Computational Approaches for Analysis of non-Western Music Traditions

Xavier Serra, Martin Clayton, Barış Bozkurt

Agenda

- Introductory presentations (Xavier, Martin, Baris) [30 min.]
- Musicological perspective (Martin) [30 min.]
- Corpus-based research (Xavier, Baris) [30 min.]

----- *break* ------

- Rhythm analysis (Martin, Baris) [30 min.]
- Tuning analysis (Baris) [30 min.]
- Closing remarks (Xavier) [10 min.]
- Open discussion [20 min.]

[**Materials and references in:** https://www.upf.edu/web/mtg/non-western-music-tutorial]

Introductory presentations

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Xavier Serra

- Professor of the Dept. of Information and Communication Technologies at Universitat Pompeu Fabra, Barcelona
- Director of the Music Technology Group and head of its ASP-Lab
- Coordinator of the Master in Sound and Music Computing
- President of Phonos Foundation

- ***Areas of interests:*** Audio Signal Processing, Sound and Music Computing, Music Information Retrieval, Computational Musicology, Music Education.

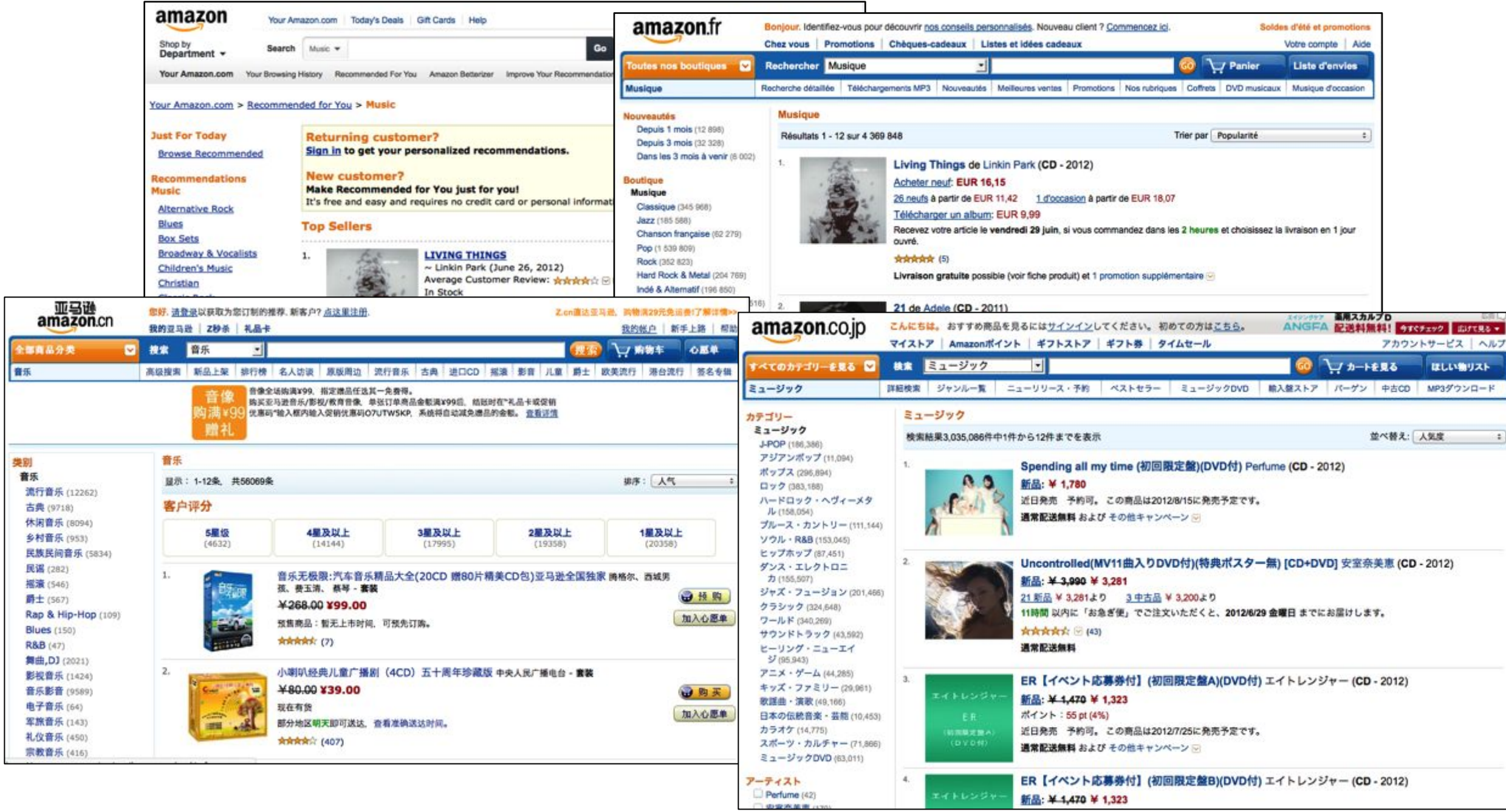
Music Technology Group

- Part of Dept. of Information and Communication Technologies at UPF

- 50 researchers (+ 20 Master students / year)

- Research topics:
  - Audio signal processing
  - Music information retrieval
  - Musical interfaces
  - **Computational musicology**
  - ….and expanding

India 2010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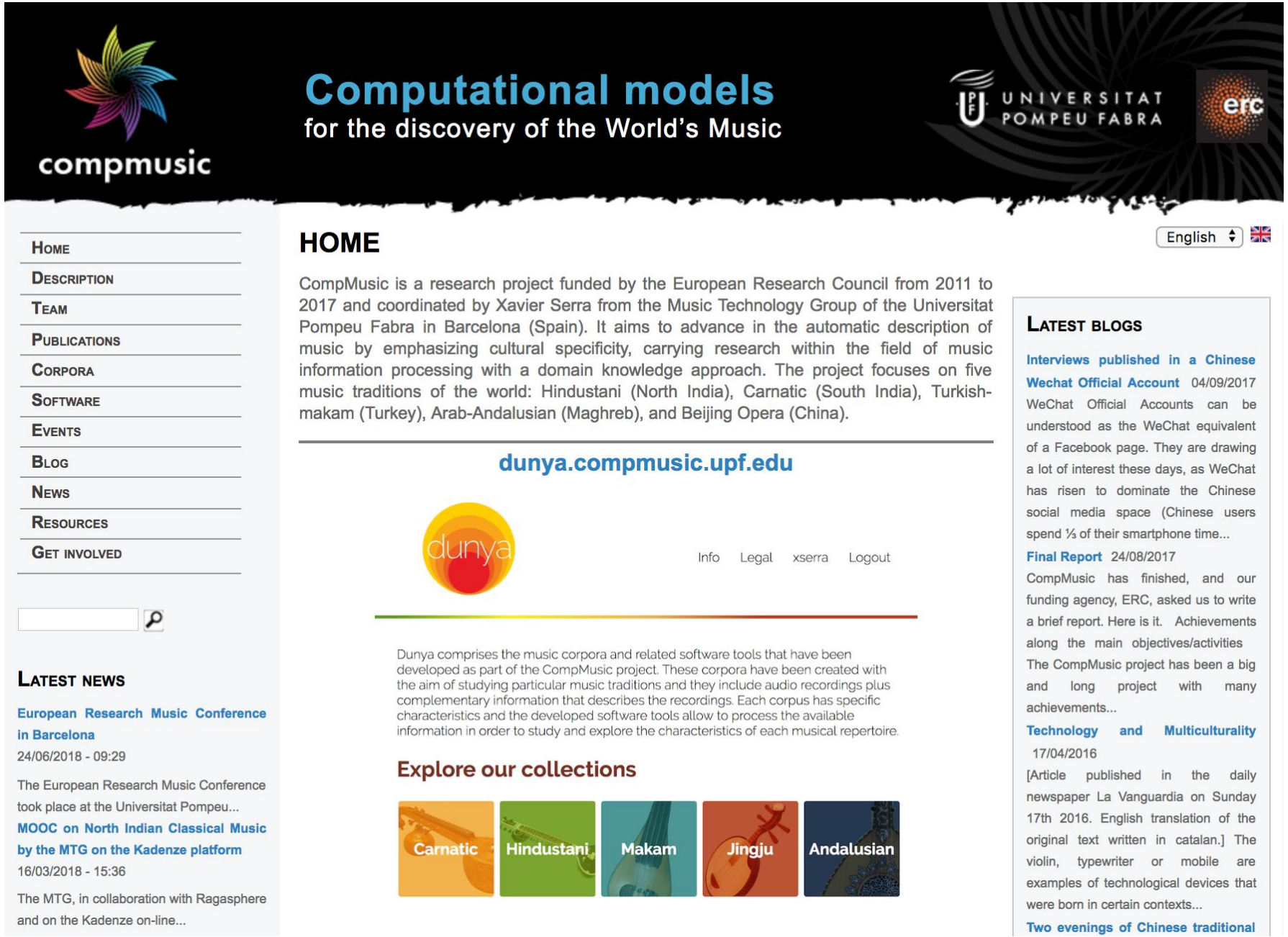
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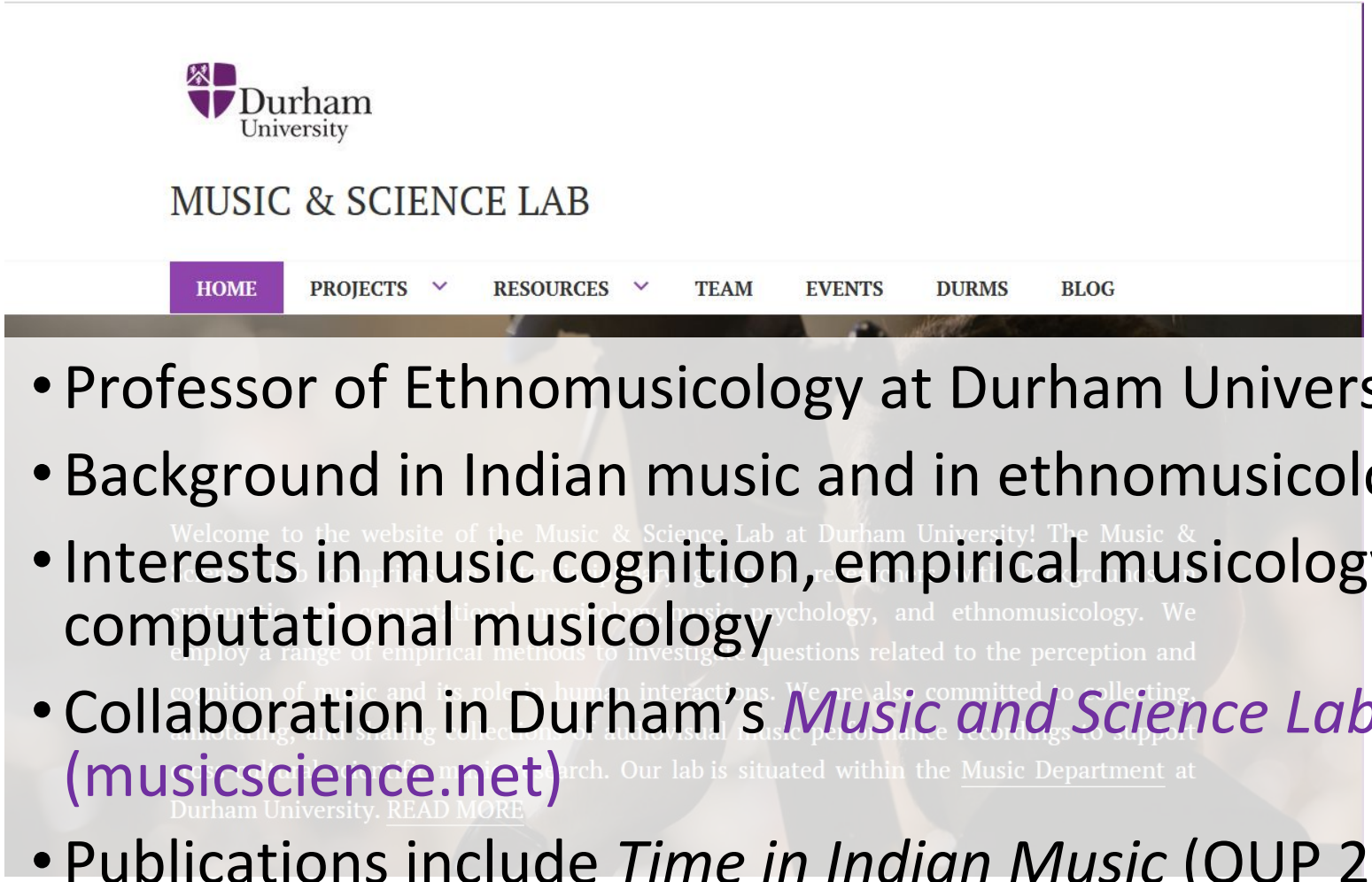
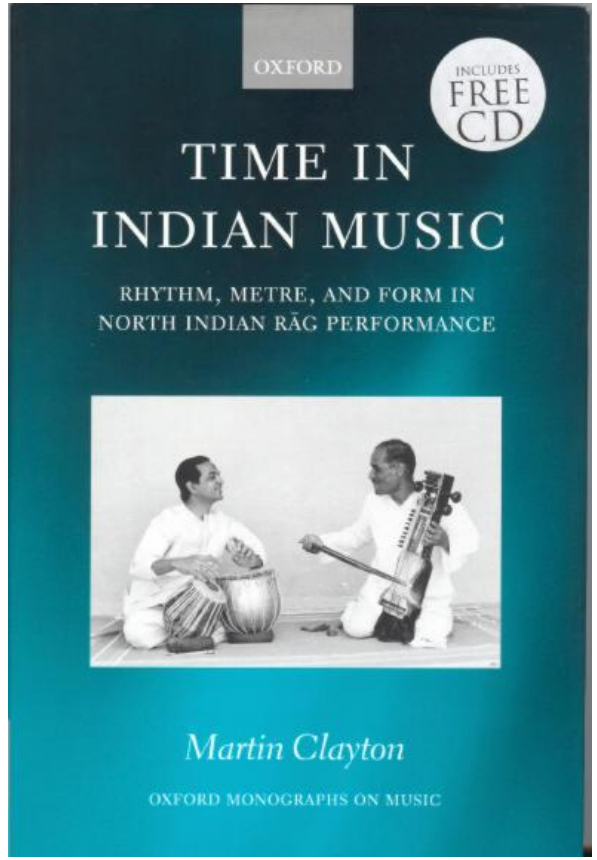
Martin Clayton



- Professor of Ethnomusicology at Durham University
- Background in Indian music and in ethnomusicology
- Interests in music cognition, empirical musicology, computational musicology
- Collaboration in Durham's *Music and Science Lab* (musicscience.net)
- Publications include *Time in Indian Music* (OUP 2000)



Background

- Studied different forms of South Asian music, but mostly Hindustani (North Indian classical/ raga)
- Ethnomusicological training includes
  - Introductions to world musics
  - Transcription and analysis techniques
  - Organology
  - Social and cultural theories applied to music
  - No computing!

Research Aims

- Underlying aim of my work is to help understand:
  - how and why people make music,
  - why it takes on the specific forms that it does, and
  - how specific musical practices have social effects and are culturally significant

Research approaches

- This means studying:
  - How music-making builds on fundamentals of **human cognition and embodiment**
  - The **material traces** of music-making (e.g. audio signals)
  - **Discourse**: How people think and talk about music
  - Music's conceptual architecture (**theories, notations** etc)

Research approaches: computation

- How this intersects with computing:
  - How music-making builds on fundamentals of **human cognition and embodiment**
  - The **material traces** of music-making (e.g. audio signals)

>>Analysis of audio signals, video images, physiological data etc

Research approaches: computation

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  >>Analysis of audio signals, video images, physiological data etc
  - **Discourse**: How people think and talk about music
  - Music's conceptual architecture (**theories, notations** etc)

  >>Reading and transformation of symbolic representations; identification of theoretical constructs in raw signals or symbols (e.g. keys, metres)

Summary

- Computational tools can be used to study:
  - Phenomena discussed theoretically:
    - beat, metre, tonality, raga, etc
  - Phenomena not lending themselves to precise verbal description:
    - intonation, timing, timbre, pitch or dynamic curves
  - (Less important for Indian music) relating signals to extant music notations (matching audio to score)

Baris Bozkurt

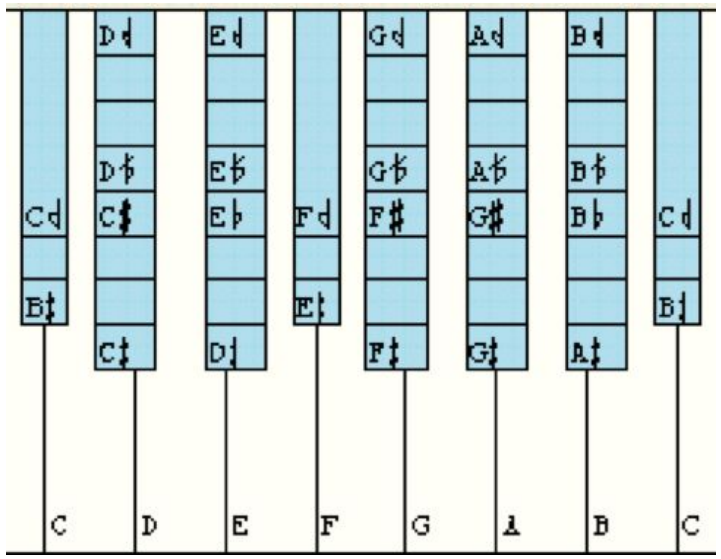
- Professor of the Electrical and Electronic Engineering at Izmir Democracy University, Turkey
- ***Areas of interests:*** Audio Signal Processing, Sound and Music Computing, Computational Musicology

- MS in Biomedical Engineering
- PhD in speech analysis (source-filter decomposition) and speech synthesis

Interest in music computing started in 2008, triggered by the attempt of learning to play Turkish makam music, observing inconsistencies in theory and mismatch with practice.

Microtonality in Turkish makam music

Theoretical construct



(Physical) Practice

Culture-specific music processing

- Music theory
- Communication with masters (and actual practice)
- Involving musicological perspective in research (collaboration with musicologists)

Introductory presentations

Xavier Serra, Martin Clayton, Barış Bozkurt