

# Music Audio Research at LabROSA

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1. Chroma Pattern Mining
2. Multitrack Alignment
3. Source-Based Transcription
4. Chord Recognition

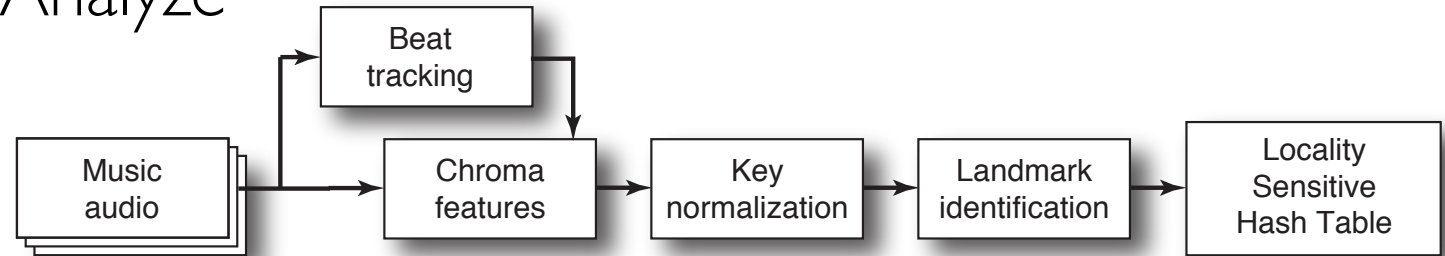


COLUMBIA UNIVERSITY  
IN THE CITY OF NEW YORK

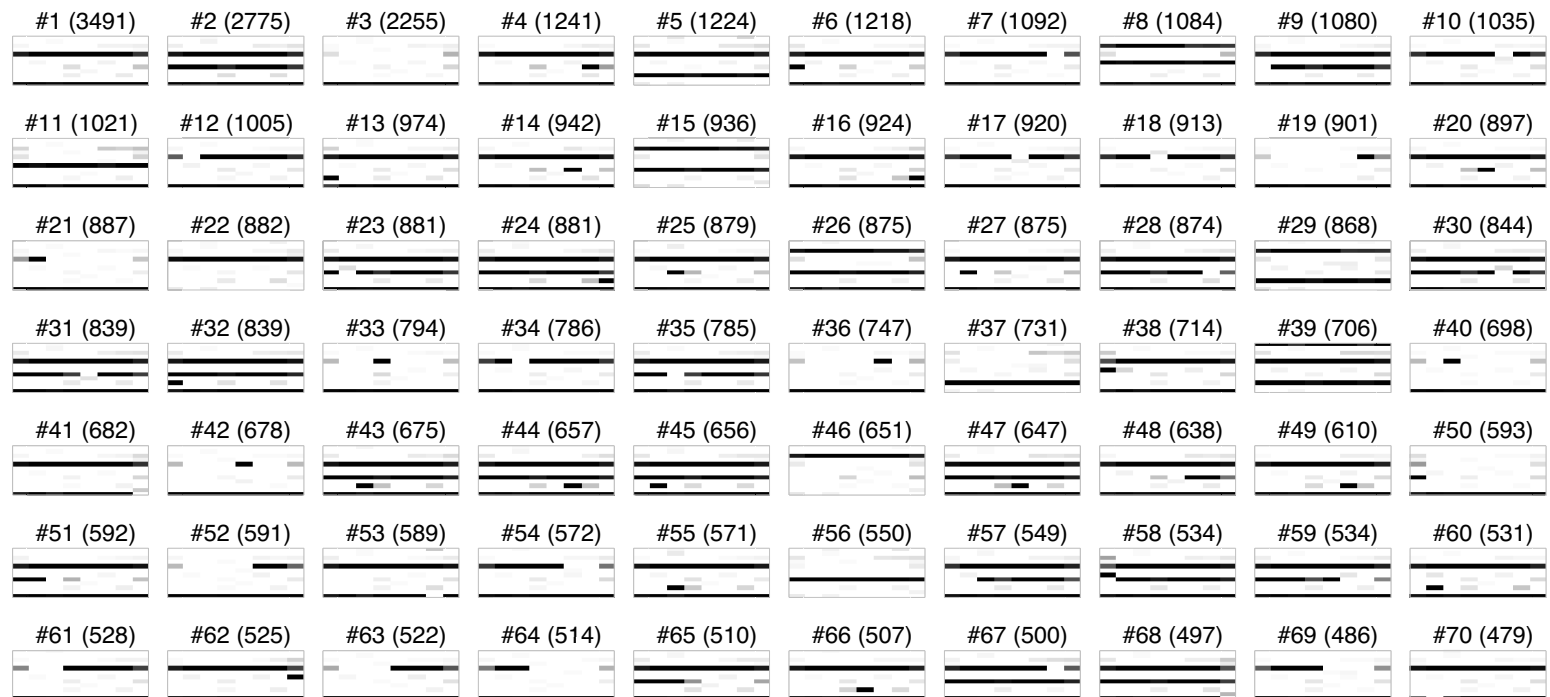
# Melodic-Harmonic Mining

*Ellis, Bertin-Mahieux, Weiss*

- 100,000 tracks from morecowbell.dj
  - as Echo Nest Analyze



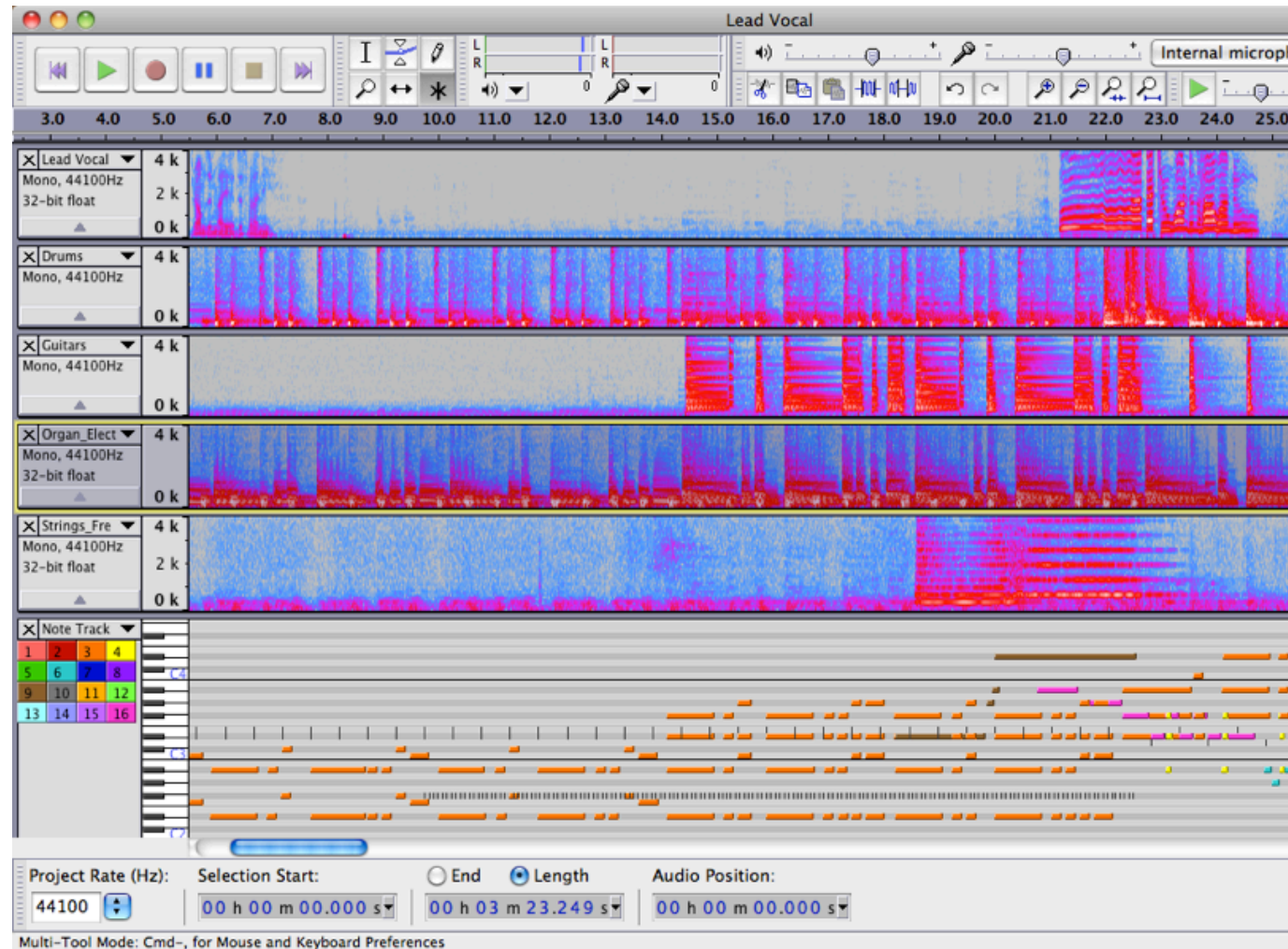
- Frequent clusters of 12 x 8 binarized event-chroma



# Multitrack Alignment

Christine Smit

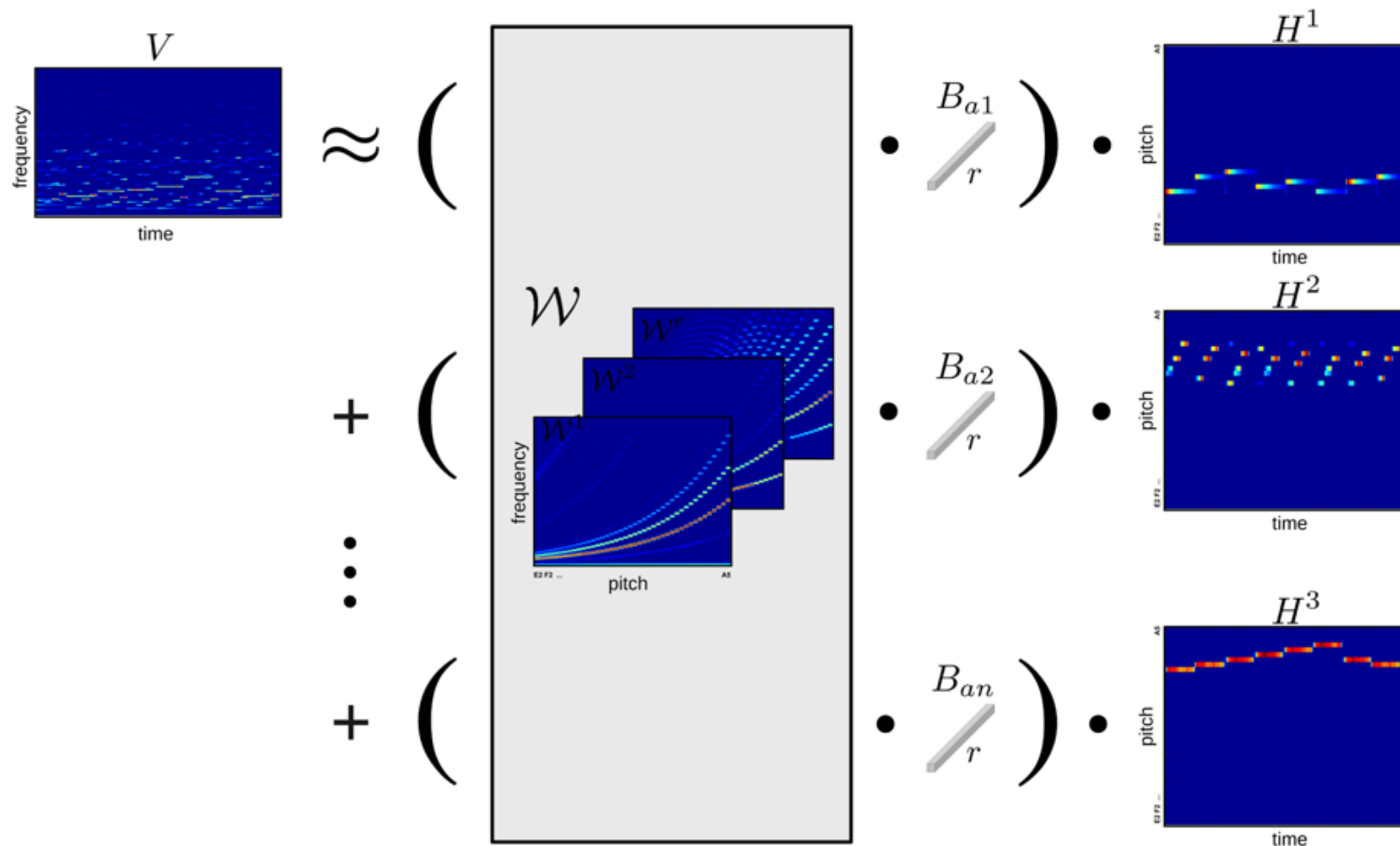
- Various forms of multitrack data are “out there”
  - studio escapees
  - Rock Band
- Valuable for MIR
  - ground truth
- Tools for automatic alignment
  - high-res alignment
  - exploit multi tracks



# Source-Based Transcription

Grindlay & Ellis '09

- Apply the Eigenvoice idea to music
  - eigeninstruments?      • Subspace NMF

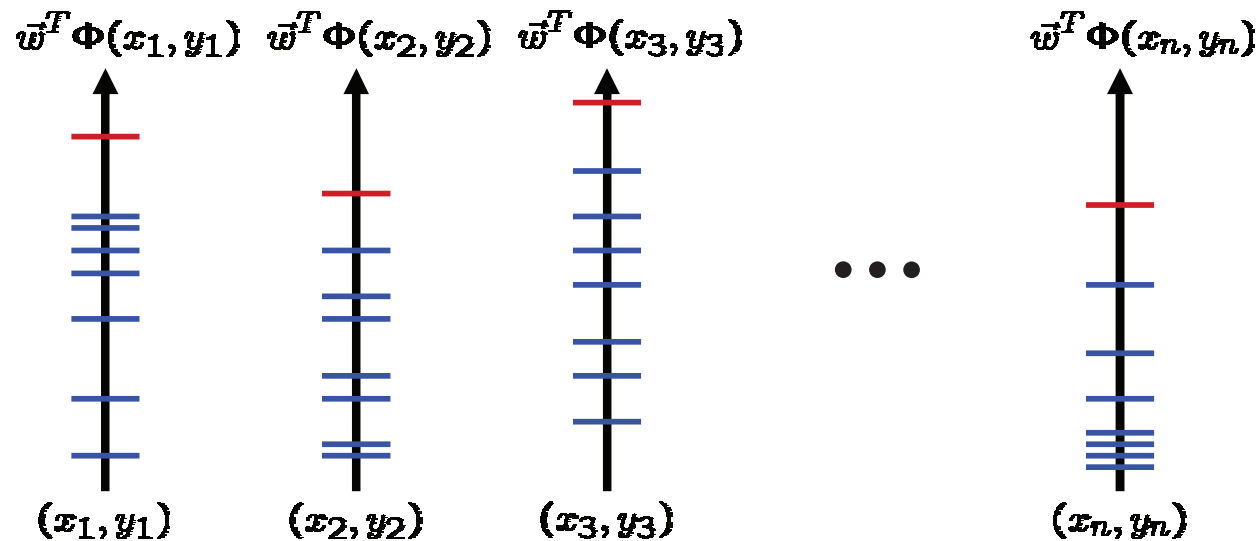


# Chord Recognition

*Tsochantaridis et al '05*  
*Weller, Ellis, Jebara '09*

## Structural Support Vector Machine

- Joint features  $\Phi(x, y)$  describe match between  $x$  and  $y$
- Learn weights  $\vec{w}$  so that  $\vec{w}^T \Phi(x, y)$  is max for correct  $y$



- Much better results

	RUSUSL	WEJ1	WEJ2	WEJ3	WEJ4
Wt. Ave. Overlap Score	0.701	0.704	0.723	0.723	0.742
Wt. Ave. Overlap Score (Merged maj/min)	0.760	0.743	0.762	0.760	0.777

# YouTube Cover Songs

Ravuri & Ellis '10

- Top 100 YouTube hits for “Let It Be”

