

Workshop HfM Karlsruhe  
**Music Information Retrieval**

## Introduction

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International Audio Laboratories Erlangen

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## Meinard Müller

- 2007 Habilitation  
Bonn University
- 2007 – 2012  
Senior Researcher  
Saarland University & MPI Informatik
- Since 2012  
Professor: Semantic Audio Processing  
Erlangen-Nürnberg University



## Group Members

- Christof Weiß
- Frank Zalkow
- Sebastian Rosenzweig
- Patricio López-Serrano



## Christof Weiß

- 2006 – 2012 Physics Diploma  
Würzburg University
- 2006 – 2012 Composition Diploma  
Würzburg University of Music
- 2012 – 2015: PhD  
Ilmenau, Fraunhofer IDMT
- Since 2015: AudioLabs Erlangen
- Freelancing composer



## Frank Zalkow

- 2008 – 2012 Bachelor Musicology/Music Informatics  
(University of Music Karlsruhe)
- 2012 – 2015 Master Music Informatics  
(University of Music Karlsruhe)
- 2015 – 2016 Research Fellow in Musicology  
(Saarland University)
- since 2016 PhD Student, Group Meinard Müller  
(AudioLabs)



## Where are we?



### Fraunhofer-Gesellschaft

- Europe's largest organization for applied research
- 18,000 employees worldwide, total budget: 1.5 billion €
- 60 institutes covering a broad range of research areas

### Fraunhofer Institute for Integrated Circuits IIS

- Largest Fraunhofer institute
- Staff >700 people
- MP3



## Where are we?



Friedrich-Alexander Universität Erlangen-Nürnberg (FAU)

- One of Germany's largest universities
- More than 35,000 students



Collaboration between FAU and Fraunhofer IIS

- Roots of "MP3" audio compression scheme
- Research on audio coding in Erlangen since 1981

## International Audio Laboratories Erlangen

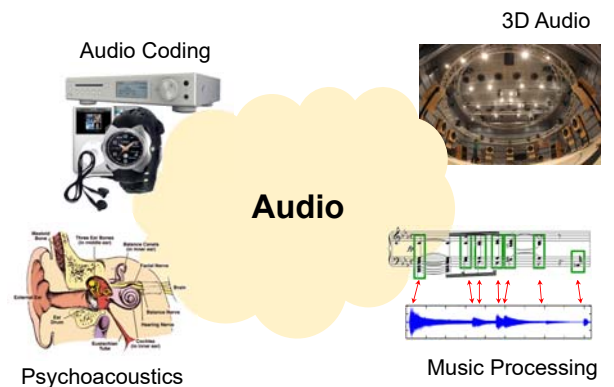


**AUDIO  
LABS**

## International Audio Laboratories Erlangen

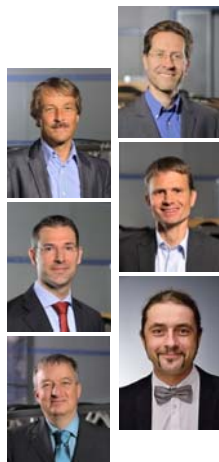
**Audio**

## International Audio Laboratories Erlangen

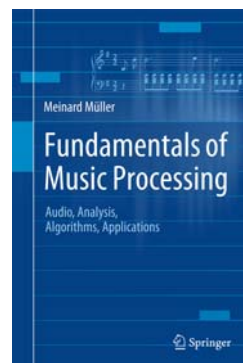


## AudioLabs – FAU

- Prof. Dr. Jürgen Herre  
Audio Coding
- Prof. Dr. Bernd Edler  
Audio Signal Analysis
- Prof. Dr. Meinard Müller  
Semantic Audio Processing
- Prof. Dr. Emanuel Habets  
Spatial Audio Signal Processing
- Prof. Dr. Frank Wefers  
Spatial Audio Signal Processing
- Dr. Stefan Turowski  
Coordinator AudioLabs-FAU



## Book: Fundamentals of Music Processing



Meinard Müller  
Fundamentals of Music Processing  
Audio, Analysis, Algorithms, Applications  
483 p., 249 illus., hardcover  
ISBN: 978-3-319-21944-8  
Springer, 2015

Accompanying website:  
[www.music-processing.de](http://www.music-processing.de)

## Book: Fundamentals of Music Processing

Chapter	Music Processing Scenario
1	Music Representations
2	Fourier Analysis of Signals
3	Music Synchronization
4	Music Structure Analysis
5	Chord Recognition
6	Tempo and Beat Tracking
7	Content-Based Audio Retrieval
8	Musically Informed Audio Decomposition

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## Workshop MIR

### Dienstag

14:00 – 16:00 **Lecture:** Introduction + Music Representations  
16:00 – 18:00 **Lecture:** Audio Features

### Mittwoch

10:00 – 12:00 **Lecture:** Harmony Analysis  
13:00 – 15:00 **Programming Exercise:** Fourier Transform & Chroma Features

### Donnerstag

10:00 – 11:00 **Lecture:** Music Synchronization  
11:00 – 12:00 **Lecture:** Music Classification  
13:00 – 17:00 **Programming Exercise:** Harmonic–Percussive Separation

### Freitag

10:00 – 12:00 **Student Mini-Projects / Further Exercises**  
13:00 – 16:00 **Student Mini-Projects / Further Exercises**

### Course material:

[www.audiolabs-erlangen.de/resources/MIR/2018\\_CourseMIR\\_HfM-Karlsruhe](http://www.audiolabs-erlangen.de/resources/MIR/2018_CourseMIR_HfM-Karlsruhe)