

International Acoustofluidics Forum and Olympics

(3rd SIG Meeting of The Acoustofluidics in Fluidic Network)

This international Acoustofluidics Forum and Olympics is a showcase for acoustic waves interacting with liquid, covering fundamental understanding of the phenomena and its applications. It will include topics of microfluidics induced by ultrasonic, surface acoustic waves, bulk acoustic waves and flexural waves, and use of these for bio-sampling, microanalysis, and microfluidic diagnosis.



Date: 26th and 27th April 2018
Northumbria University, Newcastle Upon Tyne, UK

Meeting Place: 26th April 2018: Sandyford Building, (4th Floor, Hedley Suite)
[https://goo.gl/maps/GgUGq6Bezp22 \(map\)](https://goo.gl/maps/GgUGq6Bezp22)
27th April, Great Hall at Sutherland Building (101)
<https://goo.gl/maps/ZM24na51CyT2>
(Click here for [City Campus map](#))

26th April, Talk and Olympia
@Sandyford Building 4th floor
(Hedley Suite)



Agenda

| Day 1 26 th April | Time | Speaker | Institute | Title |
|---|-----------------------|---|--|---|
| Sandyford Building, Hedley Suite | | | | |
| | 9:00-10:00 | Welcome: Tea and coffee | | |
| 1 | 10:00-10:20 | Prof. Glen McHale | Northumbria University, UK | Opening speech: Microfluidics on smart surfaces |
| 2 | 10:20-10:50 | Prof. Achim Wixforth | Augsburg University, Germany | Honey, I shrunk the lab! (using acoustic waves) |
| 3 | 10:50-11:20 | Prof. Jon Cooper | University of Glasgow, UK | Shaping acoustic fields to create complex microfluidic flows |
| 4 | 11:20-11:50 | Prof. Michael Baudoin | University of Lille, France | Miniaturized single beam acoustical tweezers based on focalized acoustical vortices |
| 5 | 11:50-12:20 | John Clayton | KTN-UK | KTP and Innovative UK - Innovation through collaborations |
| | 12:20-13:30 | Lunch and poster and interactions | | |
| 6 | 13:30-14:00 | Prof. Leslie Yeo | RMIT University, Australia | Acoustically-driven microscale fluid-structure interactions: Something old, something new, something unexpected |
| 7 | 14:00-14:30 | Prof. Marc P.Y. Desmulliez | Heriot-Watt University, UK | Acoustic streaming: unexpected applications in water sampling and printed circuit boards manufacturing |
| 8 | 14:30-14:45 | Prof. Jack Luo | University of Bolton, UK | Thin film flexible acoustic wave sensors |
| 9 | 14:45-15:00 | Prof. Richard Fu | Northumbria University, UK | Thin film flexible and bendable acoustofluidics |
| 10 | 15:00-15:20 | Dr. Anne Bernassau | Heriot-Watt University, UK | Micro-acoustics in cell patterning and sorting |
| | 15:20-15:40 | Tea and Coffee: Interactions | | |
| | 15:40-18:00 | Acoustofluidics Olympia and Poster Presentations | | |
| | | Dr. Peter Glynn Jones | University of Southampton, UK | An air based acoustic levitator |
| | | Asier Marzo | University of Bristol, UK | Acoustic Levitation |
| | | Luke Cox + Asier Marzo | University of Bristol, UK | Huge Levitation |
| | | Dr. Stefan Radel | Vienna University of Technology, Austria | Sonicatch |
| | | Christian Witte/Elijah Nazarzadeh | University of Glasgow, UK | High speed drop race |
| | | Xi King/Elijah | University of Glasgow, UK | Misting for drug delivery to the lungs |
| | | Dr. Julien Reboud/Rab Wilson | University of Glasgow, UK | Acoustic heating |
| | | Dr. Julien Reboud/Rab Wilson | University of Glasgow, UK | Jetting : most directional / highest jet ! |
| | | Dr. Ran Tao | Northumbria University, UK | Flexible SAW microfluidic devices. |
| | | Dr. Hamdi Torun | Northumbria University, UK | Listening with electromagnetic ears |
| | | Dr. Prashant Agrawal | Northumbria University, UK | Lendenfrost effects |
| | | Dr. Qiang Wu | Northumbria University, UK | Optical fibre for acoustic microphone |
| | | Dr. Jeremy Hawkes, UK | | A filter for biological cells based on enhancing sedimentation with ultrasound |
| | | Dr. Jeremy Hawkes, UK | | Combining acoustofluidics and dielectrophoresis to select uniform droplets "an experiment you can try at home" |
| | | Dr. Raimund Brünig | Belektronig, Germany | SAW-chip to stir small liquids |
| | End of the day | | | |

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| Day 2 27th April | | | | |
| Great Hall, Sutherland Building | Before 9:00 | Tea and Coffee: Interactions | | |
| 11 | 9:00-9:30 | Dr. Peter Glynn Jones | University of Southampton, UK | Current challenges and future directions in acoustofluidic devices |
| 12 | 9:30-10:00 | Dr. Stefan Radel | Vienna University of Technology, Austria | Ultrasound enhanced process analytical technology |
| 13 | 10:00-10:20 | Dr. Julien Reboud | University of Glasgow, UK | SAW-based pulmonary drug delivery – nebulising the right size |
| 14 | 10:20-10:40 | Dr. Hamdi Torun | Northumbria University, UK | Microsystem development for single-molecular measurements |
| | 10:40-11:00 | Tea and Coffee and interactions | | |
| | 11:00-13:00 | Funding and research directions Forum and discussions | Key future challenges of acoustofluidics How to solve them Brainstorming Selection Implementation/planning | |
| | 13:00-14:00 | Lunch and interactions | | |
| 15 | 14:00-14:20 | Raimund Brünig | Belektronig, Germany | SAW Generator |
| 16 | 14:20-14:40 | Dr. Mehdi Jangi | University of Birmingham, UK | High-fidelity CFD modelling of droplet dynamics subjected to the surface acoustic waves |
| 17 | 14:40-15:00 | Dr. Baixin Chen | Heriot-Watt University, UK | The hydrodynamic and thermal responses of droplet to Rayleigh SAW: Observations and simulations |
| 18 | 15:00-15:20 | Dr. Ben Ash | University of Exeter, UK | Annular hole phononic crystal for surface acoustic waves |
| 19 | 15:20-15:40 | Amanda Franklin | University of Bristol, UK | Exploring acoustic lenses and signatures for three-dimensional particle trapping |
| | 16:00- | Tea and Coffee: Further discussions | | |
| | End of the meeting | | | |

Travel Information

Northumbria City Campus is at the heart of Newcastle about a 15-20 minutes' walk from the mainline railway station or can be accessed by taking the metro to **Haymarket Station** and then walking down Northumberland Road. The University's standard travel instructions are [here](#) and a Campus map is [here](#).

Main subjects and topics associated with this Forum and Olympics:

- Digital acoustofluidics and microchannel based acoustofluidics
- Acoustic-induced streaming and simulation
- Ultrasonic-induced streaming and agitation, mixing, cell/particle separation, cell lysis, heating.
- Micromixing and pumping in microdroplet and microchannel
- Acoustic wave jetting and nebulisation
- Acoustic tweezer and particle/cell sorter
- Acoustic wave induced heating and polymerise chain reaction
- Liquid droplet generation in digital microfluidics and microchannel by ultrasonic or acoustic waves.
- Two phase or multiphase flow in channel induced by acoustic wave;
- Micro bubble generation and interaction with liquid due to acoustic waves
- Cell and bacteria interacting with acoustic waves.
- Microfluidics actuated by different wave modes (Lamb Wave, Rayleigh waves, shear waves, Love waves, bulk acoustic waves)

- Acoustic wave nebulisation, nanoparticle formation and drug/chemical analysis
- Acoustic wave induced printing and patterning.
- Standing wave based microfluidics and traveling wave based microfluidics.
- Integration of acoustofluidics with sensing and other microfluidic technology, such as phononics, electrowetting, dielectrophoresis, surface enhanced Raman spectroscopy (SERS), surface plasma resonance (SPR).
- Acoustic wave based microfluidic biosensing/detection, lab-on-chip based diagnosis system.

Lists of all attendance

| | Attendance | Institute | Email |
|----|----------------------------|--|--|
| 1 | John Clayton | KTN-UK | john.clayton@ktn-uk.org |
| 2 | Prof. Achim Wixforth | Augsburg University, Germany | achim.wixforth@physik.uni-augsburg.de |
| 3 | Prof. Jon Cooper | University of Glasgow, UK | Jon.Cooper@glasgow.ac.uk |
| 4 | Prof. Leslie Yeo | RMIT University, Australia | leslie.yeo@rmit.edu.au |
| 5 | Prof. Glen McHale | Northumbria University, UK | glen.mchale@northumbria.ac.uk |
| 6 | Prof. Richard Fu | Northumbria University, UK | richard.fu@northumbria.ac.uk |
| 7 | Dr. Peter Glynne Jones | University of Southampton, UK | pgj1a06@soton.ac.uk |
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