairs: P. Gardonio</td>
<td><strong>Vibroacoustics</strong> Chairs: V. Sorokin and E. Manconi</td>
<td><strong>System Identification and Inverse Problems</strong> Chairs: R. Fuentes and M. Aucejo</td>
</tr>
<tr>
<td><strong>10:30</strong></td>
<td>V. Sorokin (122) On elastic wave propagation in quasi-periodic structures</td>
<td>R. Fuentes (40) Efficient parameter identification and model selection in dynamical systems via sparse Bayesian learning</td>
</tr>
<tr>
<td><strong>10:50</strong></td>
<td>G. Duval (29) Modelling the vibrational field of a single-layered ground containing a buried object</td>
<td>T.J. Rogers (65) Identification of a Duffing Oscillator Using Particle Gibbs with Ancestor Sampling</td>
</tr>
<tr>
<td><strong>11:10</strong></td>
<td>E. Turco (78) Experimental implementation of a shunted electro-magnetic Tuneable Vibration Absorber</td>
<td>E. Manconi (228) Wave transmission from asymmetrical changes of cross-sectional area in a beam</td>
</tr>
<tr>
<td><strong>11:30</strong></td>
<td>N. Battistella (172) Semi-active dampers for vibration control of professional washing machines</td>
<td>X. Niu (149) An analytical model of transducer array arrangement for guided wave excitation and propagation on cylindrical structures</td>
</tr>
<tr>
<td><strong>11:50</strong></td>
<td>S. Chesné (279) Hybrid Mass Damper: application to an helicopter</td>
<td>Y. Yang (277) Prediction of sound transmission through periodic structures using a wave and finite element method</td>
</tr>
</tbody>
</table>

### 12:30 Lunch

### 13:40 Plenary Session 2
Amphitheatre
Chair: N. Totaro

**Dr Alain Berry**, “Time-space indentification of dynamic transverse loads on plane elastic structures”, *Université de Sherbrooke, Canada*

### 14:00 Refreshments

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<tr>
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<tbody>
<tr>
<td><strong>Active Vibration Control and Smart Structures II</strong> Chair: S. Chesné</td>
<td><strong>Structural Acoustics and Noise Control</strong> Chair: S. Bolton</td>
<td><strong>Structural Model Validation I</strong> Chair: K. Sweitzer</td>
</tr>
<tr>
<td><strong>14:50</strong></td>
<td>Y. Jiang (303) An experimental study on an energy harvesting shock absorber with mechanical motion rectification</td>
<td>D. Zhao (221) The acoustic response of stiffened plates</td>
</tr>
<tr>
<td><strong>15:30</strong></td>
<td>E. Rustighi (185) Prediction of the acoustic emissions of a rigid electrodes DEAP loudspeaker</td>
<td>Y. Xue (55) Structural Damping by Layers of Fibrous Media Applied to a Periodically-Constrained Vibrating Panel</td>
</tr>
<tr>
<td><strong>15:50</strong></td>
<td>U. Manella (156) Development of a feedback control solution for Multi-Input Multi-Output swept sine testing in a Virtual Shaker environment</td>
<td>S. Miyano (74) Effect of contact area with fixture on dynamic behavior of joint interface in ultrasonic welding of thermoplastics</td>
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## MONDAY 15 APRIL 2019

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<tr>
<th>AMPHITHEATRE</th>
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<tbody>
<tr>
<td><strong>Rotors Dynamics and Control</strong></td>
<td><strong>Energy Harvesting</strong></td>
<td><strong>Structural Model Validation II</strong></td>
</tr>
<tr>
<td>Chair: P. Forte</td>
<td>Chair: L.D. Bo and Y.C. Kim</td>
<td>Chair: L. Solazzi</td>
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<tr>
<td>16:40</td>
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<tr>
<td>M. Barsanti (63)</td>
<td>M. D. Bo (104)</td>
<td>M.E. Absawy (39)</td>
</tr>
<tr>
<td>Random error propagation and uncertainty analysis in the dynamic characterization of tilting pad journal bearings</td>
<td>Sealing laws of electromagnetic and piezoelectric seismic vibration energy harvesters</td>
<td>Dynamic Behavior of Variable Cross-Section Offshore Wind Turbine with Flexible Foundation Using Finite Element Method</td>
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<tr>
<td>17:00</td>
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<td>17:20</td>
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<tr>
<td>G. Tuzzi (232)</td>
<td>M. Perez (284)</td>
<td>D. Chawda (130)</td>
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<tr>
<td>Investigation on coupling between disc “Umbrella mode” and shaft bending modes in a rotating shaft-disc assembly</td>
<td>Optimization of a two degree-of-freedom vibration energy harvester for a dual-frequency excitation</td>
<td>Dynamic amplification factor and Response the spectrum of Cantilever Beam under Successive Moving Loads</td>
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<tr>
<td>17:20</td>
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<tr>
<td>F. Dohnal (257)</td>
<td>K. Bendine (26)</td>
<td>Z. Saeed (192)</td>
</tr>
<tr>
<td>Tuning of Parametric Excitation for Rotor Balancing</td>
<td>Numerical modelling of piezoelectric based energy harvesting from bridge structure using ANSYS</td>
<td>Design and performance test of an electromagnetic energy harvester to supply sustainable power for smart tyre monitoring system</td>
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<td>17:40</td>
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<td>19:00</td>
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<tr>
<td>Z. Saeed (192)</td>
<td>Y.C. Kim (305)</td>
<td>Reception, Valpré Lyon</td>
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<tr>
<td>Substructuring for Contact Parameters Identification in Bladed-disks</td>
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Tuesday 16 April 2019

09:00 Plenary Session 3
Amphitheatre
Chair: E. Rustighi

Professor Gaetan Kerschen, “Dynamic vibration absorbers: revisiting classical results and introducing new tuning strategies”, University of Liége, Belgium

10:00 Refreshments

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<tbody>
<tr>
<td>10:30</td>
<td>G. Čepon (254)</td>
<td>Introduction of line contact in frequency-based substructuring process using measured rotational degrees of freedom</td>
<td>E. Mucchi (56)</td>
</tr>
<tr>
<td>10:50</td>
<td>H. Fakhreddine (144)</td>
<td>Geometrically nonlinear forced vibrations of fully clamped multi-span beams carrying multiple masses and resting on a finite number of simple supports</td>
<td>V. Kumar (188)</td>
</tr>
<tr>
<td>12:10</td>
<td>N.K. Sahu (60)</td>
<td>Experimental analysis of dynamic stability characteristics of beams under parametric excitation</td>
<td>H. Li (296)</td>
</tr>
<tr>
<td>12:30</td>
<td>Lunch</td>
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</table>
| 13:40  | Plenary Session 4
Amphitheatre
Chair: T. Waters

Professor Domingos A. Rade, “Dynamic modeling of advanced composite materials”, Aeronautics Institute of Technology, Brazil

14:50 Passive Vibration Control and Devices I
Chair: T. Waters

A. Di Egidio (44) | Visco-elastic coupling between a linear two-dof system and a rocking rigid block to improve the dynamic response |

E. Capire-Lernout (87) | Nonparametric probabilistic approach for uncertainty quantification of geometrically nonlinear mistuned bladed-disks. |

L. Benchouaf (240) | The influence of geometric imperfections on large-amplitude vibrations of thin simply supported plate by an asymptotic numerical method |

15:10 Investigation of Inerter-based Dynamic Vibration Absorber for Machining Chatter Suppression
Chair: M. Boltezar

E. Pesaresi (88) | Analysis of synthesized non-Gaussian excitations for vibration-based fatigue life testing |

M. de Castro Magalhaes (301) | Non-linear dynamic vibration absorbers (NDVA) using targeted energy transfer (TET) – A review |

15:30 Optimal design of inerter-integrated vibration absorbers for seismic retrofitting of a high-rise building in Colombia

A. Trapp (141) | Characterizing non-Gaussian vibration loading using the trispectrum |

S. Chen (298) | An explicit-implicit method for nonlinear time-domain soil-structure interaction analysis |

15:50 Shunted piezoelectrical suspension for vibration attenuation: Numerical simulations and experimental results

G.S. Sharma (280) | Effect of geometric and material uncertainties on the acoustic performance of a voided rubber in water |

16:10 Refreshments
## Tuesday 16 April 2019

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<thead>
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<th>Time</th>
<th>Amphitheatre</th>
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</table>
| 16:40 | Railway Dynamics  
Chair: L. Auersch and B. Van Damme  
L. Auersch (252)  
Vehicle-track-soil interaction and train-induced ground vibration – Theory and measurements in Germany, Switzerland and France | Passive Vibration Control and Devices II  
Chair: A. Di Egidio  
P. Deastra (28)  
Time domain analysis of structures with hysteretic vibration suppression systems | Experimental Techniques II  
Chair: D. Gorjup  
D. Tajiri (109)  
Identification of modal parameters in a lightly damped system based on impact vibration testing: Application of exponential window and removal of its effect |
| 17:00 | Y. Liu (299)  
Experimental research on temperature field of CRTS-II slab ballastless track structure in construction period | M. Basili (175)  
A hysteretic absorber to mitigate vibrations of rail noise barriers | X.N. Meng (274)  
Search on application of PVDF piezoelectric film for stress and vibration measurement |
| 17:20 | B. Van Damme (34)  
Railway Ballast Experimental Testing and Modelling for Structural Analysis | D.F. Ledezma-Ramirez (174)  
Shock response of a two stage isolation system | F. Vasquez (184)  
Off-road motorcycle tyre force estimation |
| 17:40 | L. Liang (127)  
The vibration and noise characteristics of steel box-girder bridge under three typical track structures | | |
| 18:00 | N. Fu (289)  
Study of vibration energy characteristics of a ballastless track with anti-vibration structure by power flow analysis | | |
| 19:30 | Conference Dinner, Brasserie Georges | | |
## Plenary Session 5

**Amphitheatre**

Chair: N.S. Ferguson

**Dr John Macdonald,** “Human-structure interaction: modelling, experiments and full-scale measurements”, *University of Bristol, UK*

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<tr>
<th>Time</th>
<th>Session</th>
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<tr>
<td>09:00</td>
<td>Plenary Session 5</td>
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<tr>
<td>10:00</td>
<td>Refreshments</td>
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### Civil Engineering Structures

Chairs: E.A. Tingatinga and E. Ahmadi

- **10:30** E. Ahmadi (52)
  - Nonlinear Dynamics of Pre-tensioned Rocking Rigid Blocks
  - Numerical investigation of the potential of tailored inclusions as noise reduction measures

- **10:50** J.-D. Kang (196)
  - Equivalent SDOF System for Estimating Inelastic Seismic Response of Buildings with Fluid Viscous Dampers
  - Wave dispersion curves in discrete lattices derived through asymptotic multi-scale method

### Metamaterials

Chairs: A. Rallu and Q. Aumann

- **10:00** A. Rallu (58)
  - Vibration characteristics of an operating ball mill

### Multibody Dynamics and Modelling

Chairs: T. Yoshida and H. Ibrahim

- **10:30** T. Yoshida (73)
  - Vibration characteristics of an operating ball mill

- **10:50** O. Vinogradova (146)
  - The dynamics of a cylinder on a vibrating plane with friction

### Technical Papers

#### 10:30

- **E. Ahmadi (52)**
  - On the Use of Entangled Wire Materials in Pre-tensioned Rocking Columns

- **J. Van Hauwermeiren (293)**
  - The effect of the spatial distribution of crowds on the structural response to pedestrian excitation

- **A. Rallu (58)**
  - Wave dispersion curves in discrete lattices derived through asymptotic multi-scale method

- **F. Mittermeier (72)**
  - Numerical investigation of the potential of tailored inclusions as noise reduction measures

- **Q. Aumann (76)**
  - Parametric model order reduction for acoustic metamaterials based on local thickness variations

- **J. Wu (54)**
  - Modelling of a train seat with subject exposed to lateral, vertical and roll vibration

#### 11:10

- **E. Ahmadi (53)**
  - On the Use of Entangled Wire Materials in Pre-tensioned Rocking Columns

- **Q. Aumann (76)**
  - Parametric model order reduction for acoustic metamaterials based on local thickness variations

- **M. Miksch (117)**
  - Numerical computation of the spatial decaying wave characteristics for the design of locally resonant acoustic metamaterials

- **J. Wu (54)**
  - Modelling of a train seat with subject exposed to lateral, vertical and roll vibration

- **H. Ibrahim (33)**
  - Static and Random Vibration Analyses of a University CubeSat Project

#### 11:50

- **E.A. Tingatinga (195)**
  - Blast Load Analysis and Simulation of Unreinforced Concrete Masonry Wall

- **T. Branci (135)**
  - Evaluation of the seismic resistance capacity of steel X-braced frames through their seismic behavior factor

- **G.S. Sharma (280)**
  - Effect of geometric and material uncertainties on the acoustic performance of a voided rubber in water

#### 12:10

- **E. Ahmadi (53)**
  - On the Use of Entangled Wire Materials in Pre-tensioned Rocking Columns

- **M. Miksch (117)**
  - Numerical computation of the spatial decaying wave characteristics for the design of locally resonant acoustic metamaterials

- **H. Ibrahim (33)**
  - Static and Random Vibration Analyses of a University CubeSat Project

- **J. Wu (54)**
  - Modelling of a train seat with subject exposed to lateral, vertical and roll vibration

#### 12:30

- **Closing Ceremony and Best Presentation Award**

#### 12:45

- **Lunch**

#### 15:00

- **Tour of Laboratory of Vibration and Acoustics, and the Contact and Structure Mechanics Laboratory, INSA Lyon (optional)**
Conference Centre Valpré Lyon
1 chemin de Chalin, 69130 Ecully, Lyon

As supplied by Valpré, Lyon