

# LECTURE INVITATION



## Sound Quality of Audio Systems

Modeling, Measurement & Control

March 13<sup>th</sup> - 15<sup>th</sup> 2017 (Technical University Dresden, Germany)

The 2017 lecture on "Sound Quality of Audio Systems" presented by Prof. Dr. Wolfgang Klippel, honorary professor of the Institute of Acoustics and Speech Communication, will give you a deep understanding on the latest measurement and diagnostic techniques used in telecommunication, automotive, multi-media and professional applications to design small, light and cost-effective loudspeakers.

The generation of signal distortion is modelled by linear, nonlinear and time-variant systems with lumped and distributed parameters. The course makes the relationship between symptoms and physical causes of the distortion more transparent. Practical sections will give each participant further opportunities for learning by doing.

### Highly recommended for:

- Students and university staff of the electro-acoustics

## Key Topics

Benefit from the over 30 years of fundamental research by Prof. Dr. Klippel.

- COMPREHENSIVE ASSESSMENT OF AUDIO SYSTEMS
- PHYSICAL MEASUREMENT AND PERCEPTUAL EVALUATION
- ROOT CAUSE ANALYSIS OF SIGNAL DISTORTION
- DESIGNING GREEN SPEAKERS - PROVIDING MORE OUTPUT WITH HIGHER EFFICIENCY AND LOWER COST
- ACTIVE CONTROL OF ELECTRO-ACOUSTICAL TRANSDUCERS

## Tutorials

Attendees will be able to choose between different tutorials offered Monday and Tuesday for 2 hours. Please see a selection below.

- HOW TO MEASURE TS PARAMETERS ACCURATELY
- HOLOGRAFIC LOUDSPEAKER MEASUREMENT
- LOUDSPEAKERS FOR AUTOMOTIVE APPLICATIONS
- SYSTEMATIC LISTENING TESTS USING AURALIZATION TECHNIQUES
- HOW TO MEASURE MICROSPEAKERS
- INTRODUCTION TO ADAPTIVE NONLINEAR CONTROL

This is a selection only.  
Subject to changes.

[More Information](#)

## More Information

### Date and Time:

13.-15.03.2017 (9am - 5 pm)

### Address:

Dresden University of Technology  
Gerber-Bau (Room: GER 038)  
Bergstraße 53  
01069 Dresden, Germany

### Language:

English

### Contact:

Contact Jasmin for more information  
about agenda and your registration.

Jasmin Klaue

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[Register now!](#)

# CONTENT

## ELECTRO-ACOUSTICAL MODELLING:

- Fundamentals - transduction, vibration, radiation
- Abstraction - models with lumped and distributed parameters
- Small Signal Performance - linear approximation and transfer function
- Large Signal Performance - thermal dynamics and nonlinearities
- Time-varying properties - influence of climate and aging

## MEASUREMENTS AND ANALYSIS:

- Persistent excitation - artificial and natural stimuli
- Monitored signals - electrical, mechanical and acoustical sensors
- Complex structures - digital and analogue components
- Sound field - measurements in the near and far field
- Interaction with the room - direct and diffuse sound part
- Measurement time - ultra-fast and long-term (power) testing
- Distortion analysis - linear and nonlinear components
- System identification - optimal fitting and parameter estimation
- Transformations - Fourier, wavelet and perceptual modelling
- Data compression - separation of unique and redundant information

## INTERPRETATION AND DIAGNOSTICS:

- Interpretation - measured symptoms and physical causes
- Perception - audibility and impact on perceived sound quality
- Evaluation - selection of optimal drive units for system design
- Specification - minimal but comprehensive set of data
- Tolerances - variation of parameters and influences

## NEW TOPICS ADDRESSED THIS YEAR:

- Measurement of the nonlinear mechanical damping
- Air nonlinearities in leaky boxes
- Experimental modal analysis
- Measurement of smart-phones
- Active stabilization of voice coil rest position

# TUTORIALS

Tutorials will be offered on Monday and Tuesday from 15:00 to 17:00.

Attendees can choose one option per day.

Notifications of subscriptions will be sent out at the end of February by Jasmin.

## MONDAY, MARCH 13<sup>TH</sup>, 2016

Topics to be confirmed

## TUESDAY, MARCH 14<sup>TH</sup>, 2016

Topics to be confirmed