

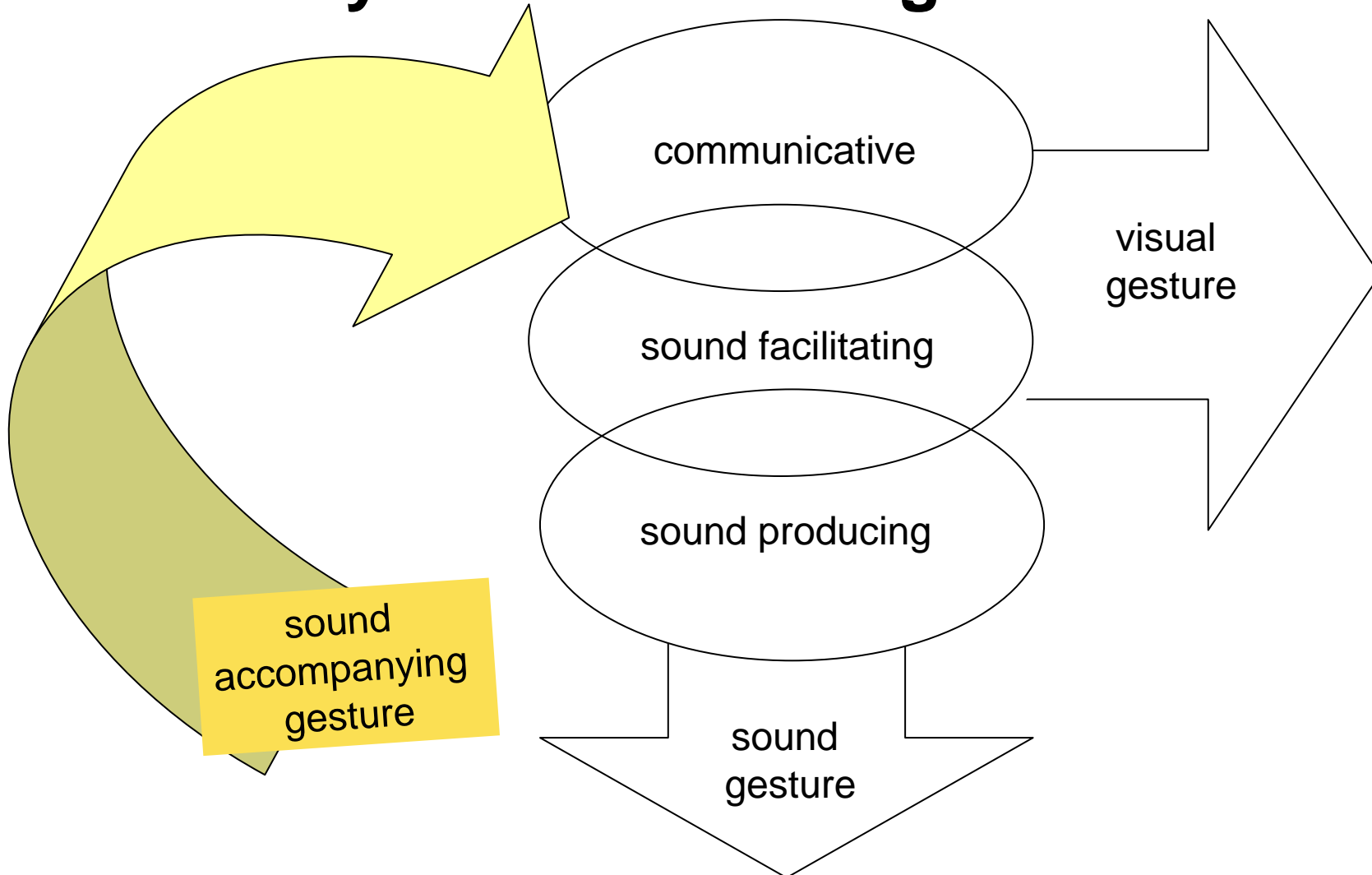


# Looking at movement gesture

Examples from drumming and percussion

Sofia Dahl

# Players' movement gestures



## **Broad Categorization of players' movement gestures**

### **1. Control gestures:**

- Primarily for the production of notes  
(Conveying intention and expression through the resulting sound events)

### **2. Communicative gestures:**

- Directly expressing intentions of the performer to observers and co-performers

## Today's case studies:

- **Control gestures**

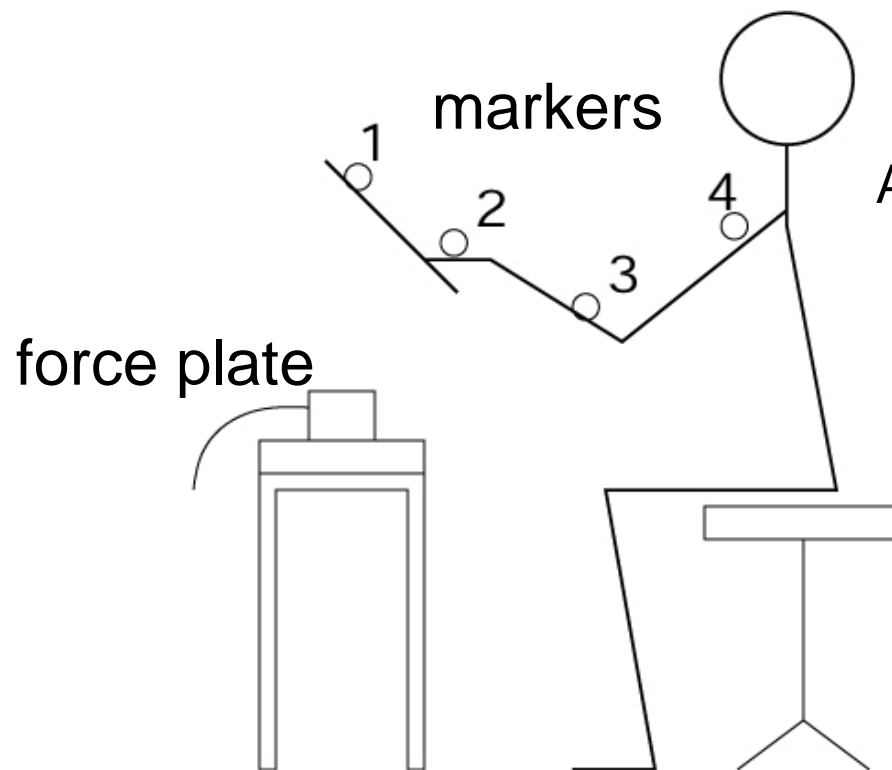
**drummers' preparatory movements for a simple musical element (an accent)**

- **Communicative gestures**

**expressiveness in musicians' playing movements for specific emotional intentions**

camera

camera



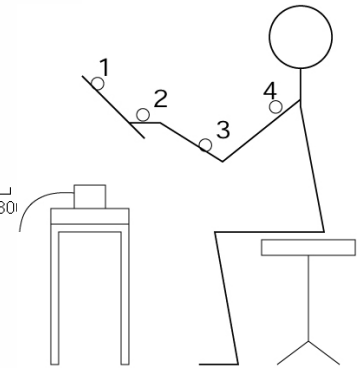
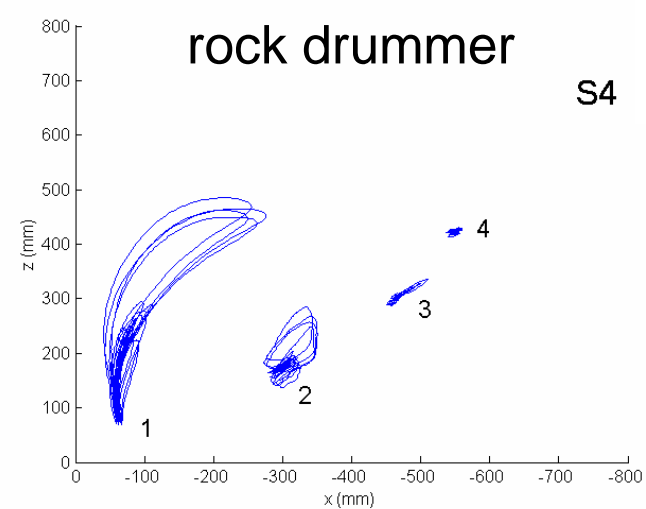
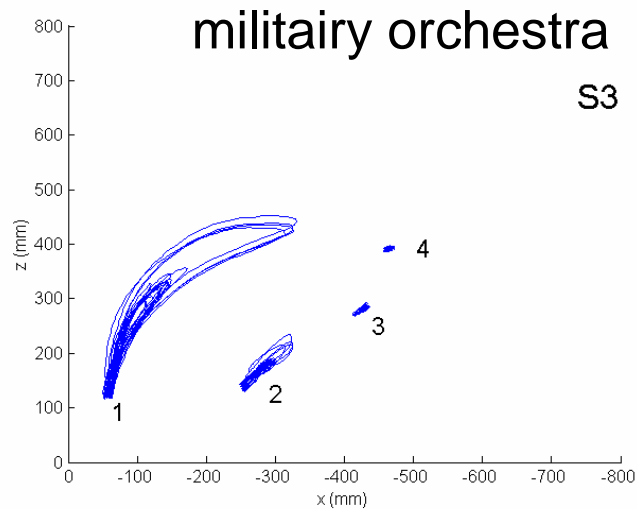
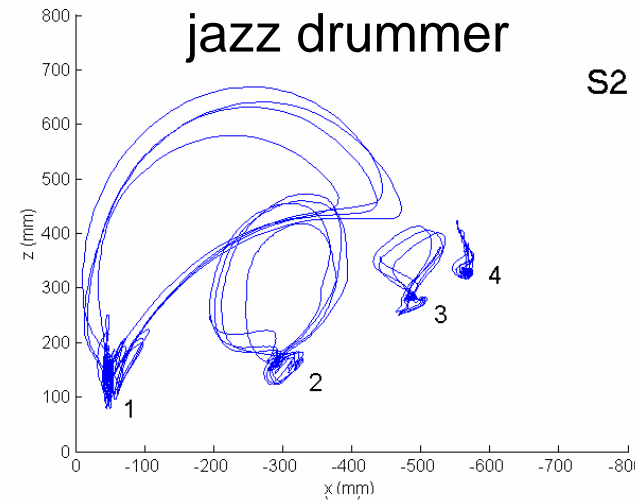
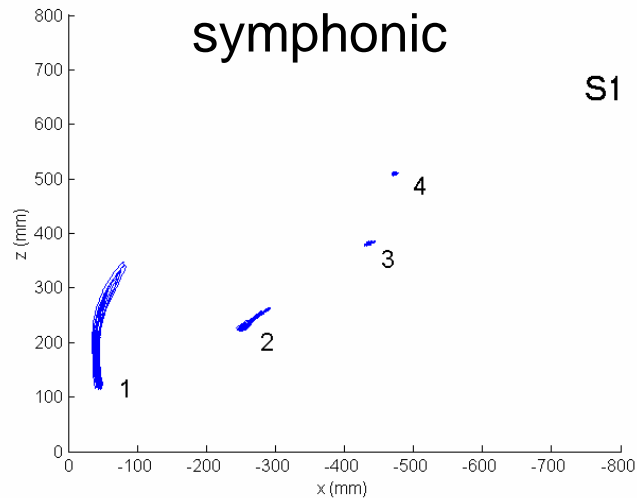
Accented rhythm performed at  
Three tempi:  
116, 160 and 200 BPM

Three dynamic levels:  
*pp*, *mf* and *ff*

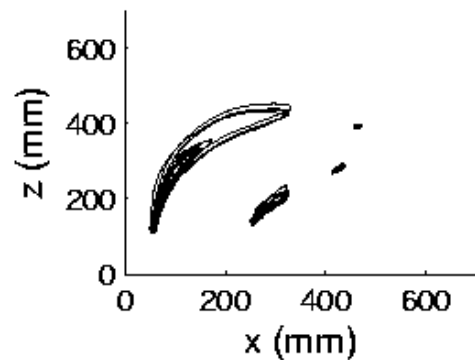
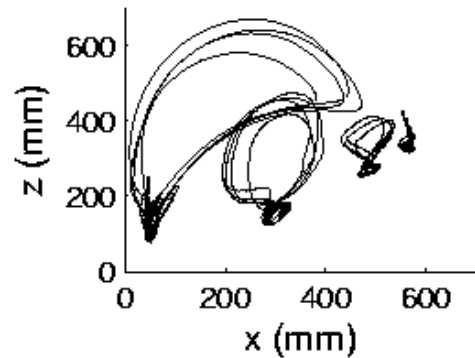
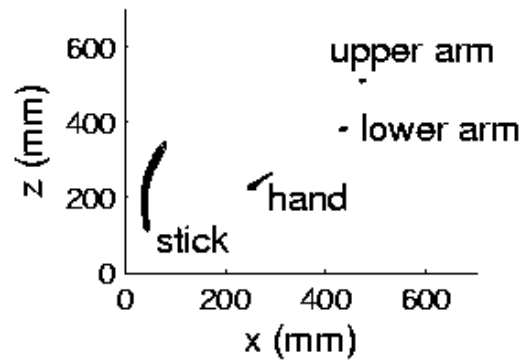
Three striking surfaces:  
normal, soft and hard

(...and 3 striking tools:  
stick, mallet and brush)

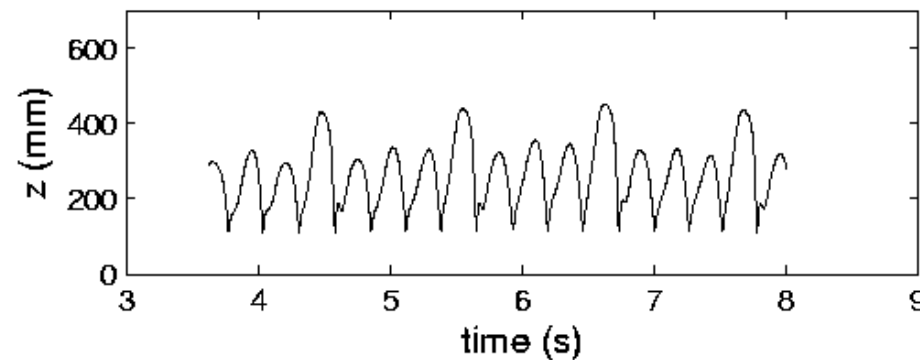
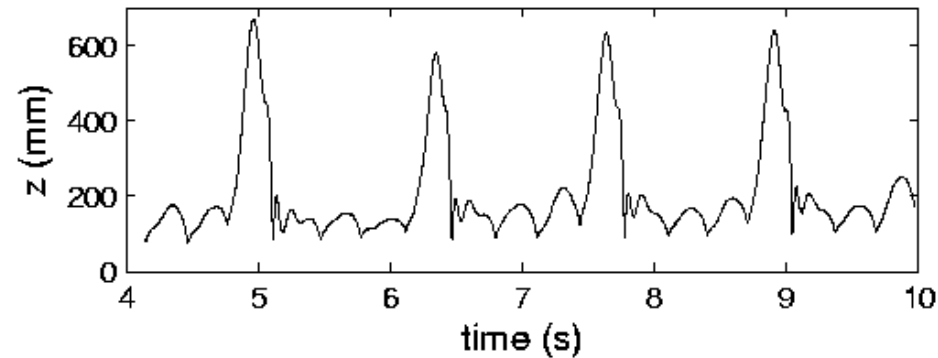
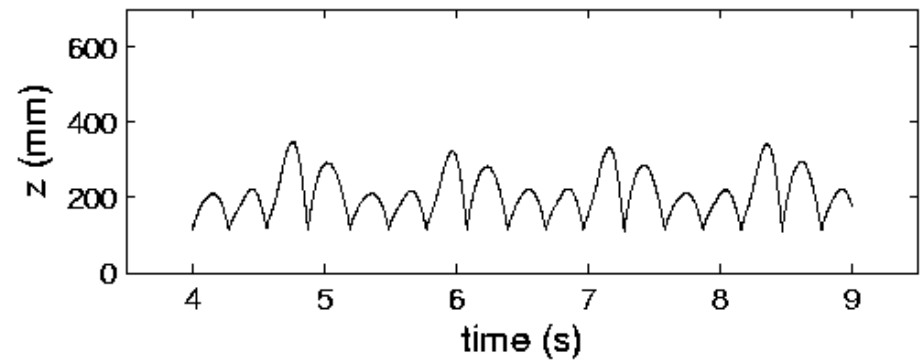
# Movement trajectories of four drummers



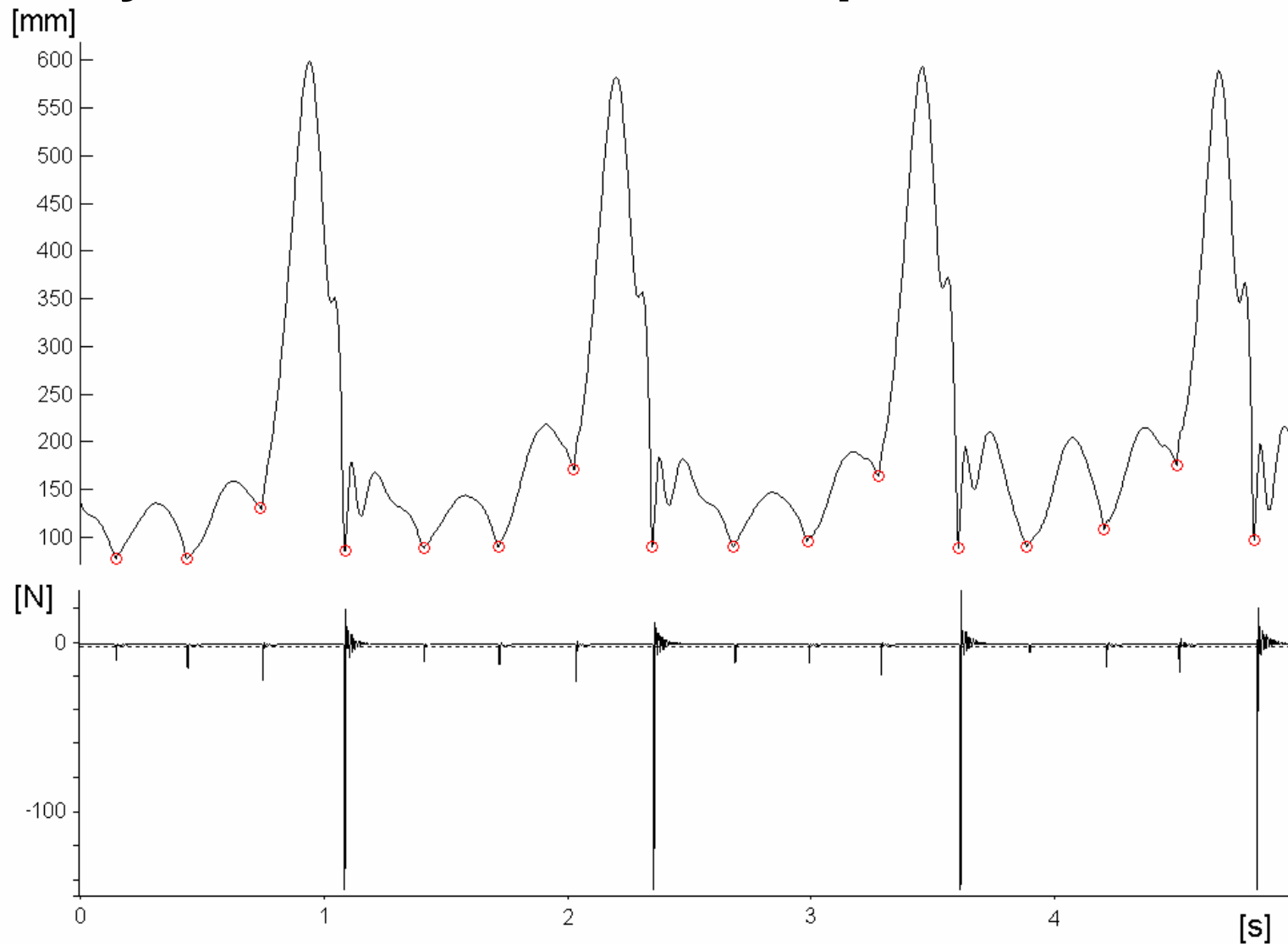
trajectories



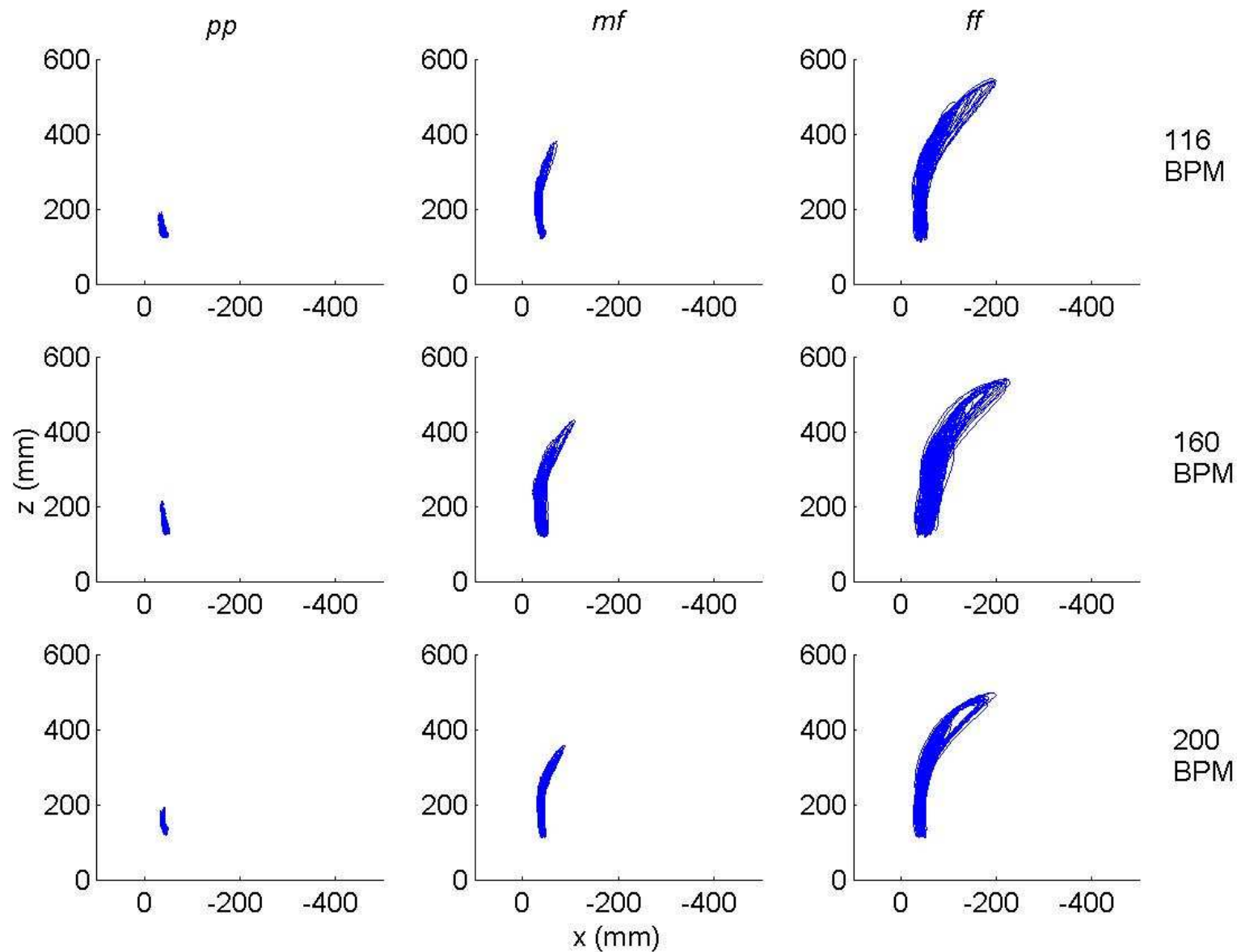
vertical stick displacement



## Player S2, vertical stick displacement vs. time



S1

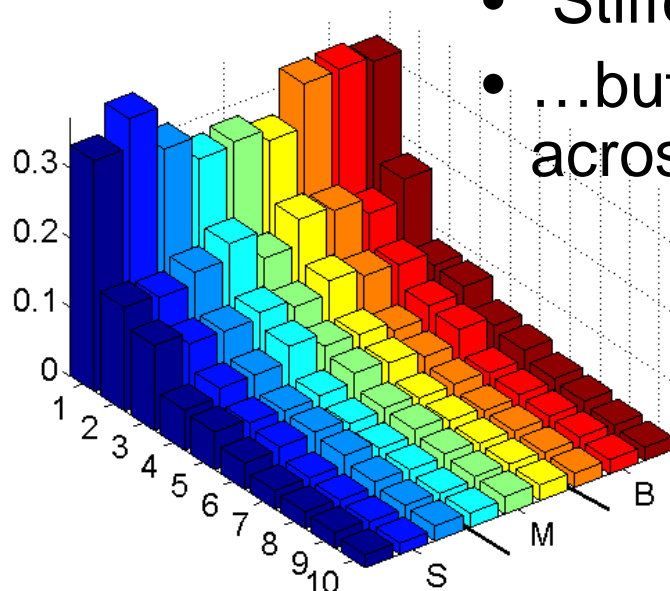


## Studying control gestures in drumming

- Consistent behavior within performers but different players use different movement strategies
  - Comparisons between players difficult even in simplified musical contexts
- Dynamic level affects preparatory height, striking velocity and timing
- Small effect of striking surface
- The interval beginning with the accent prolonged
  - timely for dealing with the stronger rebound

## Effect of striking tool (Work with Raoul Huys)

- Preliminary results of Principle Component Analysis show effect of tempo and striking tool (stick, mallet or brush)
  - Players seem to adjust for the differences in rebound
  - “Stiffening” of the system at higher tempi
  - ...but problematic to draw general conclusions across performers



# Communicative gestures in marimba playing



- One piece performed with intentions:
  - HAPPINESS
  - SADNESS
  - ANGER
  - FEAR
- Each intention performed twice

## Rating expressive movements

Observers rated:

- Emotional content
  - Anger
  - Sadness
  - Happiness
  - Fear
- Movement cues
  - Amount  
*none - large*
  - Speed  
*slow - fast*
  - Fluency  
*jerky - smooth*
  - Regularity  
*irregular- regular*



full



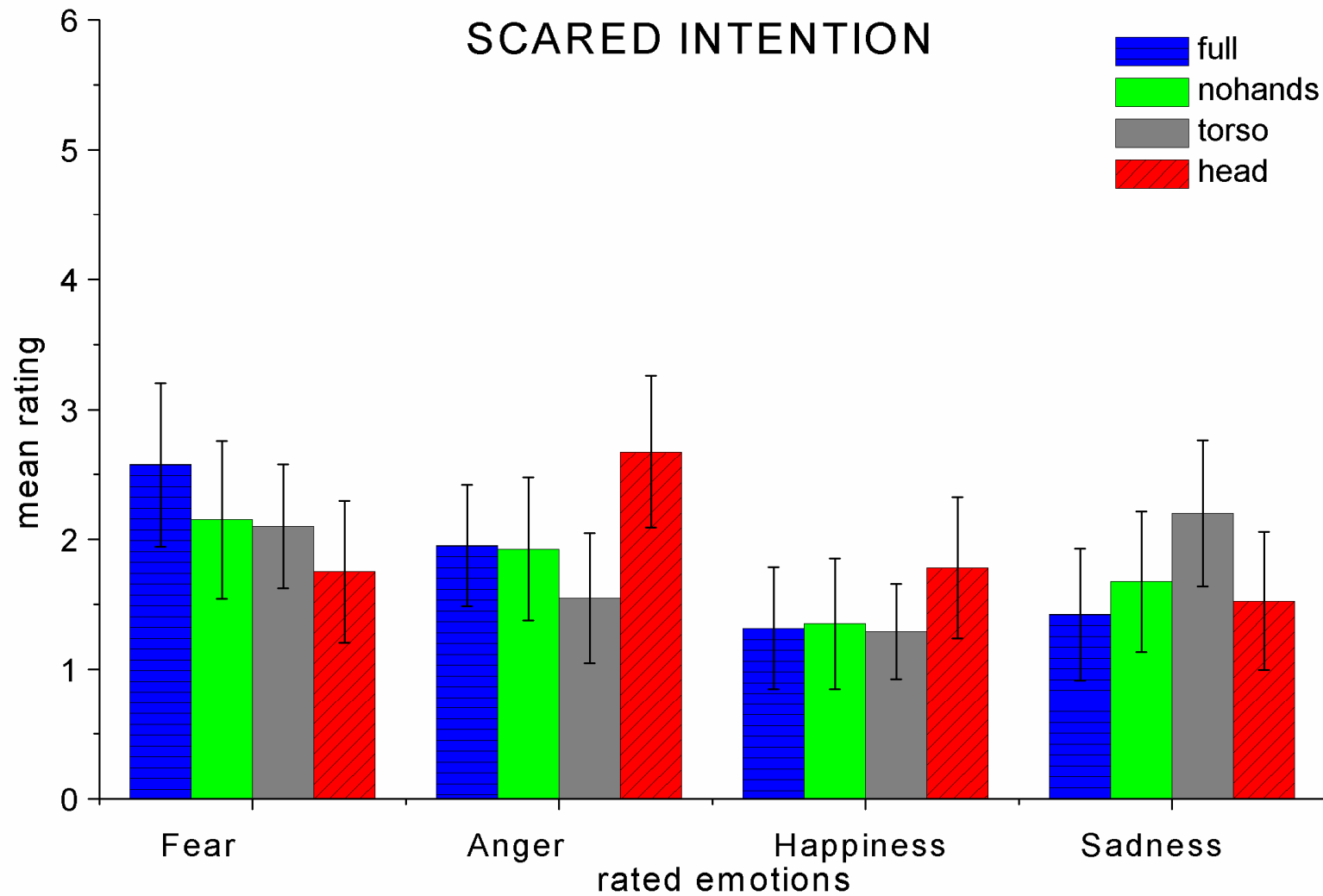
no-hands



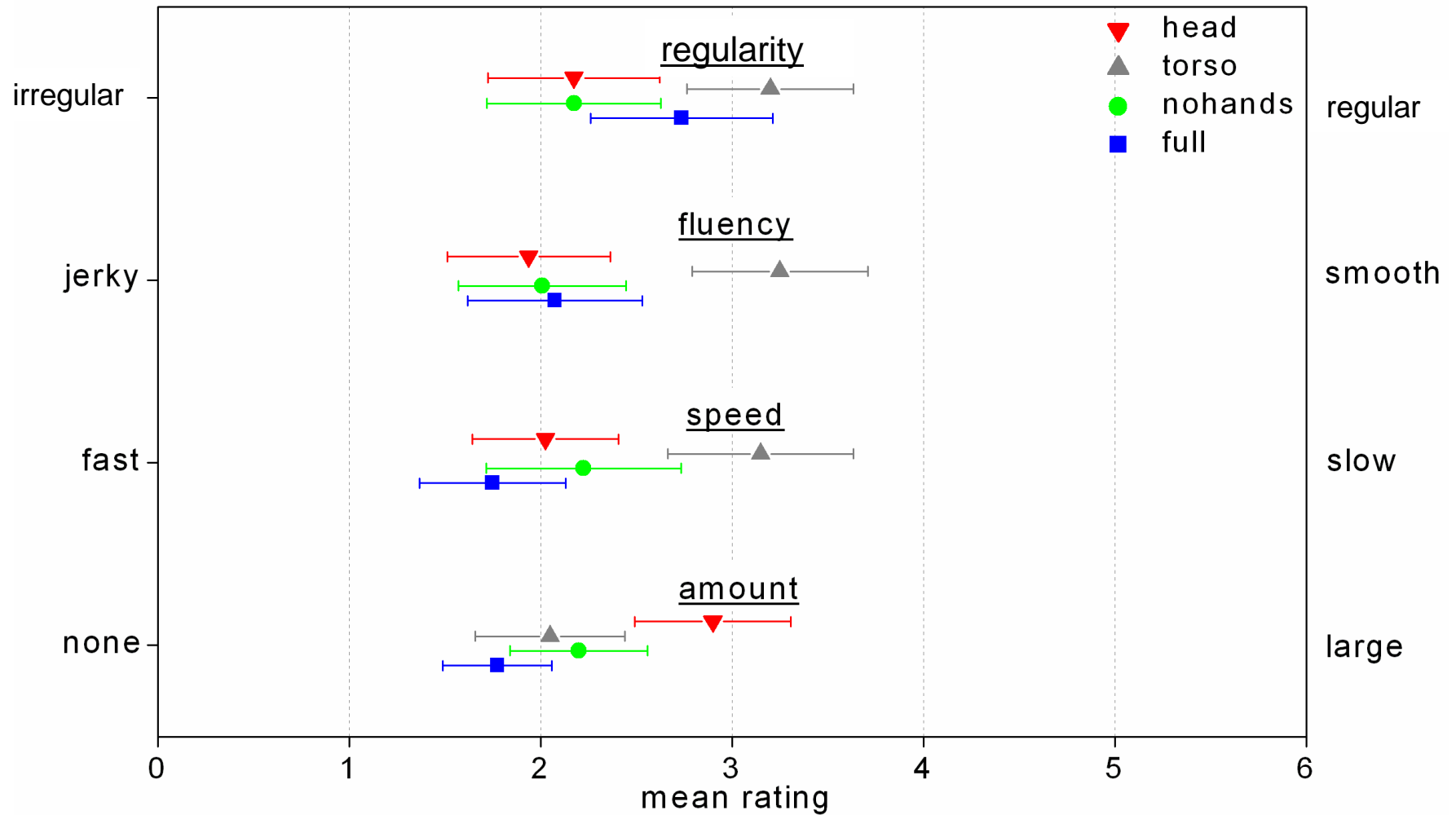
torso



head



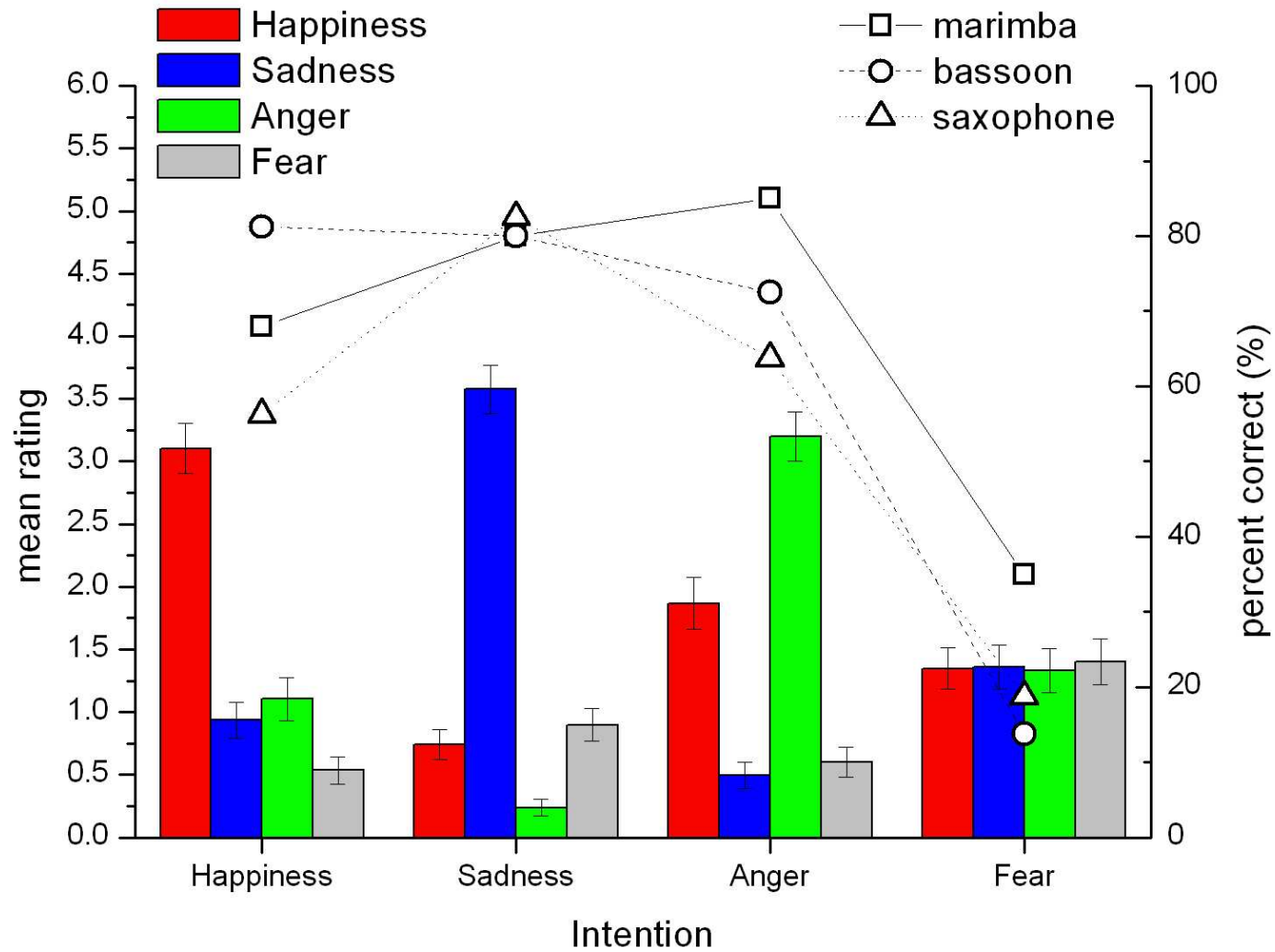
### SCARED INTENTION



## Woodwind stimuli

- Four musical excerpts
- Performed with intentions:
  - HAPPINESS
  - SADNESS
  - ANGER
  - FEAR
- Two performers:
  - Soprano saxophone
  - Bassoon





## Movement and **audio** cues

	<b>amount</b> <i>sound level</i>	<b>speed</b> <i>Tempo</i>	<b>fluency</b> <i>articulation</i>	<b>regularity</b> <i>tempo var.</i>
<b>Happiness</b>	large <i>high</i>	fast <i>fast</i>	<i>staccato</i>	<i>small</i>
<b>Sadness</b>	small <i>low</i>	slow <i>slow</i>	smooth <i>legato</i>	regular <i>final ritard</i>
<b>Anger</b>	large <i>high</i>	fast <i>fast</i>	jerky <i>staccato</i>	irregular <i>small</i>
<b>Fear</b>	small <i>low</i>	<i>fast</i>	jerky <i>staccato</i>	irregular <i>large</i>



## Now, about the head...

This clip was rated  
very differently



...than this clip



## Summary Communicative gestures

- Observers able to identify Sadness, Happiness and Anger seemed but not Fear
- Generally small effects from viewing condition, although the head was important to convey the sad intention
- Movement cues for Sadness, Happiness and Anger with resemblance to cues in music performance.
- Differences between performers, and possibly instruments.

# Thanks

- ....to the organizers for making my participation possible
- ...to Anders Friberg, co-worker and co-author
- ... to you all for listening!

## Some links:

- Music Cognition at the Ohio State University  
[www.musiccog.ohio-state.edu/](http://www.musiccog.ohio-state.edu/)
- My (old but still valid) home page  
[www.speech.kth.se/~sofiadah](http://www.speech.kth.se/~sofiadah)
- The KTH Music Acoustic Group  
[www.speech.kth.se/music](http://www.speech.kth.se/music)
- Gesture Controlled Audio Systems:  
[www.cost287.org](http://www.cost287.org)