### MONDAY, 9 July 2018

**Plenary Lecture 1: Nonlinear Acoustic Metamaterials**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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</thead>
<tbody>
<tr>
<td>14:00</td>
<td>Opening Comments and Welcoming Ceremony</td>
</tr>
<tr>
<td></td>
<td>M. Hamilton, P. Johnson, J. Rosenbaum</td>
</tr>
<tr>
<td>14:40</td>
<td>Seismic metamaterials: recent progress and remaining challenges.</td>
</tr>
<tr>
<td></td>
<td>S. Guenneau</td>
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</tbody>
</table>

#### Session 1: Physics of nonlinear materials
Chairperson: TBA

<table>
<thead>
<tr>
<th>Time</th>
<th>Presentation</th>
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</thead>
<tbody>
<tr>
<td>15:50</td>
<td>Towards higher energy density processes in sonoluminescing bubbles</td>
</tr>
<tr>
<td></td>
<td>S. Putterman</td>
</tr>
<tr>
<td>16:10</td>
<td>The evolution of the power spectral density for finite amplitude sound wave</td>
</tr>
<tr>
<td></td>
<td>J. Shi</td>
</tr>
<tr>
<td>16:30</td>
<td>On the signal amplitude asymmetry in nonlinear propagation</td>
</tr>
<tr>
<td></td>
<td>F. Prieur</td>
</tr>
<tr>
<td>16:50</td>
<td>Acousto-convective relaxation oscillation in plasma lamp</td>
</tr>
<tr>
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<td>S. Pree</td>
</tr>
<tr>
<td>17:10</td>
<td>Pycnoclinic acoustic force</td>
</tr>
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<td>J. Koulakis</td>
</tr>
<tr>
<td>17:30</td>
<td>Living body as a sensor of gravity changes</td>
</tr>
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<td>N. Vilchinska</td>
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#### Session 2: Metamaterials
Chairperson: TBA

<table>
<thead>
<tr>
<th>Time</th>
<th>Presentation</th>
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<tbody>
<tr>
<td>15:50</td>
<td>Acoustic 'spoo plasmons' in an array of sound-soft inclusions</td>
</tr>
<tr>
<td></td>
<td>C. Horvath</td>
</tr>
<tr>
<td>16:10</td>
<td>Manipulating vector elastic solitons with flexible mechanical metamaterials</td>
</tr>
<tr>
<td></td>
<td>V. Tournat</td>
</tr>
<tr>
<td>16:30</td>
<td>Non-reciprocal waves in bi-linear spring-mass chains</td>
</tr>
<tr>
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<td>S. Wallen</td>
</tr>
<tr>
<td>16:50</td>
<td>Nonlinear waves in a chain of magnetically coupled pendula</td>
</tr>
<tr>
<td></td>
<td>N. Jimenez</td>
</tr>
<tr>
<td>17:10</td>
<td>Radiation pressure for ultrasonic nonreciprocal transmission and switch effects</td>
</tr>
<tr>
<td></td>
<td>A. Cebrecos</td>
</tr>
<tr>
<td>17:30</td>
<td>Modulated-nonlinearity in phononic crystals: from extremely linear to effective cubic nonlinear media</td>
</tr>
<tr>
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<td>N. Jiménez</td>
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</tbody>
</table>
TUESDAY, 10 July 2018
Session 3: Medicine and Biology
Chairperson: TBA

08:30 - 08:50  Dolphin sonar transmissions and nonlinear effects  
T. Muir

08:50 - 09:10  Controlling the formation of shock fronts in the focal region of a nonlinear acoustic beam by phase modulation at the source surface  
O. Sapozhnikov

09:10 - 09:30  Prospective nonlinear time reversal acoustic medical applications  
A. Sutin

09:30 - 09:50  The study of biceps anisotropy, relaxation and nonlinearity with standard clinical tools for ultrasonic imaging  
T. Krit

09:50 - 10:10  Full-wave nonlinear ultrasound simulation: exploiting parallelism in the move towards exascale  
B. Treeby

Session 4: Bubbles
Chairperson: TBA

08:30 - 08:50  Quasi-monochromatic weakly nonlinear waves of high frequency exceeding eigenfrequency of bubble oscillations in compressible liquid containing microbubbles  
T. Yoshimoto

08:50 - 09:10  Numerical study on growth and collapse of cloud cavitation in a focused ultrasound field  
K. Okita

09:10 - 09:30  Multiple-scales analysis on high speed and high frequency pressure waves induced by liquid compressibility in bubbly liquids  
R. Akutsu

09:30 - 09:50  Dynamics of acoustic vaporization of encapsulated microdroplets  
C. Olivier

09:50 - 10:10  Reflection of simple wave at vapor-liquid interface accompanied with phase change  
T. Yano

Plenary Lecture 2: Nonlinear Wave Mixing

10:30 - 11:30  The three phonon vertex: from instron (0+ Hz) to second sound (10^11 Hz)  
R. Guyer

Session 5: Medicine and Biology
Chairperson: TBA

13:15 - 13:35  Estimation of temperature elevation induced by focused ultrasound using bio-heat models  
D. Zhang

B. Tripathi

13:55 - 14:15  Shear shock waves are observed in the ex vivo porcine brain  
D. Espindola

14:15 - 14:35  Dissipation and detonation of shock waves in a lipid monolayer at the air-water interface  
S. Shrivastava
### Session 6: Microfluidics
Chairperson: TBA

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:15 - 13:35</td>
<td>Particle manipulation and acoustic fabrication in structured ultrasound fields</td>
<td>P. Fischer</td>
</tr>
<tr>
<td>13:35 - 13:55</td>
<td>Acoustic field around a planar object levitated in an ultrasound waveguide</td>
<td>K. Masuda</td>
</tr>
<tr>
<td>13:55 - 14:15</td>
<td>Theoretical and numerical studies of the streaming generated by a vortex beam</td>
<td>R. Marchiano</td>
</tr>
<tr>
<td>14:15 - 14:35</td>
<td>Measurement of the radiation pressure exerted by the acoustic tweezers</td>
<td>D. Zhao</td>
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</table>

### Session 7: Nonlinear NDE
Chairperson: TBA

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:55 - 15:15</td>
<td>Diffuse spectral analysis for characterization of nonlinear elasticity</td>
<td>J. Potter</td>
</tr>
<tr>
<td>15:15 - 15:35</td>
<td>Nonlinear Resonant Ultrasound Spectroscopy for Evaluation of Small Pressed Pellets</td>
<td>C. Donahue</td>
</tr>
<tr>
<td>15:35 - 15:55</td>
<td>Non-collinear wave mixing for nonlinear ultrasonics in an elastic medium: modelling and experiments</td>
<td>A. Demcenko</td>
</tr>
<tr>
<td>15:55 - 16:15</td>
<td>Evaluation of Quadratic Nonlinearity in Tensile Curve from Ultrasonic Linear and Nonlinear Measurements</td>
<td>K.-Y. Jhang</td>
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</tbody>
</table>

### Session 8: Atmosphere
Chairperson: TBA

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<tr>
<th>Time</th>
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</thead>
<tbody>
<tr>
<td>14:55 - 15:15</td>
<td>Nonlinear propagation of shaped supersonic signatures through turbulence</td>
<td>T. Stout</td>
</tr>
<tr>
<td>15:15 - 15:35</td>
<td>Turbulent flow due to the interaction of two mutually perpendicular crossed turbulent streaming jets in water</td>
<td>J. Cartron</td>
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<tr>
<td>15:35 - 15:55</td>
<td>Frequency-domain nonlinearity analysis of noise from a high-performance jet aircraft</td>
<td>K. Gee</td>
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<tr>
<td>15:55 - 16:15</td>
<td>Analysis of sound synthesis methodology for combustion engines</td>
<td>S. Narayan</td>
</tr>
<tr>
<td>16:15 - 16:35</td>
<td>A measurement system for the study of nonlinear propagation through arrays of scatterers</td>
<td>C. Hart</td>
</tr>
</tbody>
</table>
### Session 9: Nonlinear acoustics in the atmosphere, ocean, and earth and Shocks

Chairperson: TBA

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<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>16:15 - 16:35</td>
<td>Acoustics of natural lightning flashes: reconstruction, statistical analysis and nonlinearities</td>
<td>F. Coulouvrat</td>
</tr>
<tr>
<td>16:35 - 16:55</td>
<td>Remote underwater laser acoustic generation using shaped plasmas</td>
<td>T. Jones</td>
</tr>
<tr>
<td>16:55 - 17:15</td>
<td>Application of hugonions for fast computation of shock and detonation waves</td>
<td>W. Ohm</td>
</tr>
<tr>
<td>17:15 - 17:35</td>
<td>Conservation of a specific acoustic impulse of a shock wave propagating in the atmosphere</td>
<td>J. Lonzaga</td>
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### Session 10: Thermoacoustics and devices

Chairperson: TBA

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
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</thead>
<tbody>
<tr>
<td>16:35 - 16:55</td>
<td>Derivation of coupling conditions of amplitude death in delay-coupled thermoacoustic oscillators</td>
<td>H. Hyodo</td>
</tr>
<tr>
<td>16:55 - 17:15</td>
<td>Numerical simulations of thermoacoustic oscillations in a looped tube by asymptotic theories</td>
<td>D. Shimizu</td>
</tr>
<tr>
<td>17:15 - 17:35</td>
<td>Spectral energy cascade in nonlinear acoustic and thermoacoustic waves</td>
<td>P. Gupta</td>
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</tbody>
</table>
### Session 11: Nonlinear NDE

**Chairperson:** TBA  

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter</th>
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</thead>
<tbody>
<tr>
<td>08:10 - 08:30</td>
<td>Nonlinear Analysis of Damaged Composite Plates Using Guided Waves</td>
<td>M. Bentahar</td>
</tr>
<tr>
<td>08:30 - 08:50</td>
<td>AM/FM Separation in vibro-acoustic modulation method</td>
<td>D. Donskoy</td>
</tr>
<tr>
<td>08:50 - 09:10</td>
<td>Evaluation of bonding quality in cfrp composite laminates by measurements of local vibration nonlinearity</td>
<td>I. Solodov</td>
</tr>
<tr>
<td>09:10 - 09:30</td>
<td>Approach to automated characterization of local defect resonances for use in nonlinear acoustics</td>
<td>L. Pieczonka</td>
</tr>
<tr>
<td>09:30 - 09:50</td>
<td>Sensitivity of the measured acoustic nonlinearity parameter, beta to specific changes in material microstructure</td>
<td>L. Jacobs</td>
</tr>
<tr>
<td>09:50 - 10:10</td>
<td>Impact vibration study on environmental moisture and damage in neat cement paste</td>
<td>J. Popovics</td>
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### Session 12: Bubbles

**Chairperson:** TBA  

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<thead>
<tr>
<th>Time</th>
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</thead>
<tbody>
<tr>
<td>08:10 - 08:30</td>
<td>Cavitation bubble clouds block low-frequency components of ultrasonics waves</td>
<td>Y. Yuan</td>
</tr>
<tr>
<td>08:30 - 08:50</td>
<td>Experimental investigation of microstreaming induced by free nonspherically oscillating microbubbles</td>
<td>S. Cleve</td>
</tr>
<tr>
<td>08:50 - 09:10</td>
<td>Demonstration on the nonlinear scattering of crossed ultrasonic beams in the presence of a single bubble in water</td>
<td>K. Haas</td>
</tr>
<tr>
<td>09:10 - 09:30</td>
<td>Cavitation inception pressure and bubble cloud formation by backscattering from bubble interfaces in hifu</td>
<td>T. Horiba</td>
</tr>
<tr>
<td>09:30 - 09:50</td>
<td>Bubble cloud's spectroscopic nonlinear parameter measurement</td>
<td>L. D'hondt</td>
</tr>
<tr>
<td>09:50 - 10:10</td>
<td>Influence of nonlinear surface tension properties on the dynamics of a bubble/droplet nanosystem during acoustic vaporization</td>
<td>T. Lacour</td>
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**Plenary Lecture 3: Topic TBA**  

<table>
<thead>
<tr>
<th>Time</th>
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<th>Presenter</th>
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<tbody>
<tr>
<td>10:30 - 11:30</td>
<td>TBA</td>
<td>J. Tu</td>
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</table>
### Session 13: Nonlinear NDE
Chairperson: TBA

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter</th>
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</thead>
<tbody>
<tr>
<td>13:15 - 13:35</td>
<td>Numerical study of the second harmonic generation of lamb waves at an imperfect joint of plates</td>
<td>N. Mori</td>
</tr>
<tr>
<td>13:35 - 13:55</td>
<td>Symmetric lamb wave sum-harmonic generated by mutual interaction of sh waves in plate</td>
<td>C. Lissenden</td>
</tr>
<tr>
<td>13:55 - 14:15</td>
<td>Numerical investigation of self-focusing lamb waves in anisotropic media</td>
<td>L. Ambrozinski</td>
</tr>
<tr>
<td>14:15 - 14:35</td>
<td>Multi-mode nonlinear ultrasonic phased array for closed crack imaging</td>
<td>Y. Ohara</td>
</tr>
<tr>
<td>14:35 - 14:55</td>
<td>A numerical model for heat generation and nonlinear emission at ultrasonically excited contact defects</td>
<td>K. Van Den Abeele</td>
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</table>

### Session 14: Nonlinear acoustics in solids, structures, or relaxing media
Chairperson: TBA

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>13:15 - 13:35</td>
<td>Nonlinear response of a relaxing shear wave resonator to elliptical driving motion</td>
<td>J. Cormack</td>
</tr>
<tr>
<td>13:55 - 14:15</td>
<td>Internal-variable modeling of solids with slow dynamics: wave propagation and resonance simulations</td>
<td>H. Benjamin</td>
</tr>
<tr>
<td>14:15 - 14:35</td>
<td>Nonlinear tuning curve vibration and two-tone tests using a column of glass beads vibrating over a clamped elastic plate using wetted or non-wetted beads</td>
<td>E. Santos</td>
</tr>
<tr>
<td>14:35 - 14:55</td>
<td>The nonlinear crystal-star effect and cosmic radiation</td>
<td>I. Ostrovskii</td>
</tr>
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</table>

### Session 15: Nonlinear NDE
Chairperson: TBA

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<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>15:15 - 15:35</td>
<td>Nonlinear modal analysis of concrete structures</td>
<td>C. Payan</td>
</tr>
<tr>
<td>15:55 – 16:15</td>
<td>Stress corrosion crack imaging in stainless steel using the time reversed elastic nonlinearity diagnostic and nonlinear resonant ultrasound spectroscopy</td>
<td>B. Anderson</td>
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<tr>
<td>16:15 - 16:35</td>
<td>TBA</td>
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**Session 16: Solids and relaxing media**  
**Chairperson: TBA**

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<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>15:15 - 15:35</td>
<td>Acoustic nonlinearity at real cracked interfaces measured by dynamic acousto-elastic testing (daet) with surface wave probes</td>
<td>J. Jin</td>
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<tr>
<td>15:35 - 15:55</td>
<td>Evolution of damping and velocity during very early stages of conditioning and relaxation in diverse media</td>
<td>M. Tortello</td>
</tr>
<tr>
<td>15:55 - 16:15</td>
<td>Investigation of vibro-acoustic modulation for different motion type of contact interface</td>
<td>A. Klepka</td>
</tr>
<tr>
<td>16:15 - 16:35</td>
<td>Dispersion of acoustical activity and anisotropy of acoustical attenuation in bismuth silicate crystals</td>
<td>F. Akhmedzhanov</td>
</tr>
</tbody>
</table>
THURSDAY, 12 July 2018
Session 17: General nonlinear acoustics in fluids and solids
Chairperson: TBA

08:30 - 08:50  Single-point characterization of spectral amplitude and phase changes due to nonlinear propagation
               B. Reichman
08:50 - 09:10  A numerical investigation on the contribution of local nonlinear effects
               M. Diaz
09:10 - 09:30  Two-dimensional nonlinear acoustic waves induced by time-periodic oscillation of wavy wall
               M. Inaba
09:30 - 09:50  Numerical study of nonlinear sustained oscillations in a cylindrical open-ended tube
               P. Rendón
09:50 - 10:10  Non-linearity parameters describing elastic wave interactions
               W. Domanski

Session 18: Nonlinearity in geomaterials
Chairperson: TBA

08:30 - 08:50  Elastic nonlinearity of fractured rocks and its relation with fluid permeability
               P. Shokouhi
08:50 - 09:10  Slow relaxation in unconsolidated granular materials: time-scale distributions and glassy dynamics of structural heterogeneities
               C. Lieou
09:10 - 09:30  Separation of nonlinearity contributions to damping and elastic modulus
               A. Di Bella
09:30 - 09:50  Nonlinear frequency shift and decay of local damage resonance: can version
               I. Solodov
09:50 - 10:10  Nonlinear relaxation in geomaterials: new results
               L. Ostrovsky

Plenary Lecture 4: Nonlinear seismicity
10:30 - 11:30  The variety of nonlinear seismic observations on Earth: from the tenuous tides to the damaging earthquakes and volcanoes
               F. Brenguier

Session 19: Experimental methods using nonlinear acoustics
Chairperson: TBA

13:15 - 13:35  Acoustic holography combined with radiation force balance measurements for high-intensity field characterization
               S. Tsysar
13:35 - 13:55  Low-frequency parametric ultrasound imaging using pulse compression with maximum-length sequence excitation
               H. Nomura
13:55 - 14:15  Remote signal amplification in parametric acoustic receiving array using the mathieu type oscillator
               H. Zhang
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>14:15 - 14:35</td>
<td>Characterizing bandlimited nonlinear (and linear) systems with memory while reducing the curse of dimensionality using a new Volterra expansion technique</td>
<td>D. Hughes</td>
</tr>
<tr>
<td>14:35 - 14:55</td>
<td>A Spatially Coherent Averaging Technique for Denoising Full-Field Mode Shape Measurements</td>
<td>D. Mascarenas</td>
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**Session 20: Geomaterials**  
Chairperson: TBA

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<th>Time</th>
<th>Title</th>
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<tbody>
<tr>
<td>13:15 - 13:35</td>
<td>Efforts on micron scale imaging to understand material characteristics that generate slow dynamics</td>
<td>J. Bittner</td>
</tr>
<tr>
<td>13:55 - 14:15</td>
<td>Laboratory study of linear and nonlinear elastic pulse propagation in sandstone</td>
<td>T. Muir</td>
</tr>
<tr>
<td>14:15 - 14:35</td>
<td>Explaining everything about wave propagation in long bars</td>
<td>M. Remillieux</td>
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**Session 21: Nonlinear acoustics in relaxing media**  
Chairperson: TBA

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<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>15:15 - 15:35</td>
<td>Effect of molecular relaxation on nonlinear evolution of n-waves</td>
<td>P. Hammerton</td>
</tr>
<tr>
<td>15:35 - 15:55</td>
<td>Asymptotic and numerical analysis of pulse propagation in relaxing media</td>
<td>E. Aljabali</td>
</tr>
<tr>
<td>15:55 - 16:15</td>
<td>Ultrasonic attenuation of aqueous solution of 2,6-lutidine</td>
<td>K. Egamberdiev</td>
</tr>
<tr>
<td>16:15 - 16:35</td>
<td>Ultrasonic relaxation spectroscopy of suspensions of particles in water</td>
<td>S. Mirzaev</td>
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**Session 22: Nonlinear acoustics of geomaterials and earthquakes**  
Chairperson: TBA

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<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>15:15 - 15:35</td>
<td>The nonlinear interaction of p and s waves under uniaxial load</td>
<td>L. Hayes</td>
</tr>
<tr>
<td>15:35 - 15:55</td>
<td>A numerical model for the nonlinear interaction of elastic waves with cracks</td>
<td>H. Rusmanugroho</td>
</tr>
<tr>
<td>15:55 – 16:15</td>
<td>Imaging rupture nucleation with ultrafast ultrasound</td>
<td>J. Aichele</td>
</tr>
<tr>
<td>16:15 - 16:35</td>
<td>Nonlinearity in solid earth geophysics</td>
<td>A. Delorey</td>
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FRIDAY, 13 July 2018  
Session 23: Microfluids  
Chairperson: TBA

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker(s)</th>
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</thead>
<tbody>
<tr>
<td>8:30 - 8:50</td>
<td>Acoustic radiation force and torque on nonspherical particles in the born approximation</td>
<td>M. Hamilton</td>
</tr>
<tr>
<td>8:50 - 9:10</td>
<td>Near-field multiple traps of acoustic vortices generated by sector transducer array and its application in object manipulation</td>
<td>Q. Ma</td>
</tr>
<tr>
<td>9:10 - 9:30</td>
<td>Patterning technique of adhesive cells using ultrasound flexural vibration</td>
<td>D. Koyama</td>
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<tr>
<td>9:30 - 9:50</td>
<td>Experimental considerations of droplet manipulation mechanism using surface acoustic wave devices</td>
<td>J. Kondoh</td>
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Session 24: Thermoacoustics  
Chairperson: TBA

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>08:30 - 08:50</td>
<td>Numerical nonlinear formulation of rott equations for a thermoacoustic engine: acoustic streaming and phase change</td>
<td>K. Yasui</td>
</tr>
<tr>
<td>08:50 - 09:10</td>
<td>Thermodynamic properties of fluid particles and energy fluxes in thermoacoustic Taconis oscillations</td>
<td>S. Adachi</td>
</tr>
<tr>
<td>09:10 - 09:30</td>
<td>Shocked and unshocked thermoacoustic oscillations in a looped tube</td>
<td>N. Sugimoto</td>
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Session 25: Microfluids  
Chairperson: TBA

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker(s)</th>
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</thead>
<tbody>
<tr>
<td>10:10 - 10:30</td>
<td>Suppression of acoustic streaming by the inhomogeneity-induced acoustic body force</td>
<td>W. Qiu</td>
</tr>
<tr>
<td>10:30 - 10:50</td>
<td>Different origins of acoustic streaming at resonance</td>
<td>J. Bach</td>
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<tr>
<td>10:50 - 11:10</td>
<td>Transient and High Frequency Motion of Objects Under Acoustic Radiation Force</td>
<td>Y. J. Wang</td>
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<tr>
<td>11:10 - 11:30</td>
<td>From acoustic radiation pressure to three-dimensional forces on a sphere</td>
<td>L. Zhang</td>
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### Session 26: Nonlinear acoustics of fluids and in medicine
Chairperson: TBA

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>10:10 - 10:30</td>
<td>Propagation of intense acoustic wave in the periodic layered fluid media</td>
<td>H. Li</td>
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<tr>
<td>10:30 - 10:50</td>
<td>Measurement of droplet position on surface acoustic wave device based on radiated longitudinal wave</td>
<td>S. Tsunogaya</td>
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<tr>
<td>10:50 - 11:10</td>
<td>A fixed distance plane wave method for measurement of the ultrasound coefficient of nonlinearity</td>
<td>A. Panfilova</td>
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<td>11:10 - 11:30</td>
<td>The influence of impedance mismatch of the medium with gradient change of impedance</td>
<td>B. Hu</td>
</tr>
<tr>
<td>11:30 - 11:50</td>
<td>Time reversal focusing of high amplitude sound in a reverberation chamber</td>
<td>B. Patchett</td>
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