

# Introduction to Audio Content Analysis

Module 0.0: Introduction to the online course

alexander lerch

# introduction

about alexander lerch

## ■ education

- Electrical Engineering (Technical University Berlin)
- Tonmeister (University of Arts Berlin)

## ■ professional

- Associate Professor at the **Georgia Tech Center for Music Technology**
- previous: CEO at **zplane.development**

## ■ research focus

- Music Information Retrieval (MIR)
- Audio Content Analysis
- Audio Signal Processing
- Music Performance Analysis
- Music Generation



# introduction

## course introduction

## Audio Content Analysis and Music Information Retrieval (MIR):

- extract and infer descriptors from music signals
- answers questions and tasks such as
  - “What is the tempo/key/mood of this song?”
  - “Transcribe this signal into a musical score.”
  - ...
- MIR is commercially interesting for, e.g.,
  - music recommendation
  - music identification
  - intelligent music production
  - automatic music generation

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## course goals

after successful completion of this course, you will

- 1 have a good **overview of typical tasks** in MIR
- 2 **understand algorithmic approaches** in a large variety of basic MIR systems
- 3 be able to **implement MIR systems** in Matlab/Python
- 4 be able to **formally evaluate** systems with common datasets and metrics



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## course overview

- 1** Introduction to ACA and MIR
- 2** Fundamentals
  - Signals & Pre-Processing
  - Input Representations
  - Inference
  - Data & Evaluation
- 3** Music Transcription
  - Tonal Analysis (Pitch, Key, ...)
  - Analysis of Intensity
  - Temporal Analysis (Onset, Beats, Structure, ...)
  - Alignment
- 4** Music Identification & Classification
- 5** Audio Fingerprinting
- 6** Classification: Genre, Similarity, Mood, Instrument
- 7** Music Performance Assessment



# introduction

## prerequisites

- basic knowledge in **DSP**
  - signals & systems, block diagrams, ...
- familiarity with **Matlab**
  - m-files and functions, scripting, file I/O, ...
- helpful: knowledge of **machine learning** concepts
  - classification & regression, training and testing, evaluation metrics



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## course materials & resources

### ■ **text book:** “An Introduction to Audio Content Analysis”:

- published version at IEEE
- new edition draft available on Canvas

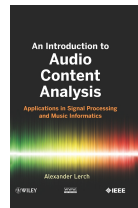
### ■ optional reading

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### ■ online resources @AudioContentAnalysis.org:

- slides & videos of previous classes
- datasets
- code (matlab, python)

### ■ software: Python 3, (Matlab)





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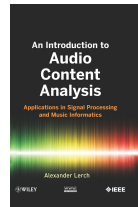
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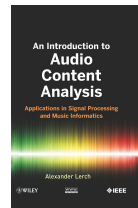
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