

Hochschule für Musik Karlsruhe

Blockvorlesung

Advanced Audio-Based Music Processing

Introduction

Christof Weiß, Frank Zalkow, Meinard Müller

International Audio Laboratories Erlangen

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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

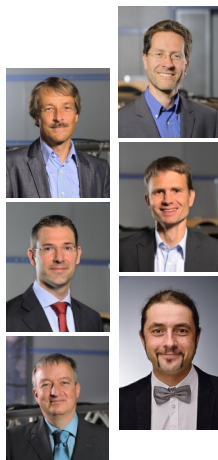
- Roots of "MP3" audio compression scheme
- Research on audio coding in Erlangen since 1981

International Audio Laboratories Erlangen



AudioLabs – FAU

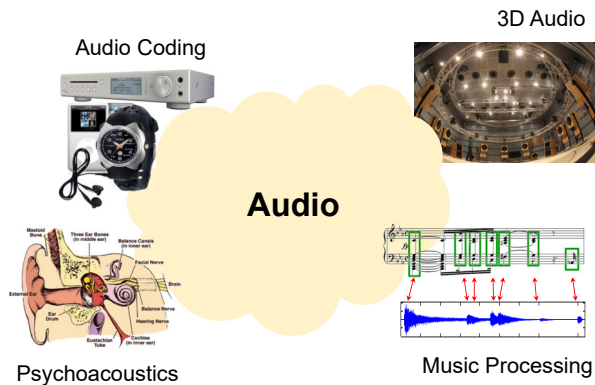
- Prof. Dr. Jürgen Herre
Audio Coding
- Prof. Dr. Bernd Edler
Audio Signal Analysis
- Prof. Dr. Meinard Müller
Semantic Audio Processing
- Prof. Dr. Emanuel Habets
Spatial Audio Signal Processing
- Prof. Dr. Frank Wefers
Spatial Audio Signal Processing
- Dr. Stefan Turowski
Coordinator AudioLabs-FAU



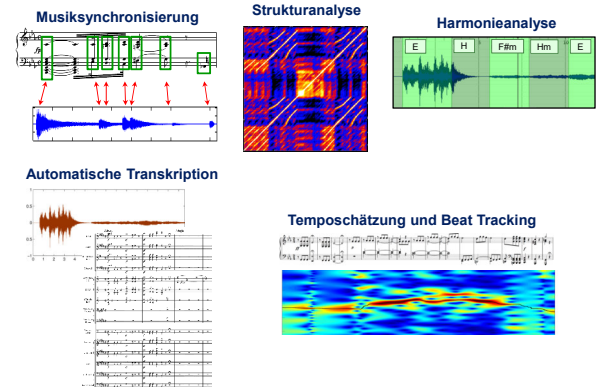
International Audio Laboratories Erlangen



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Music Processing / Music Information Retrieval



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
- Michael Krause



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
- 2018: KlarText Preis für
Wissenschaftskommunikation
- Freelancing composer



Christof Weiß

- 2006 – 2012: Physics Diploma
Würzburg University
- 2006 – 2012: Composition Diploma
Würzburg University of Music



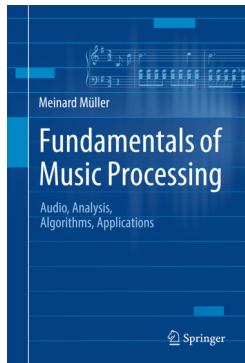
Saitengesang (2013)

Jonas Palm, Violoncello
Philipp Heiß, Klavier



www.christofweiss.de

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

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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Book: Fundamentals of Music Processing

- Accompanying Code: Jupyter Notebooks (Python)



www.audiolabs-erlangen.de/FMP

Organization

- Presence days
 - Friday, 8.5.2020
 - Friday, 29.5.2020
 - Friday, 19.6.2020
 - Friday, 10.7.2020
- Format
 - Presence phases mainly for discussion and questions
 - „Inverted classroom“: videos and reading assignments
 - Programming exercises in python & jupyter notebooks
 - Tools: ZOOM and Nextcloud
- Grading (Master Music Informatics):
 - Exercises
 - Mini-project / Hausarbeit (together with Daniel Höpfner's course)

Material

- M. Müller (2017), **Fundamentals of Music Processing**
 - Kapitel 1, 2, 3, 5
 - Library, Springer, eBook Download [Springer Link](https://link.springer.com/book/10.1007%2F978-3-319-21945-5)
 - <https://link.springer.com/book/10.1007%2F978-3-319-21945-5>
- C. Weiß (2017), **Computational Methods for Tonality-Based Style Analysis of Classical Music Audio Recordings**, PhD Thesis, TU Ilmenau
 - Selected chapters and passages
 - http://www.db-thueringen.de/servlets/MCRFileNodeServlet/dbt_derivate_00039054/ilm1-2017000293.pdf
- Audiolabs Erlangen, **Python Notebooks for Fundamentals of Music Processing**
 - Basis for practical exercises
 - Close to the book *Fundamentals of Music Processing*



Contact

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- Web: <https://www.audiolabs-erlangen.de/fau/assistant/weiss>