The 10th International Workshop on the Mechanics of Hearing

*Keele University, United Kingdom*

**Programme**

*July 26 – Aug 1, 2008*

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<th>Wednesday, July 30</th>
<th>Thursday, July 31</th>
<th>Friday, August 1</th>
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<tr>
<td>7:30-9:00</td>
<td>Break</td>
<td>Talks #1-3</td>
<td>Coffee break</td>
<td>Break</td>
<td>Talks #25-27</td>
<td>Break</td>
<td>Break</td>
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<tr>
<td>9:00-10:30</td>
<td>Welcome</td>
<td>Talks #4-6</td>
<td>Coffee break</td>
<td>Talks #19-21</td>
<td>Talks #28-30</td>
<td>Talks #34-36</td>
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<tr>
<td>10:30-11:00</td>
<td>Get-Together</td>
<td>Lunch</td>
<td>Talks #13-15</td>
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<td>Lunch</td>
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<tr>
<td>11:00-12:30</td>
<td>Reception</td>
<td>Plenary #1</td>
<td>Tea break</td>
<td>Talks #22-24</td>
<td>Plenary #2</td>
<td>Talks #37-39</td>
<td>Plenary #1</td>
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<tr>
<td>12:30-1:30</td>
<td>(collect registration packs, setup talks and posters)</td>
<td>Tea break</td>
<td>Tea break</td>
<td>Excursion to Chester / Delamere Forest</td>
<td>Tea break</td>
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<td>1:30-3:00</td>
<td>Welcome</td>
<td>Plenary #1</td>
<td>Tea break</td>
<td>Plenary #3</td>
<td>Dinner</td>
<td>Business meeting / Open Discussion (+ tea-break)</td>
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<td>3:00-4:00</td>
<td>Get-Together</td>
<td>Tea break</td>
<td>Talks #16-18</td>
<td>Plenary #3</td>
<td>Dinner</td>
<td>Farewell Dinner</td>
<td>Business meeting / Open Discussion (+ tea-break)</td>
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<tr>
<td>4:00-4:30</td>
<td>Dinner</td>
<td>Talks #7-9</td>
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<td>Tea break</td>
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<td>Farewell Dinner</td>
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<td>4:30-6:00</td>
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<td>Farewell Dinner</td>
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<td>7:00-11:00</td>
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<td>Farewell Dinner</td>
<td>Break</td>
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**Key to venues:**

- Medical School
- Keele Hall
- Comus Restaurant
- Hawthorns restaurant

**Sponsored by:**

- Starkey
- Polytec
- Tucker-Davis Technologies
- Oticon
- MED-EL
- OtoDynamics
Welcome, Acknowledgements, and Friendly Faces?

Welcome to the 10th International Workshop on the Mechanics of Hearing. We hope that you enjoy your stay in Keele, and get the most of this once-every-three-years opportunity to advance our understanding of the mechanics of hearing.

The workshop is being sponsored entirely by outside companies and organisations with direct interests in the field. The organisers are particularly grateful for the financial support provide by:

- Otodynamics Ltd – [www.otodynamics.com](http://www.otodynamics.com)
- Polytec GmbH – [www.polytec.com](http://www.polytec.com)
- The Oticon Foundation – [www.oticon.com](http://www.oticon.com)
- MED-EL – [www.medel.com](http://www.medel.com)
- Starkey Labs – [www.starkey.co.uk](http://www.starkey.co.uk)
- Tucker-Davies Technologies – [www.tdt.com](http://www.tdt.com)

The workshop is being organised by Nigel Cooper and David Kemp, but there are a large number of other people involved in running it, chief among whom are:

- Janet Norton – registration desk
- Ron Knapper – technical support (presentations, etc)
- Rob Wust (accompanying persons programme)
- Mike Evans & Dave Furness (general help – Keele residents!)
- Chris Bergevin (MoH-101 discussion session)
- Chris Shera & David Mountain (open discussion session)

Please feel free to ask any of the team for help and advice if you have any problems or questions.

Many thanks – Nigel, David, and the rest of the team.

Programme

Saturday, July 26

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<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tr>
<td>13:30-18:00</td>
<td>Registration and room check-in.</td>
<td>Medical School Foyer</td>
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<td>Poster room set-up</td>
<td>Medical School Rooms 1.35-1.38</td>
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<td>Talk set up for presentations on Sunday</td>
<td>MS Lecture Theatre 1</td>
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<td>19:00</td>
<td>Welcome get-together</td>
<td>Comus Restaurant / Le Café Bar</td>
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<td>drinks reception from 7pm, food from 7:30-9pm</td>
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Sunday, July 27

8:50  Cooper & Kemp. Welcome, introduction & acknowledgements.

Session 1: BM / ooC / wave measurements
Chairs: Nuttall & Dong

9:00  Mellado Lagarde, Drexl, Lukashkina, Lukashkin & Russell. Determining the identity of the cochlear amplifier: electrical stimulation of the tecta mouse cochlea.

9:30  Ren & He. Differential measurement of basilar membrane vibration in sensitive gerbil cochlea.

10:00 Fridberger & Jacob. Amplification in the cochlear apex.

10:30 Coffee break

Session 2: more BM / ooC / wave measurements
Chair: Ruggero


11:30 Lukashkin, Lukashkina, Richardson & Russell. Does the cochlea compromise on sensitivity and frequency selectivity?

12:00 Dong & Olson. The role of compression and traveling wave pressures in the transmission of sound out of the gerbil cochlea.

12:30 Lunch  Comus Restaurant (in the Chancellor’s Building)

Session 3: Posters (13:30-15:00)

Session 4: Plenary – Sound processing in the cochlea
Chair: Kemp

15:00 Jont Allen. The role of the cochlea in human speech recognition.

16:00 Tea break

Session 5: BM / ooC / wave models
Chairs: Olson & Böhne

16:30 de Boer & Nuttall. Obvious and ‘hidden’ waves in the cochlea.

17:00 Frosch. DP phases in mammalian cochleae, predicted from liquid-surface-wave formulas.

17:30 Zhang & Mountain. Distortion product emissions: where do they come from?

19:00 Dinner & team building (games)  Keele Hall Restaurant
Monday, July 28

Session 1: more wave models
Chairs Duifhuis & Bergevin

9:00 Neely & Liu. Retrograde propagation of cochlear distortion.
9:30 Elliott, Ku & Lineton. Time domain model of a nonlinear inhomogeneous cochlea.
10:00 Sisto & Moleti. Cochlear reflectivity and TEOAE transfer function.
10:30 Coffee break

Session 2: Otoacoustic emission measurements
Chair: Guinan

11:00 Kemp. Slow oscillatory adaptation to brief over-stimulation and the dynamics of cochlear homeostasis.
11:30 Bian. Amplitude and frequency modulations of spontaneous otoacoustic emissions.
12:00 van Dijk & Manley. The effect of ear canal pressure on spontaneous otoacoustic emissions: comparison between human and lizard ears.
12:30 Lunch

Session 3: Posters (13:30-15:00)

Session 4: Plenary – Somatic motility
Chair: Evans

15:00 Joe Santos-Sacchi. Firing up the amplifier: IR laser induced temperature jump effects on OHC motor gating currents and NLC.
16:00 Tea break

Session 5: Prestin
Chairs: Ashmore & Hallworth

17:00 Wada, Murakoshi, Iida & Kumano. Topological characterization by atomic force microscopy of prestin in the plasma membrane of prestin-transfected chinese hamster ovary cells using quantum dots.
17:30 Rajagopalan, Sfondouris, Oghalai, Pereira & Brownell. Membrane composition tunes the outer hair cell motor.

19:00 Dinner

20:00 Bergevin et al., MoH-101 session: After dinner back-to-basics (open discussion) Chancellor’s Building rm CBA1.103
Tuesday, July 29

Session 1: Electrophysiological models and measurements
Chair: Brownell

9:00  Cheatham, Naik, Siegel & Dallos. *Modeling the cochlear microphonic in prestin knockout mice.*

9:30  Mistrik & Ashmore. *Using a large scale computational model to study the effect of longitudinal and radial electrical coupling in the cochlea.*

10:00 Guinan. *Bias-tone effects on the first-peak versus later peaks of auditory-nerve responses.*

Session 2: Comparative MET
Chairs: Köppl

11:00 Albert, Nadrowski & Göpfert. *In vivo dissection of fly auditory mechanotransduction.*

11:30 Nadrowski, Albert & Göpfert. *Transducer-based active amplification in the hearing organ of drosophila melanogaster.*

12:00 Cooper & Kemp. *Announcements (poster prizes and excursion briefing)*

12:30 Pack laptops as you board the excursion coaches

Followed by half-day excursion to Delamere Forest and/or Chester: coaches depart from Medical School from 12:30.

13:45 and 14:15 (optional) Go Ape and bike-hire sessions in Delamere Forest
14:30 (optional) 2-hour river boat cruise departs from Chester
17:30 Coaches depart from Chester and Delamere Forest, travelling direct to Crewe Hall

19:00 Drinks Reception  Crewe Hall, Table of Pillars
19:30 Banquet  Crewe Hall, Long Hall

coaches return to Medical School from 22:00 – 22:30.
Wednesday, July 30

**Session 1: BM / TM properties**
*Chairs: Gummer & Fulton*

9:00  **Newburg** & Mountain. *Mechanical response of the basilar membrane to lateral micromanipulation.*


10:00  Gueta, Barlam, Shneck & **Rousso**. *The anisotropy of the tectorial membrane guides stereocilia deflection.*

10:30  Coffee break

**Session 2: TM / subtectorial space**
*Chairs: Russell & Fridberger*

11:00  **Schoffelen**, Segenhout, van Dijk. *Frequency-selective response of the tectorial membrane in the frog basilar papilla.*

11:30  Chiaradia, Nowotny & **Gummer**. *Deflection of IHC stereocilia in response to somatic OHC electromotility.*

12:00  **Baumgart**, Chiaradia, Fleischer, Yarin, Grundmann & Gummer. *Fluid mechanics in the subtectorial space.*

12:30  Lunch  
*Medical School foyer & student’s common room*

**Session 3: Posters (13:30-15:00)**

**Session 4: Plenary – Hair bundle motility**
*Chairs: Cooper & Albert*

15:00  **Pascal Martin**. *Unifying the various incarnations of active hair-bundle motility by the vertebrate hair cell.*

16:00  Tea break

**Session 5: MET and bundle motility**
*Chairs: van Dijk & Nadrowski*

16:30  **Furness**, Mahendrasingham & Hackney. *Connections between stereociliary rootlets and lateral wall: a possible route for interactions between bundle and prestin based cochlear amplification?*

17:00  **Köppl**, Iwasa & Sul. *Big and powerful: a model of the contribution of bundle motility to mechanical amplification in hair cells of the bird basilar papilla.*

17:30  **Maoiléidigh** & Jülicher. *The interplay between active hair bundle mechanics and electromotility in the cochlea.*

19:00  Dinner  
*Comus Restaurant (in the Chancellor’s Building)*
Thursday, July 31

Session 1: cochlear models  
**Chairs:** Elliott & Aranyosi

9:00  **Iwasa,** Sul, Fang & Sinha. *Cellular basis of the cochlear amplifier.*
9:30  **Bell** & Maddess. *Tilt of the outer hair cell lattice: origin of dual tuning tips and cochlear bandwidth.*
10:00 **Steele,** Kim & Puria. *Hook region represented in a cochlear model.*
10:30  Coffee break

Session 2: cochlear models  
**Chairs:** Steele & Puria

11:00 Meaud & **Grosh.** *Exploring the role of hair bundle motility using a macroscopic cochlear model.*
11:30 **Böhnke** & Scharff. *Acoustic streaming in the cochlea.*
12:00 Lu, Mountain, **Hubbard.** *Is stereocilia velocity or displacement feedback used in the cochlear amplifier?*

12:30 Lunch  
*Medical School foyer & student’s common room*

Session 3: Posters (13:30-15:00)

Sessions 4 & 5: (15:00-16:00 & 16:30-18:00, with tea break at 16:00)  
(a) **Business meeting and** (b) **open discussion**  
**Chairs:** (a) Cooper & Kemp, (b) Mountain & Shera

19:00 Farewell Dinner & Ceilidh (featuring the Moody Food Ceili Band)  
*NB – a ceilidh is a sort of barn dance, and it’s a very weird word.*
  
*Comus Restaurant (in the Chancellor’s Building)*
Poster section 1: Middle-ear mechanics


2. **Slama**, Ravicz, Nakajima, Dong & Rosowski. Measurements of middle ear pressure gain and cochlear input impedance in the chinchilla.

3. **Dalhoff**, Turcanu, **Gummer**. A middle-ear reverse transfer function computed from vibration measurements of otoacoustic emissions on the ear drum of the guinea pig. ORIGINALLY SCHEDULED AS TALK #24

Poster section 2: Otoacoustic emissions

3. **Wittekindt**, Abel, Kössl. Shifting the operating point of cochlear amplification? Impact of low frequency biasing and contralateral sound stimulation on DPOAEs.

4. WITHDRAWN

5. WITHDRAWN


14. **Cooper** & Shera. Comparing BM vibrations & OAEs in individual ears.

Poster section 3: Cochlear mechanical measurements


16. **Olson**, de La RocheFoucauld & Dong. Quantifying the passive substrate for active cochlear tuning.


19. **Braun**. Dual tuning in the mammalian cochlea: dissociation of neural and basilar membrane responses at supra-threshold sound levels – a meta-analysis.


Richter, Fishman, Rau & Fan. Hard x-rays can be used to visualize cochlear soft tissue displacements in a closed cochlea.

**Poster section 4: Cochlear mechanical models**


Aranyosi, Ghaaffari & Freeman. Tectorial membrane waves can broaden the tips of tuning curves.

Fulton. Hensen’s stripe as a topographic waveguide defines the roles of the OHC and IHC.

Murakami & Unoki. Nonlinear responses of a nonlinear cochlear model with the function of an outer hair cell model.

How, Elliott & Lineton. The influence on predicted harmonic generation of the position of the nonlinearity within micromechanical models.

Zhang, Kim, Lee & Park. Brownian energy depot model of the BM-OHC system.

Hubbard. Conjoined cochlear models: the TWAMP and the sandwich.

Yoon, Kim, Puria & Steele. Cochlear modeling using “time-averaged lagrangean” method: comparison with $V_{bm}$, $P_{st}$, and $Z_c$ measurements.

Marquardt & Hensel. A lumped-element model of the apical cochlea at low frequencies.

**Poster section 5: Hair cells and somatic motility**

WITHDRAWN

Evans & Fettiplace. Measurement of outer hair cell electromotility using a fast voltage clamp.

Iida, Murakoshi, Kumano, Wada, Tsumoto, Ikeda, Kobayashi, & Kumagai. Assessment of the activity of purified prestin and the effect of salicylate on prestin-chloride binding studied by isothermal titration calorimetry.


WITHDRAWN

**Poster section 6: Hair bundles and transduction**

Warren, Lukashkin & Russell. The dynein motor is the basis of active oscillations of mosquito antennae.

Dierkes, Jülicher & Lindner. Mechanical properties of coupled hair bundles.

UPGRATED to a talk at the last minute – see Weds, 4:30pm