

Mechanics of Hearing 2022 program

Latest update: July 23, 2022

A word of thanks to our funding sources and sponsors: This workshop received financial support from various sources. These invaluable contributions made it possible to reduce the conference fee and thereby enable participation of a great amount of younger researchers from all over the world! The funding provides the frame for this workshop to bring the field of hearing forward - now and in the years to come!

THORLABS also agreed to bring an OCT system and to join forces with the leaders in our field working with biophotonics. There will be a workshop that will introduce the technology, the current limitations and the scientific questions we can tackle with this technology.

We have a small number of online participants - and we made an effort to include the online participants in the best possible way. All sessions will be streamed to the external participants (only). To improve the audio experience, we have a number of microphones that we will ask you to use when asking questions. The online participants will be able to interact with the on-site participants using the [MOH2022 communication platform](#). Watch out for comments on your presentation and manuscripts! We will have two dedicated discussion slots with direct interaction on-site and on-line.

The presentations will be recorded locally (only) and provided to the presenters and the online participants (to accommodate the different time zones). If you do not give your consent, then please indicate this before your presentation. After the conference, you will be provided with the recording for transcription of the questions and answers connected to your presentation. These will be included in the proceedings.

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Welcome to KONVENTUM and MOH2022! Your rooms will be ready at 15:00. Until then, please use the time to explore the venue and to chat with your colleagues. There will be refreshments available for you. Please follow the MOH2022 signs or ask the staff or anyone from the organizing team in case of questions (Caroline, Hyojin, Lily, Wei, Bastian). We will start off with dinner at 18:00, followed by a short welcome by the organizers and an artist talk by [Jacob Kirkegaard](#).

	Time	ID	Author	Title	Ch
Noon - evening	ARRIVAL (Chair: Organizing team and Konventum staff)				
	14:00			Welcome snacks	
	18:00			DINNER	
	19:20			Welcome	
	20:00			ARTIST TALK	

	Time	ID	Author	Title	Ch
BREAKFAST & MORNING ACTIVITY					
Mechanics and Imaging I (Chair: Olson)					
Morning	09:00	S01-01	Guinan	Cochlear Amplification: Clarification of concepts and new insights about how OHC motility produces traveling-wave amplification	MOI_01
	14:00	S01-09	Cooper	Micromechanical motion of the guinea-pig organ of Corti.	MOI_07
	09:40	S01-03	van der Heijden	The dramatically dispersive character of the traveling wave	MOI_03
	10:00	DISCUSSION			
	10:20	COFFEE			
Mechanics and Imaging II (Chair: Dewey)					
Noon	11:00	S01-04	Strimbu	Loss and Recovery of Amplification and Nonlinearity in vivo Following Disruption of the Endocochlear Potential	MOI_12
	11:20	S01-05	Nakajima	Human cochlear partition anatomy and motion using optical coherence tomography	MOI_06
	11:40	S01-06	Puria	Differential Transverse Motion of Outer Hair Cells Measured in Gerbil High-Frequency Region	MOI_23
	12:00	LUNCH			
	Mechanics and Imaging III (Chair: Meaud)				
Afternoon	13:20	S01-07	Nam	Advective mass transport along the cochlear coil	MND_24
	13:40	S01-08	Grosh	Nonlinearity and Energetics of Active Cochlear Models	MND_09
	14:00	S01-12	Ticháček	Hair cells specialization in a nonlinear lumped element model of the cochlea support phase-locking and cochlear amplifier mechanism	
	14:20	DISCUSSION			
	14:40	POSTERS			
Mechanics and Modeling I (Chair: Nam)					
Evening	16:40	S01-10	Meaud	Modeling the fine structure of ear canal pressure and cochlear microphonics in response to a pure tone	MND_05
	17:00	S01-11	Sisto	Fluid focusing contributes to the BM vibration amplification by boosting the pressure	MND_10
	17:20	S01-13	Allen	50 years of cochlear modeling: The remarkable trip from Delft 1983 to Denmark 2022	MOI_15
	18:00	DISCUSSION			
	18:20	DINNER			
19:40	S01-14	Bergevin	How exceptional is the ear?	MND_12	
20:00	MOH 101				
21:00	POSTERS				
EVENING ACTIVITY					

	ID	Author	Title	Ch
Paired posters	S01-A	Recio-Spinoso	Sound-evoked vibrations at the apex of the chinchilla cochlea	MOI_11
	S01-B	Ramdas	OCT-based method for the combined measurement of structural vibration and fluid pressure	TRA_04
	S01-C	van der Heijden	Spatial buildup of cochlear compression revisited	MOI_18
	S01-D	Saremi	The Timing of the Cochlear Mechanics: A Comparative Study on How Computational Models Reproduce the Phase Response of the Excitation Pattern	MND_20
	S01-E	Edri	Potential Role of Nonlinear Stiffness in Cochlear Models	
	S01-F	Alkhairy	Cochlear Wave Propagation and Dynamics in the Human Base and Apex	MOI_24
	S01-G	Sengar	Comparison of Synchronized Spontaneous OAE Dynamics in Human Data and Cochlear Mechanics Simulation: Effects of Roughness	MOI_19
	S01-H	Kerkhofs	Understanding bone conduction in the human cochlea with intracochlear OCT vibrometry	DTR_09
	S01-I	Wang	Auditory Evoked Potentials in Comparison to Pure Tone Thresholds from Adult Humans	DTR_06
	S01-J	Meenderink	Sound-evoked vibrations along the tonotopic axis in the gerbil cochlea	MOI_04
	S01-K	Alberts	Measuring Motion in the Mouse Apical Turn with Optical Coherence Tomography	
	S01-02	Altoè	The shape of noise to come: Signal vs. Noise amplification in the active cochlea	MND_02

	Time	ID	Author	Title	Ch
BREAKFAST & MORNING ACTIVITY					
Physiology from molecules to systems level I (Chair: Carney)					
Morning	09:00	S02-01	Ashmore	The two operational modes of outer hair cells: the implications for cochlear tuning	PMS_01
	09:20	S02-02	Ó Maoiléidigh	The functional contributions of links in mammalian cochlear hair bundles	PMS_03
	09:40	S02-03	Iwasa	Not so presto? Can outer hair cells be sluggish?	PMS_04
	10:00	S02-04	Le Page	Digitization and Reanalysis of Fiber-optic Displacement Data: An Elephant in the Chamber?	MOI_21
	10:20	DISCUSSION			
	10:40	COFFEE			
Physiology from molecules to systems level II (Chair: Ashmore)					
	11:00	S02-05	Toderi	High Speed Imaging of Active Motility in Hair Cells	PMS_05
	11:20	S02-06	Prasad	Physiological role of extracellular ATP in the inner ear	
	11:40	S02-07	Rabbitt	On Natural Selection of Cochlear Outer Hair Cell Electro-Mechanical Properties	PMS_09
	12:00	LUNCH			
Physiology from molecules to systems level III - modeling (Chair: Ó Maoiléidigh)					
Noon	13:20	S02-08	Høgh-Jensen	Keynote: The role of non-linear dynamics in nature	
	14:00	S02-09	Sørensen	Clustering of coupled non-linear oscillators and its (potential) role in hearing	MND_29
	14:20	S02-10	Roongthumskul	Low-level distortion product otoacoustic emissions in lizards are influenced by spontaneous activity of the inner ear	MND_30
	14:40	S02-11	Faber	Robust Synchronization and Reliable Signal Detection by Coupled, Non-isochronous Hair Cells	MND_01
	15:00	POSTERS			
Mechanics and Modeling II (Chair: Nam)					
Afternoon	16:00	S02-12	Samaras	Nonlinear Effects Basal to the Best Place Manifest in the Reticular Lamina's Response due to its Low Stiffness Relative to the Basilar Membrane	MOI_13
	16:20	S02-13	Elliott	Forms of longitudinal coupling in the organ of Corti	MND_03
	16:40	S02-14	Marrocchio	Wave motion in the longitudinally coupled cochlea	MND_04
	17:00	S02-15	Marquart	Viscous losses in the fluid versus solid damping in the cochlear partition: An FEM study	MND_11
		17:20	DISCUSSION WITH ONLINE PARTICIPANTS		
	17:50	Workshop on OCT technology - technical background and hands-on			
	18:30	DINNER			
Evening		Workshop on OCT technology - scientific background and hands-on			
	21:00	POSTERS			
	EVENING ACTIVITY				

	ID	Author	Title	Ch
Paired posters	S02-A	Gianoli	Fast adaptation of cooperative channels engenders Hopf bifurcations in auditory hair cells	
	S02-B	Raphael	Computational Model of Cochlear Ion Homeostasis	PMS_07
	S02-C	Raphael	Energetic depletion and I S K mutations destabilize potassium resupply to the endolymph	PMS_02
	S02-D	Wang	Investigation on Inner Hair Cell Stereocilia Stimulation Mechanisms through 3D Finite Element Model of the Mouse Organ of Corti	MND_23
	S02-E	Villasante	Dependence of the elastic properties of protocadherin 15 dimers on Ca ²⁺ concentration	
	S02-F	Gianoli	Using light to study sound: stimulating hair cells with photonic pressure	
	S02-G	Ver Hulst	Sound detection and emission by coupled critical oscillators	
	S02-H	Tubelli	The drive to inner and outer hair-cell bundles in a slice model of the gerbil cochlea	MND_21
	S02-I	Joliot	The transepithelial potential can control gating compliance of the hair-cell bundle.	TRA_10
	S02-J	Goyal	Hair Bundle Micromechanics Including Stereocilia Kinematics and the Interaction of Stimulus and Bundle Rate Constants	MND_19
	S02-K	Agarwal	A nonlinear mechano-electro-acoustic model of the human cochlea	MND_08



Time to move and to get some fresh air! After the morning session, we will be going on our excursion. Following the business meeting, we will grab a "lunch ToGo". The busses will leave at 13:45 (sharp) from the main entrance. The busses will drop us off at castle **Elsinore** where there will be time to explore. We will then meet in the close by harbour at 15:30 to leave on a boat trip down the coast. We will have a short introduction and presentation before the world-class museum "LOUISIANA MUSEUM OF MODERN ART". You will be provided with a voucher for dinner and the busses will leave at 21:45 from the museum back to KONVENTUM. An exciting day ahead!

	Time	ID	Author	Title	Ch
	BREAKFAST & MORNING ACTIVITY				
	(Cochlear) mechanics – Non-mammals (Chair: Bergevin)				
Morning	09:00	S03-01	Bergevin	Interpeak characterizations for spontaneous otoacoustic emissions	MOI_22
	09:20	S03-02	Nowotny	In-vivo mechanics in the miniaturized hearing organ of an insect	
	09:40	S03-03	Vavakou	Micromechanics of the Hearing Organ of the Bushcricket Measured with Optical Coherence Tomography	PMS_06
	10:00	DISCUSSION			
	10:20	COFFEE			
	10:40	S03-04	Carney	Keynote: Nonlinearity in Hearing: The Role of Inner-Hair-Cell Saturation in Neural Coding	PMS_08
	11:20	DISCUSSION			
	11:50	BUSINESS MEETING			
Paired posters Noon/Afternoon/Evening	13:00	LUNCH TO GO			
	13:45	EXCURSION			

	ID	Author	Title	Ch
	S03-A	Whiley	Convergent Otoacoustic Tuning Estimates in the Anole Lizard?	MOI_14
	S03-B	Zosuls	Measuring wave propagation in the tectorial membrane of <i>Meriones unguiculatus</i>	
	S03-C	Brandt	Spider leg joint membranes are displaced both by acoustic waves and sound-induced vibrations in their webs	
	S03-D	Mhatre	Measuring the internal mechanics of the tree cricket auditory organ (webinar)	

	Time	ID	Author	Title	Ch
BREAKFAST & MORNING ACTIVITY					
Technological developments for research and application + Developments in translational research I (Chair: Siegel)					
Morning	09:00	S04-01	Zhang (Intro: Olsson/Nakajima)	Keynote: A Comparison of Implantable Microphones Constructed Around a Piezoelectric Polymer	TRA_09
	09:40	S04-02	Kitsopoulos	Design and Testing of Ultraminiature MEMS Middle Ear Accelerometers	TRA_05
	10:00	S04-03	Lenk	Bio-inspired, adaptive acoustic sensor: sensing properties in dependence of feedback parameters	TRA_03
	10:20	DISCUSSION			
10:40	COFFEE				
Cochlear mechanics – Human (Chair: Verhulst)					
	11:00	S04-04	Siegel	What Do Recent Discoveries in Cochlear Mechanics Tell Us About Otoacoustic Emissions?	MOI_05
	11:20	S04-05	Wils	Lumped Element Models of Sound Conduction in the Human Ear: a Systematic Review	MND_22
	11:40	S04-06	Goodman	Otoacoustic Emissions extracted by pharmacological blocking of OHCs without using sound for suppression or subtractive scaling	MOI_02
	12:00	LUNCH			
Mechanics and OAE (Chair: Guinan)					
Noon	13:40	S04-07	Charaziak	Suppression of organ-of-Corti vibrations and otoacoustic emissions in mice	MOI_08
	14:00	S04-08	Dong	Imaging ratio dependency of distortion products at apical region of gerbil cochlea	MOI_09
	14:20	S04-10	Vencovsky	A component of stimulus-frequency otoacoustic emissions evoked due to perturbation of nonlinear force in a cochlear model	MND_13
	14:40	DISCUSSION			
	15:00	POSTERS			
OAE applications (Chair: Charaziak)					
Afternoon	16:40	S04-11	Koike	Relationship between DPOAE and pure tone hearing levels: Numerical analysis with human cochlear finite element model	MND_14
	17:00	S04-12	Salloom	The effect of broadband elicitor duration on transient-evoked otoacoustic emissions and a psychoacoustic measure of gain reduction	MOI_16
	17:20	DISCUSSION WITH ONLINE PARTICIPANTS			
Evening	18:00	DINNER			
	20:20	CONCERT			
	EVENING ACTIVITY				

	ID	Author	Title	Ch
Paired posters	S04-A	Davies	Cochlea-inspired acoustic metamaterials	
	S04-B	Benson	Can You Hear Me Now? Binaural Brainstem and Spatial Hearing Deficits in a Guinea Pig Model of Noise-Induced Cochlear Synaptopathy	DTR_02
	S04-C	Teal	Whole Stimulus DPOAE Analysis	DTR_01
	S04-D	Zirn	Temporal adjustment of interaural stimulation timing leads to improved sound localization but not to improved spatial release from masking in bimodal listeners	DTR_03
	S04-E	Vetesnik	Two-tone suppression and power balance in a 2D nonlinear cochlear model	MND_18
	S04-F	Xia	Investigating the Effect of Change in Cochlear Micromechanics and Activity Levels on Stimulus Frequency Otoacoustic Emissions Phase Gradient Delay	MND_07
	S04-G	Lee	Numerical analysis of nonlinearity of outer hair cells based on comparison with measurements of DPOAEs	MOI_17
	S04-H	Saiz-Alia	Speech-DPOAEs for probing speech processing in the inner ear (WEBINAR)	MND_15
	S04-I	Keshishzadeh	Individualized human cochlear models based on otoacoustic emissions recordings	
	S04-J	Stiepan	Evaluating shifts in the human cochlear tonotopic map using binaural pitch matching and SFOAE delays	MND_17
	S04-K	Laure Stickel	Making sense of fluid-jet stimulation of single outer hair-cell bundles in the rat cochlea.	
S04-09	Dewey	Similar tuning of distortion-product otoacoustic emission ratio functions and cochlear vibrations in mice (webinar)	MOI_10	

In case you are leaving today, please empty your room latest by 9:00. After the last presentation we will have a longer discussion slot where we will discuss the outcomes of the conference. This is a great chance to reflect and to identify potential changes to the manuscript. Please submit a final version of the manuscript latest one week after the conference following the author guidelines.

You will receive a link where you can download the recording of your presentation to extract the most relevant questions and to address them in the proceedings. If you agree (by explicit consent), the recording can be posted on the [MOH2022 video channel](#) (hosted by DTU) as part of the proceedings and for later use.

	Time	ID	Author	Title	Ch
	BREAKFAST & MORNING ACTIVITY				
	Technological developments for research and application + Developments in translational research II (Chair: Goodman)				
Morning	09:00	S05-01	Lyon	Keynote: Modeling Nonlinear Mechanics in Normal and Impaired Cochleas	
	09:30	S05-02	Frost	A program to enhance spectral domain optical coherence tomography vibrometry	TRA_02
	09:50	S05-03	Verhulst	Otoacoustic Emissions in a Deep-Neural-Network Model of Cochlear Mechanics	TRA_07
	10:10	DISCUSSION			
	10:40	COFFEE			
	Technological developments for research and application + Developments in translational research III (Chair: Elliott)				
	11:00	S05-04	Nakajima	Diagnosis of mechanical ear pathologies from wideband tympanometry measurements using a classification model	DTR_05
	11:20	S05-05	Slater	Modelling the Recovery of Residual Acoustic Hearing after Cochlear Implantation by Using Feasible Intracochlear Acoustic Devices	TRA_01
	11:40	S05-06	Bonomo	A graph signal processing model of the cochlea with application to cochlear implants	TRA_06
	12:00	LUNCH			
	Technological developments for research and application + Developments in translational research IV (Chair: Gummer)				
Noon	13:20	S05-07	Dalhoff	Simulation of conductive hearing loss and its impact on distortion-product otoacoustic emissions using a hydrodynamic cochlea model	MND_16
	13:40	S05-08	Borkowski	Bone conduction stimulation of the temporal bone with the inner ear: a finite element study	MND_06
	14:00	S05-09	Prodanovic	Cochlear vibration modes with bone conduction stimulation	
	14:20	FINAL DISCUSSION AND COMMENTS			
	15:30	END OF CONFERENCE			

	ID	Author	Title	Ch
Paired posters	S05-A	Lim	Difference in bone conduction analysis between a head model and an isolated cochlea model	DTR_04
	S05-B	Guan	Finite-element modeling of the effect of superior canal dehiscence on intracochlear pressures in bone conduction	DTR_07
	S05-C	Prodanovic	Development of a finite element model of a human head including a fluid-filled bony labyrinth for simulation of the transmission of bone conducted sound	
	S05-D	Ivanovic	Phase-contrast Micro-Tomography of the Human Middle Ear	