




# Sonic Interaction Design


*Exploring Sounds for Interactive Commodities*


## A New Generation of Commodities


- Everyday objects meet Information & Communication Technologies -> INTERACTIVE COMMODITIES
  - Devices get **smaller**, screens lose importance, **overload** of the visual channel
  - Sound conveys **information**, **meaning**, supports **performance** and affects the **experience** of interactive artifacts or systems


*Exploring narrative and performative sound design strategies*  
*Fast and inspiring iterative prototyping*


  
Shoe


  
Sensor


  
iPod

  
Receiver

  
Wave

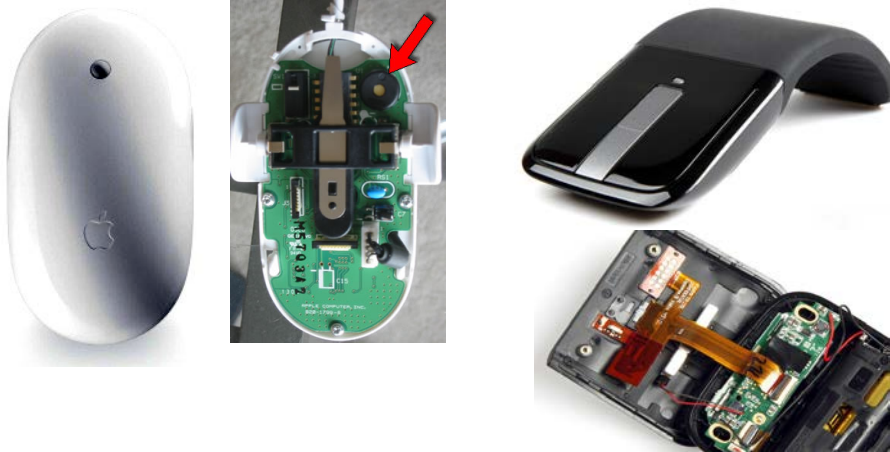
  
Point

  
Rumble



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## An „authentic“ mouse?



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## Samsung Smartwatch: Wearable Commodity

SAMSUNG  
PROXIMA



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## Google Glass: Here's Looking at You, Kid



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## Philips MIME Tags - Augmentation and Extension



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## Philips Nomads - Intimate, Fashionable Technology

**Workwear**  
The quilt liner jacket for outdoor use provides extra protection in their own. Age-advanced, long-life quilt and membrane protect from moisture, wind and cold. Integrated into their clothing for safety and efficiency.

**Technique**  
The quilt jacket is an impressive feat of engineering for being so light, providing extra protection. Removable quilt and membrane can be controlled via a single control panel on the side of the jacket. The quilt jacket is an extraordinary feat of engineering in an ultra-light jacket.

**Ergonomic**  
Providing space of relief for parents and for the baby, the quilt jacket provides extra safety for parents. Removable quilt and membrane can be controlled via a single control panel on the side of the jacket. The quilt jacket is an extraordinary feat of engineering in an ultra-light jacket.

**Fashion**  
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## Philips Plugged - Polyvalent Spaces



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## EV, HEV, PHEV – How Does this Car Sound?

NZZ am Sonntag • 23. November 2008



# Summ-summ macht der Sportwagen

Der Tesla-Zweisitzer fährt schnell und mit Strom. Eine Testfahrt mit dem «Auto der Zukunft»



Der Anlasser hält die erste Überraschung bereit. Eine kurze Melodie lässt erkennen, dass man den Zündschlüssel in die richtige Richtung gedreht hat und der Wagen startbereit ist. Die solche Ladung im Niedertarif in der Stadt Zürich 4 Franken 30 – ein Schnäppchen, verglichen mit den derzeitigen Preisen an den Tankstellen. Das Batteriepaket soll laut den Tesla-Herstellern erst nach 150 000 Kilometern ausgewechselt werden müssen. Der Strom für ihr derzeit einziges Modell soll wenn immer möglich aus erneuerbaren Quellen wie Sonne, Wind und Wasser kommen, heisst es bei Tesla. Die Firma hat dem auch vorgerechnet, dass man mit 25 Quadratmetern Solarzellen eine Strommenge produzieren kann, die für jährlich 20 000 Kilometer Fahrt mit dem Tesla genügen soll. Das Unternehmen plant, seinen

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## Roles of Sound in SID (Franinovic, Hug, Visell 2007)

### **Supports new functions or display possibilities for products**

- Displaying new informational possibilities (e.g. Nike+)
- Displaying invisible affordances of an ICT-enhanced artifact
- Providing the possibility of displaying more information using multimodal channels

### **Shape the sonic "appearance" of an artifact**

- Improving the aesthetic experience and sonic quality
- Extending the emotional aspects of the design
- Enhancing the interplay between material, form and action

### **Improve the performance in interaction processes**

- Feedback supports the use/control of interfaces, device, tool or a physical activity
- Sonification of processes and states
- Improvement of focus and flow during task execution

## Surrounded by Functional, Meaningful, Expressive Objects



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## Animated Artifacts, Expressive Sounds



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## Sound and Action: Who's in Charge Here?

**„Every sufficiently advanced technology is indistinguishable from Magic.“**

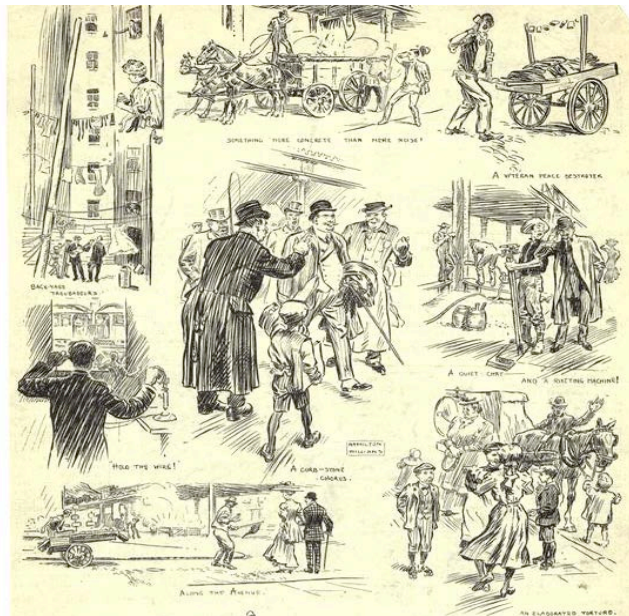
*Arthur C. Clarke*



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## Sound as Manifestation of People Doing Things with Things



Sources of Noise,  
New York, ca. 1907

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## Relationship of Sound and Objects

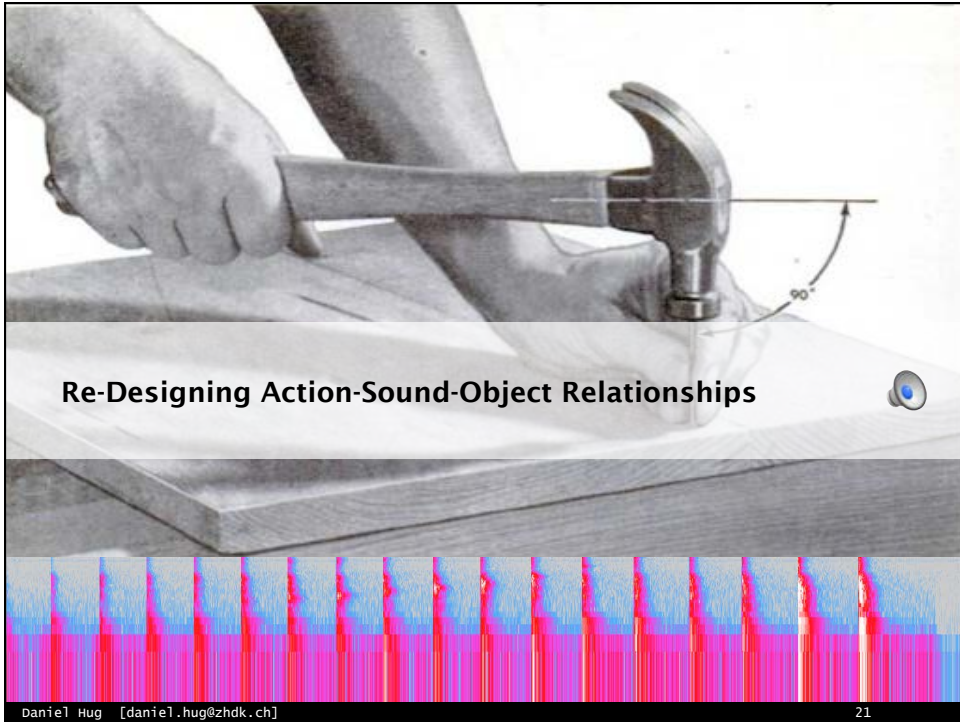
- **Sound and physical properties**
  - Direct relation to, and evocative of, **material properties** and **processes** of an object (and the related meaning potential)
  - Sonic and haptic experience similar 🧠👁️
  - -> 1<sup>st</sup> order sound semantics: Information about artifact & use: Feedback, notification, (mechanical) processes 🗣️
  - Several sounds can be combined to basic „narratives“ 🗣️🗣️
- **Beyond sonic causalism and naturalism**
  - Sound can give presence to a inexistent object or process - mental models
  - Upon recording, sound develops a quality independent from it's original source
  - Abstract sounds may carry “traces” of physical processes (*indices sonores matérialisants*, Chion 1998)
  - **Dialectical relationship:** “Immaterial corporeality” (Connor 2004)
  - Association of sounds with soul or voice of things (Connor, Fischinger, Cage)
- **Goodbye authenticity, welcome schizoponia**

## Expressive Performance, Sound – Action Relationships

- Specific **relationships** between actions, movements, object qualities and sonic structures can be observed / designed
- **Not necessarily isomorphous!** 3 relationships (Chion 1998)
  - Isomorphous / direct link: Turning the throttle on a motorcycle
  - Link indirect, delayed or established through knowledge about it: Long, sustained tone of a violin
  - Not isomorphous, gesture triggers sound, which develops autonomously: e.g. hitting a gong.
- Manipulations vs. Trigger/hold relationships
- **Ergo-Audition** (Chion 1998):
  - Positive sign of own influence on world
  - More than just feedback: Meaningful, nuanced sounds evoke the „joy of hearing oneself“
    - „Differential of power“
  - Goal: design sustainable and meaningful sounds that are **enjoyed during interaction**.








Re-Designing Action-Sound-Object Relationships

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This slide illustrates the concept of re-designing action-sound-object relationships. It features a photograph of a person using a hammer on a wooden board. A 90-degree angle is marked between the hammer's head and the board. Below the photograph is a spectrogram showing the sound spectrum of the hammering action, with red and blue vertical lines representing frequency components over time. A small speaker icon is located to the right of the text.

**Gestural Metaphors and Affordances: Audioshaker (Jenkins 2005)**



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This slide introduces the 'Audioshaker' concept. It features a photograph of a white, cylindrical object with a dark top and a handle, placed on a wooden table. To the right of the object is a portion of a computer monitor. The title 'Gestural Metaphors and Affordances: Audioshaker (Jenkins 2005)' is displayed in a yellow banner at the top of the slide.

**Sonic Expressivity and Affect: Blendie** (Dobson 2003)

Video Documentation of  
Blendie (2004)

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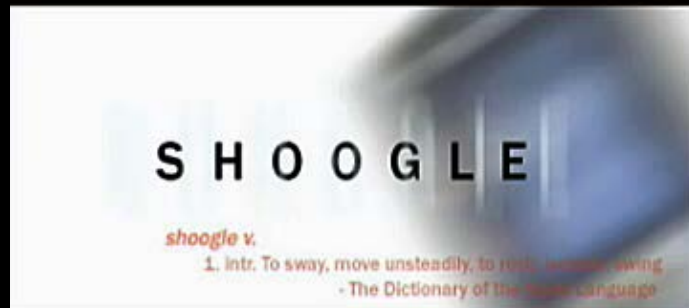
**Evoking Physical Processes: La Moccha Sensibile**  
(Davide Rocchese et al., 2008)



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**Metaphorical Sounds and Gestural Affordances: Shoogle**  
(Williamson, R. Murray-Smith, S. Hughes, 2007)



**MO: Musical Objects** (Rasamimanana et al., 2011, IRCAM)



in a bottle, lamp, or anywhere else...  
> DESIGNING EXPERIENCES WITH SOUNDING AGENTS

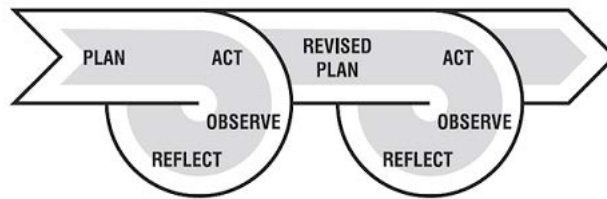
**How To Get the Genie  
Into the Lamp  
(And Out Again)?**

**Design Process**

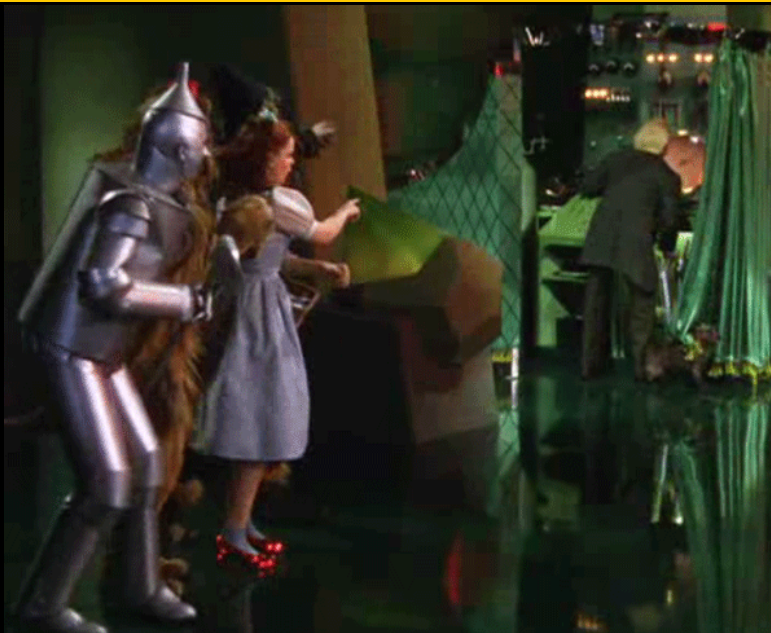
-> Wiki



## Design as Research as Design



## The Wizard of Oz



**Foley as Design & Prototyping Method (see server for more)**



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**Project Example: Wizard of Oz Foley Mockup**



Simon Morris, Irene Poutanen, Jari Suominen (Aalto University of Design)

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## Project Example: Open Demo Session, Audience Tryout



Gregor Falk, Christian Knuchel (Interaction Design, Zurich University of the Arts)

## Exercise 1: Filmic Sound Narratives



*File: /DDE/BDE\_VIAD\_Material/01\_Vorlesungen & Projekte/Semesterübergreifend/  
Sonic Interaction Design/Selection Analysis and Foley Remake)*

## Exercise: Film Sound Analysis

- Learning goals:
  - Listen closely to interaction related film sound fx
  - Understand effect of sound on our interpretation
  - Be inspired by the „masters of sound design“

### Assignment (teams of 2, 10m Analysis):

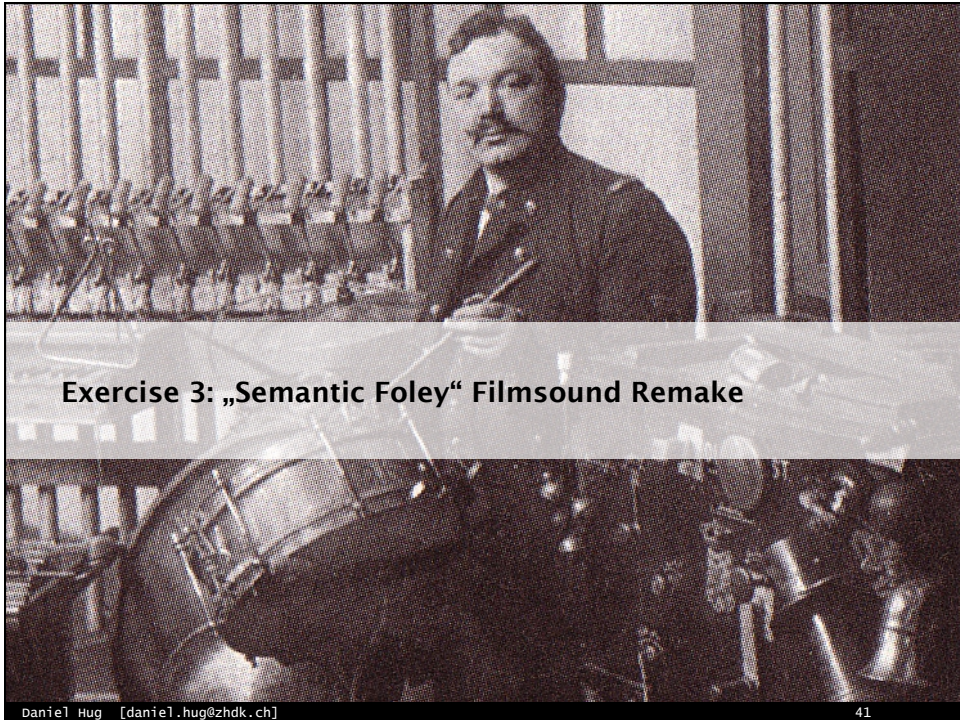
- Watch the movie clip assigned to your team (focus on object interaction)
  - With and without sound / image
- Write on paper: Film name, your names, and then:
  - Describe the action / processes depicted
  - Describe sound(s) associated with action & processes
    - How does it sound?
    - What does the sound tell us about the **action and / or process?** What about the **object?**
- Present the outcome (5m per team)

Physical Description	Attack	Body	Decay
Duration	sudden moderate slow multiple	non-existent brief moderate long continuous	rapid moderate slow multiple
Frequency/ Mass	very high high mid-range low very low		
Fluctuations/ Grain	steady-state transient multiple transients rapid stable medium pulsation slow shock		
Dynamics	f very loud mf moderately loud mp moderately soft f soft pp very soft f-p lead to soft p-cf soft to loud		
← Total Estimated Duration of Event →			
<i>Description of a sound event.</i>			

## Narrative Metatopics

nature & judgement	Quality of use	Quality of control	Power/energy & its qualities	power/energy life cycles	structural states
manifestation of life	Gesturalilty	transformation, processes	temporal structure	Atmosphere, mood	





## Exercise: Semantic Foley Sound Remake

- Learning goals:
  - Turn listening into soundmaking
  - create a first small auditory display / SID design
  - Convey information sonically (micronarrative)

### Assignment (20m, teams of 3):

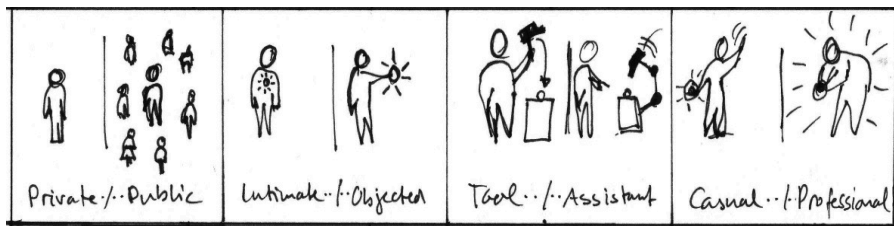
- Try to mimick the **sound effects** from your clip using Foley techniques and voice
- Redefine the processes and actions quality depicted in the clip
  - Example Qualities: (in)secure, powerful, dangerous, friendly, simple, complicated, important
- Invent sounds for the processes and actions, using Foley techniques based on original sound
- Perform your Foley Sound Remake live to the videoclip!  
(20m for designing and practicing the live performance)

## How To Get the Genie Into the Lamp (And Out Again)?

### Part 2: Topics and Artifacts (A Kind of) „Zwicky Box“



## Heuristic Framework: Situation



**Social interaction, public/private/casual... : Soci-O-Mat**



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**Quantified self, implant, intimat, privacy: Doc-o-Mat**



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The Smart Home, shared, private, relax&produce: HomeMaid



The Smart Home, shared, private, relax&produce: HomeMaid



**Work Environments: Shared, time critical, productive: WorkIT**



THX 1138, George Lucas

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**Navigation, Transportation, Travelling, Space: MoveIT**



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## Entering the Matrix: Topics and Artifacts

### Assignment:

- Create a matrix.
  - X = Objects / Artifacts, Y = Topics.
  - One Field = one A4 Page (landscape)
- Teams of two, each selects one object
- Invent **two ideas** for one X-Y combination on the matrix and sketch it on a paper of A4
  - You have ten minutes
- Present the idea to the others, using bodystorming and live soundmaking.

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**Go  
Create!**

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