SAPEM 2021
6TH TRIENNIAL

SYMPOSIUM ON THE ACOUSTICS OF PORO-ELASTIC MATERIALS

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ALTAIR

- Keynotes
- Contributed papers' sessions
- Live chat & discussions

EDT (East Coast USA)	PDT (West Coast USA)	CEST (Central Europe)	CST (China)	Mon March 29th	Tue March 30th	Wed March 31th	Thur April 1st	Fri April 2nd
8:30 AM	5:30 AM	2:30 PM	8:30 PM	Opening S. Bolton, Y.T. Xue, L. Jaouen, F.X Bécot	Session "Characterization & measurements Part 1" Presentations + Q&A (10 min + 2min) x 6 Chairs: Yutong (Tony) Xue, Tian Jian Lu	Session "Noise control" Presentations + Q&A (10 min + 2min) x 6 Chairs: Ed Green, Arnaud Duval	Session "Characterization & measurements Part 2" Presentations + Q&A (10 min + 2min) x 6 Chairs: Xiaolin Wang, Paolo Bonfiglio	Session "Computational methods" Presentations + Q&A (10 min + 2min) x 6 Chairs: Olivier Dazel, Luca Alimonti
9:00 AM	6:00 AM	3:00 PM	9:00 PM	Ultralight hybrid-cored sandwich constructions for simultaneous load bearing, energy absorption and sound absorption Tian Jian Lu Chairs: Stuart Bolton, Weichun Huang				
9:30 AM	6:30 AM	3:30 PM	9:30 PM		Themed discussion "Characterization & measurements Part 1" Moderators: Yutong (Tony) Xue, Tian Jian Lu	Themed discussion "Noise control" Moderators: Ed Green, Arnaud Duval	Themed discussion "Characterization & measurements Part 2" Moderators: Xiaolin Wang, Paolo Bonfiglio	Themed discussion "Computational methods" Moderators: Olivier Dazel, Luca Alimonti
10:00 AM	7:00 AM	4:00 PM	10:00 PM	Themed discussion "Lightweight structures" Moderators: Tian Jian Lu, Weichun Huang	Additive Manufacturing of Porous Noise Absorbers Bisham Sharma Chairs: Tomasz Zielinski, Tian Jian Lu	Application of porous materials in the automotive industry when subject to multi-dimensional constraints Gordon Ebbitt Chairs: Stuart Bolton, Arnaud Duval	Wave propagation in hierarchical nanoporous materials Rodolfo Venegas Chairs: Claude Boutin, Kirill Horoshenkov	Poro-elastic materials and the control of low frequency sound Stuart Bolton Chairs: Yutong (Tony) Xue, François-Xavier Bécot
10:30 AM	7:30 AM	4:30 PM	10:30 PM	Break				
11:00 AM	8:00 AM	5:00 PM	11:00 PM	What are the microstructural features having a significant effect at the upper scale in acoustic materials? Understanding the physics and guiding the manufacturing process Camille Perrot Chairs: Thomas Herdtle, Fabien Chevillotte	Themed discussion "Architectured materials" Moderators: Bhisham Sharma, Tomasz Zielinski	Themed discussion "Noise control" Moderators: Gordon Ebbitt, Arnaud Duval	Themed discussion "Multi-scale / nano-scale materials & characterization" Moderators: Rodolfo Venegas, Kirill Horoshenkov	Themed discussion "Poro-elastic materials at low frequencies" Moderators: Yutong (Tony) Xue, François-Xavier Bécot
11:30 AM	8:30 AM	5:30 PM	11:30 PM		Break	Break	Break	Perspectives, closing ceremony & future edition Chairs: Stuart Bolton, Luc Jaouen, Yutong (Tony) Xue, François-Xavier Bécot + Guest
12:00 PM	9:00 AM	6:00 PM	12:00 AM	Session "Micro-macro approaches" Presentation + Q&A (10 min + 2min) x 6 Chairs: Thomas Herdtle, Fabien Chevillotte	Session "New materials" Presentations + Q&A (10 min + 2min) x 6 Chairs: Michael Haberman, Marco Miniaci	Session "Modeling" Presentations + Q&A (10 min + 2min) x 6 Chairs: Kevin Verdière, Jean-Philippe Groby	Session "Multi-scale / nano-scale materials" Presentations + Q&A (10 min + 2min) x 6 Chairs: Claude Boutin, Kirill Horoshenkov	
12:30 PM	9:30 AM	6:30 PM	12:30 AM					
1:00 PM	10:00 AM	7:00 PM	1:00 AM	Themed discussion "Micro-macro approaches" Moderators: Thomas Herdtle, Fabien Chevillotte	Themed discussion "New materials" Moderators: Michael Haberman, Marco Miniaci	Themed discussion "Modeling" Moderators: Kevin Verdière, Jean-Philippe Groby	Themed discussion "Multi-scale / nano-scale materials" Moderators: Claude Boutin, Kirill Horoshenkov	

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Title	List of authors	First author affiliation
KEYNOTES		
Ultralight hybrid-cored sandwich constructions for simultaneous load bearing, energy absorption and sound absorption	Tian Jian Lu	Nanjing University of Aeronautics and Astronautics, China
What are the microstructural features having a significant effect at the upper scale in acoustic materials? Understanding the physics and guiding the manufacturing process	Camille Perrot	Université Gustave Eiffel, France
Additive Manufacturing of Porous Noise Absorbers	Bhisham Sharma	Wichita State University, USA
Application of porous materials in the automotive industry when subject to multi-dimensional constraints	Gordon Ebbitt	Ebbitt Acoustical Consulting, Ann Arbor, MI, USA
Wave propagation in hierarchical nanoporous materials	Rodolfo Venegas	University Austral of Chile, Chile
Poro-elastic materials and the control of low frequency sound	Stuart Bolton	Purdue University, IN, USA

1_MONDAY_MARCH_29 MICRO-MACRO APPROACHES	Fabien Chevillotte	Thomas Herdtle
Towards the design of soft periodic porous structures for acoustic applications	Sagar Deshmukh, Ankush Borkar, Alankar Alankar, Shankar Krishnan, Sripriya Ramamoorthy	Indian Institute of Technology Bombay, India
Experimental study of a meta-poro-elastic system with needle inclusions to improve the low-frequency absorption performance	S. Ahsani, Q. Zhang, B. C. Kim, C. Claeys, F. Scarpa, W. Desmet, E. Deckers	KU Leuven, Belgium
Towards elastic wave manipulation in Kelvin cell packings with controlled anisotropy	M. Gaborit, R. Rumpler, H. Mao, P. Göransson	The Marcus Wallenberg Laboratory for Sound and Vibration Research (MWL), Sweden
Comprehensive Evaluation of Microstructure Properties of Polyurethane Foams	T. Fitzgibbons, D. Monaenkova, C. Broomall, M. Chyasnavichyus, T. Fowler, L. Wright, D. Honkomp, K. Kiszka, J. Frketic, M. Allen, M. Thota	Dow Chemical Company, Corporate R&D
Can a perfectly matched layer be mimicked with a porous medium?	D. Keith Wilson, M. B. Muhlestein, C. R. Hart	U.S. Army Engineer Research and Development Center, USA

2_TUESDAY_MARCH_30 CHARACTERIZATION & MEASUREMENTS I	Tian Jian Lu	Yutong (Tony) Xue
Structural damping properties of natural porous material of jute felt	R. Kumar, A. R. Mohanty	Department of Mechanical Engineering, India
Characterization of the elastic parameters of porous materials as function of the initial load	F. Marchetti, F. Chevillotte	MATELYS-Research Lab, France
Equivalent dynamic model of multilayered structures with imperfect interfaces: application to a three-layer plate with sliding interfaces	N. Auquier, K. Ege, E. Gourdon	Univ. Lyon, France
Low frequency acoustic method to measure static thermal permeability	E. Di Giulio, M. Napolitano, F. Auriemma, R.A. Romano, R. Dragonetti	Department of Industrial Engineering, Italy
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3_TUESDAY_MARCH_30 NEW MATERIALS	Michael Haberman	Marco Miniaci
Rapid additive manufacturing of optimised anisotropic metaporoussurfaces for broadband absorption	T. Cavalieri, J. Boulvert, V. Romero-Garcia, G. Gabard, M. Escouflaire, J. Regnard, and J.-P. Groby	LAUM, France
3D printed folded porous material for sub-wavelength absorption of sound	J. Boulvert, J. Costa-Baptista, E. R. Fotsing, T. Cavalieri, V. Romero-Garcia, G. Gabard, A. Ross, J. Mardjono, J.-P. Groby	LAUM, France
3D Printed PLA-hydogel fractal acoustic composite metamaterial	G. Comandini, F. Scarpa, M. Azarpeyvand, V. P. Ting	Bristol Composites Institute, UK
Natural sonic crystal absorber constituted of Aegagropilae fibernetwork	L. Barguet, V. Romero-Garcia, N. Jiménez, L.M. Garcia-Raffi, V. J. Sanchez-Morcillo, J.-P. Groby	LAUM, France
Sound insulation of clamped single panel and infinite double panel system by addition of poro-elastic resonators	Ke Li, N. Dauchez, B. Nennig	Université de technologie de Compiègne, France

4_WEDNESDAY_MARCH_31 NOISE-CONTROL	Ed Green	Arnaud Duval
Maximizing sound absorbing performance of PU foam by the layered GO nanoplatelets loading	I. Jung, J. Kim, J. Jeon, Y. J. Kang	Kyung Hee University, Republic of Korea
2D Wrinkled Graphene Oxide-Wrapped 3D Auxetic foam for Sound Wave and Shock Energy Multi-Dissipation	J.-S. Kim, J.-H. Oh, I.-K. Oh	National Creative Research Initiative Center for Functionally Antagonistic NanoEngineering, Republic of Korea
Impedance-tube characterisation of additively manufactured slitted sound absorbers	K. C. Opiela, T. G. Zielinski, K. Attenborough	Institute of Fundamental Technological Research, Poland
Parameter study on a composite sound-absorbing structure lined on elevator shafts	Ting Qu, Hequn Min	School of Architecture, China
Acoustic Design and Optimization of Automotive Inner Dash Insulations Using Compound Injection Moulding (CIM) Composites	G. Lesage, M. Tarello, F. Tinti. R. Morris-Kirby, J. Zepponi, E. Harry	Adler Pelzer Group, Italy
Hybrid Polyfoam T Ultimate: an efficient chips urethane basedgreen & light insulator	A. Duval, M. Goret, D. Lemaire, G. Crignon	Treves Product, France

5_WEDNESDAY_MARCH_31 MODELING	Kevin Verdière	Jean-Philippe Groby
Closed-forms derivation and experimental validation of the Willis coupling of different asymmetric structures	M. Malléjac, A. Merkel, D. Torrent, J. Li, V. Tournat, V. Romero-Garcia, J.-P. Groby	LAUM, France
Analytical approximations for sound absorption by labyrinthine architectures	K. Attenborough	Engineering and Innovation, UK
Morphology versus acoustic features of permeo-elastic materials	C. Boutin, R. Venegas	ENTPE, France
Energetic homogenization of one-dimensional porous material with variable cross-sectional area	M. B. Muhlestein	US Army Engineer Research and Development Center, USA
A knowledge of the surface impedance of a resonant surface backing a fibrous layer can be insufficient when calculating the absorption of the combined system	R. Gerdes, T. Herdtle	3M Company, USA
A vibration transmissibility dynamic poroelastic model for open cell polyurethane foam involving viscoelasticity and pneumatic damping effects	Q. Zhang, F. Scarpa, D. Barton, Y. Zhu, Z. Lang	Bristol Composites Institute (ACCIS), UK

6_THURSDAY_APRIL_01 CHARACTERIZATION & MEASUREMENTS II	Xiaolin Wang	Paolo Bonfiglio
Extension of frequency range of the eight-microphone method in normal-incidence sound absorption coefficient measurement	A. Sanada, H. Nakagawa	Industrial Technology Center of Okayama prefecture, Japan
Determination of angle-dependent absorption coefficients of porous materials based on the modal decomposition method	Z. Zhang, H. Denayer, C. Claeys, W. Desmet, E. Deckers	KU Leuven, Belgium
The Test Principles of Biot Properties of Poro-Elastic Material and Its Engineering Validation - ProSynx sponsor session	J. Pang, X. Xiong, H. Zhang	Prosynx, China
A New Device for Fluid Equivalent Parameters Assessment	J.C. Le Roux, J.P. Dalmont, N. Poulain	CTTM, France
Deterministic and statistical methods for the characterisation of poroelastic media from sound absorption measurements	J. Cuenca, P. Göransson, L. De Ryck, T. Lähivaara	Siemens, Belgium
Ultra-broadband Acoustic Barrier based on Hyper-dampened Fanoresonance	H. Nguyen, S. Tracy, G. Huang	Department of Mechanical & Aerospace Engineering, USA

7_THURSDAY_APRIL_01 MULTISCALE-NANOSCALE MATERIALS	Claude Boutin	Kirill Horoshenkov
Low-frequency broadband dissipation using Micro-Capillary Plates	T. Bravo, C. Maury	Instituto de Tecnologías Físicas y de la Información, Spain
Acoustical and non-acoustical behaviour of nanofibers membranes	K. V. Horoshenkov, A. Hurrell	Department of Mechanical Engineering, UK
Acoustic Characterisation of Thin Layer Nanofibers	V. Chen, I. Perez Pablos, J.M. Chen	Dyson, Singapore
Acoustical properties of TEOS based granular silica aerogels	H. Begum, K. V. Horoshenkov, M. Conte, W. J. Malfait, S. Zhao, M. M. Koebel, P. Bonfiglio, R. Venegas	Department of Mechanical Engineering, UK
Acoustical investigation of aerogel granules modeled as a layer of poroelastic material	Y. Xue, A. Dasyam, J. S. Bolton, B. Sharma	Seagate US LLC, USA
A Poro-Elastic Model for Activated Carbon Stacks	Z. Mo, T. Shi, S. Lee, Y. Seo, J. S. Bolton	Ray W. Herrick Laboratories, USA

8_FRIDAY_APRIL_02 COMPUTATIONAL METHODS	Olivier Dazel	Luca Alimonti
High order X-FEM for the acoustic analysis of sound absorbing poro-elastic material with coupling interfaces	S. Wu, O. Dazel, G. Gabard, G. Legrain	Ecole Centrale de Nantes, France
Adaptive high order Finite Element modelling of poroelastic materials	S. Jonckheere, H. Bériot, O. Dazel, W. Desmet	Siemens, Belgium
A programmable auxetic vibro-acoustic metamaterial	H. Mao, R. Rumpler, P. Göransson	The Marcus Wallenberg Laboratory for Sound and Vibration Research (MWL), Sweden
Effects of discontinuous impedance boundaries on sound absorption coefficient measurements in a standing wave tube	H. Lou, H. Min	School of Architecture, China
A non-locally reacting Impedance Model for Periodic Noise Control Treatments	A. Parrinello, L. Alimonti, N. Atalla	ESI North America, USA
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