Context Research
Bachelor

Student

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Mentors

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ZHdK – Interaction Design – FS 2013

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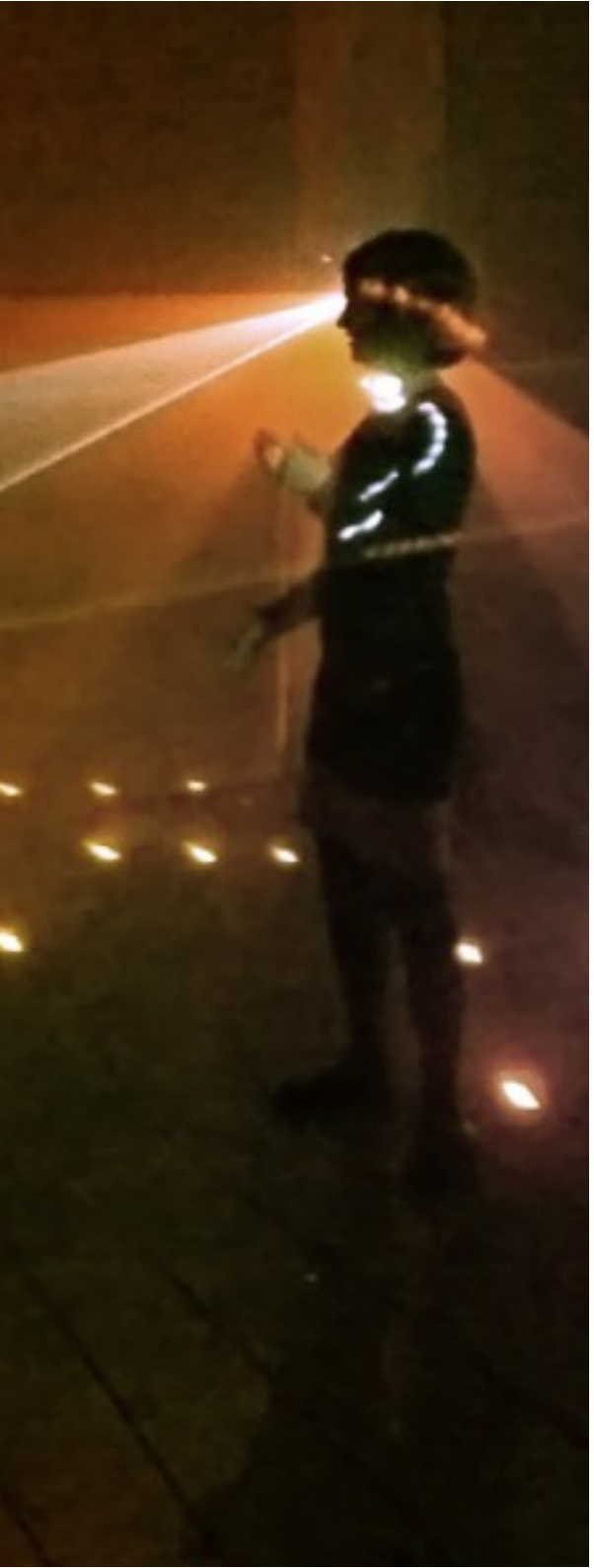


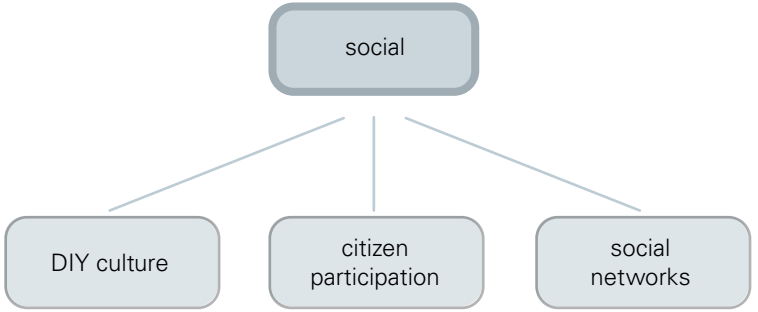
1. Interactive Architecture?

In the background research we postulated the need for a focus shift from static architectural concepts to a more interactive architectural approach. Here, new technologies such as smart materials which react to different kinds of inputs (temperature, noise, humidity, light, pressure, movement etc.) can help. New strategies of decentralized, meshed networks to replace existing centralized networks help coordinate hundrends, if not thousands of sensors in buildings. This transforms buildings to act like an organism with a nervous system capable of smelling, feeling as well as reacting to circumstances in such a way that the building becomes aware.

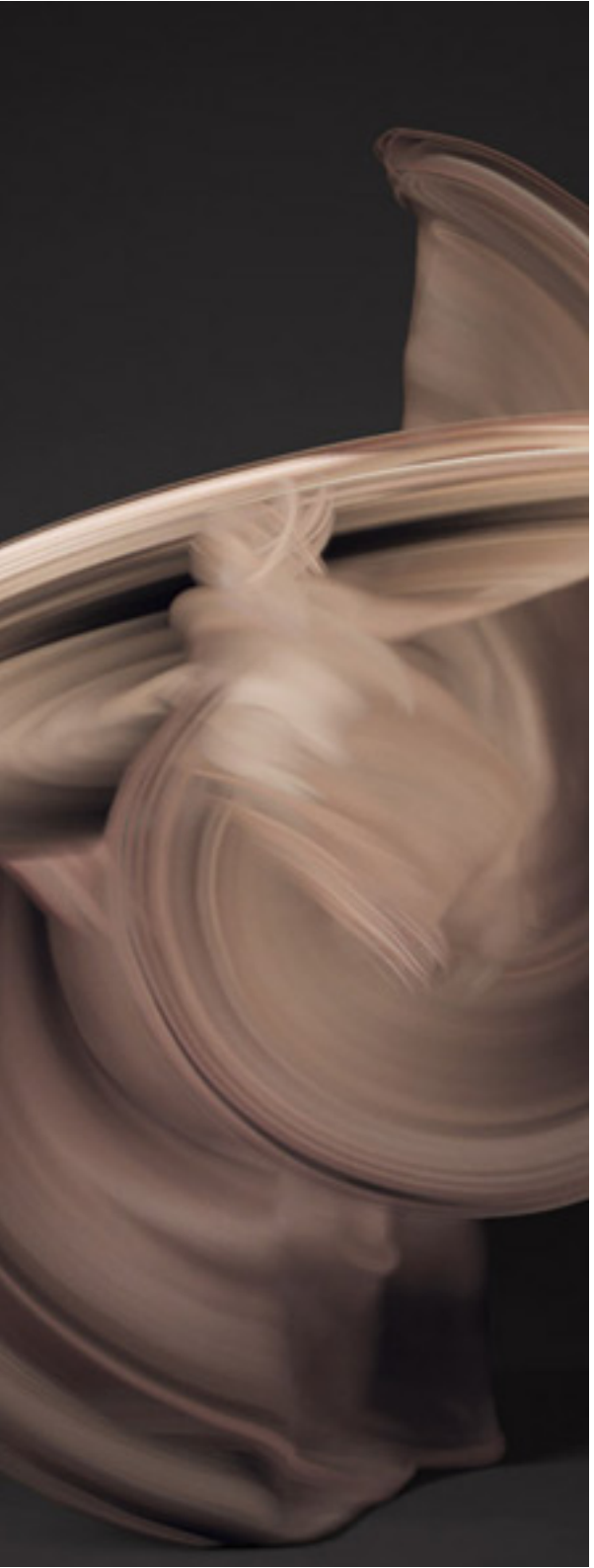
As Tomasz Jaskiewicz (faculty of Architecture, TU Delft) explains:

> The concept of interactive architecture (iA) stems from the premise that buildings and built environments can be formed and trans-formed in continuous and direct response to needs and activities of their inhabitants, while also, in turn, reciprocally influencing future needs and activities. The past decade has seen a revival of iA ideas, made possible with latest technological advancements and following current social trends.

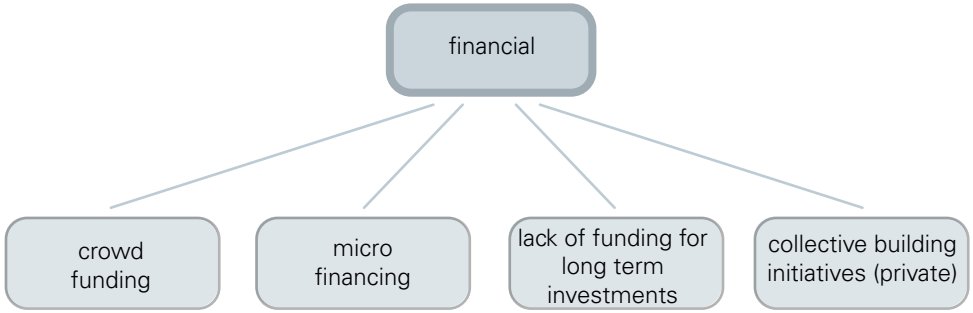
There are a wide amount of trends which are pushing towards interactive architecture:



A growing trend towards do-it-yourself communities is emerging which are exploring, experimenting with commercially available technologies, materials and their applications. People can participate in events or workshops, opening the scene to a broader audience. Social connectedness is helping to accelerate these trends.

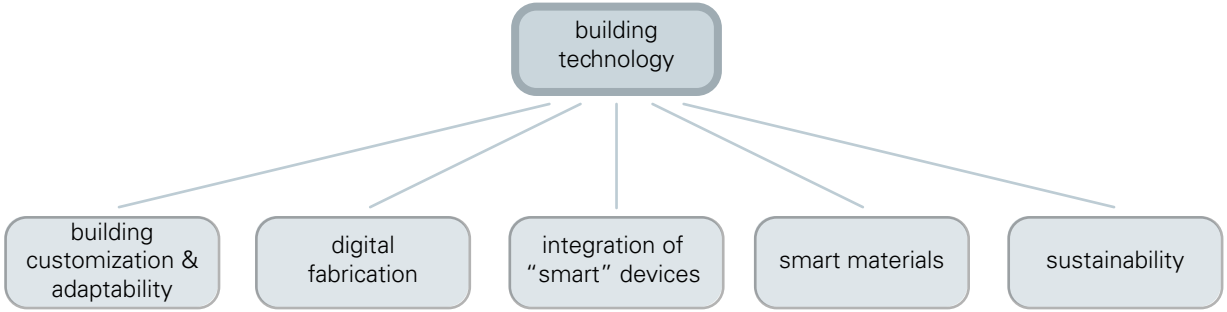


1. Interactive Architecture?

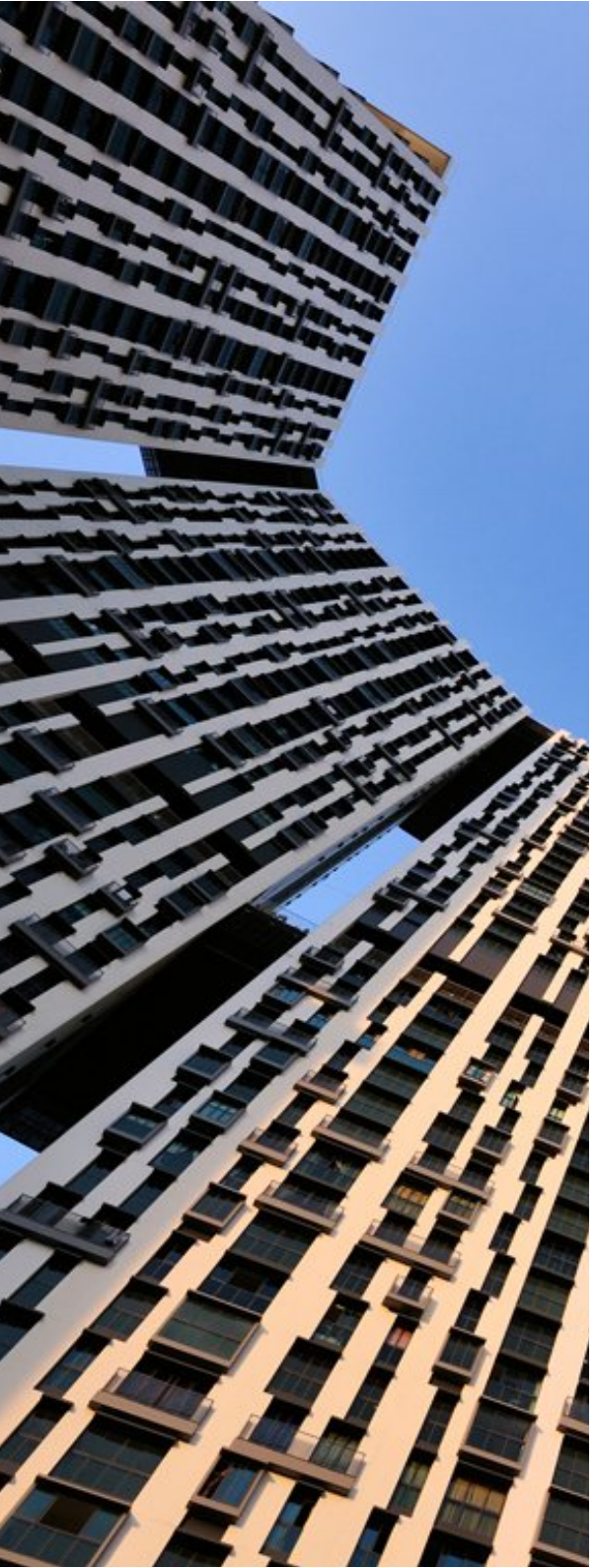


Individuals are more free to investigate and explore new ideas up to the stages of production and sales. These are often realized with the help of micro financing through other individuals or establishments. Due to the lack of funding for long term investments, more and more groups are taking matters in their own hand in creating private, collective building initiatives as the needs for people starts to decentralize.

1. Interactive Architecture?



With the help of new materials, devices as well as fabrication and replicating systems or even new techniques and methods, possibilities of interaction multiply and become attainable in terms of price even for individuals. The push towards sustainablilty is creating a new reasoning with what we are buying and building.



1. Interactive Architecture?

With change there is often resistance. Problems and risks arises when introducing new methods. Also, there are usually constraints (law, cultural, social, financial etc.), so current practices are sometimes not compatible to a forward thinking generation of smart home hobbyists, DIY enthusiasts or future-thinking architects.

social

- cultural acceptance of interactive buildings
- social conflicts

financial

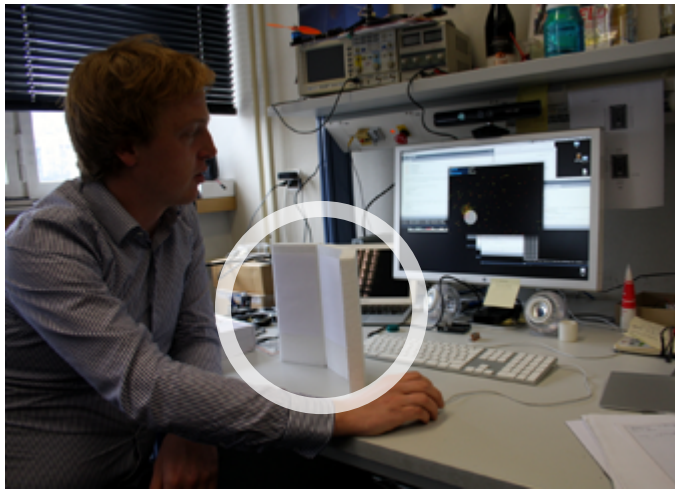
- current financing models favour long term investments
- legislative constraints

building technology

- current building systems are geared towards permanence
- safety

2. Technology Based Contextualization

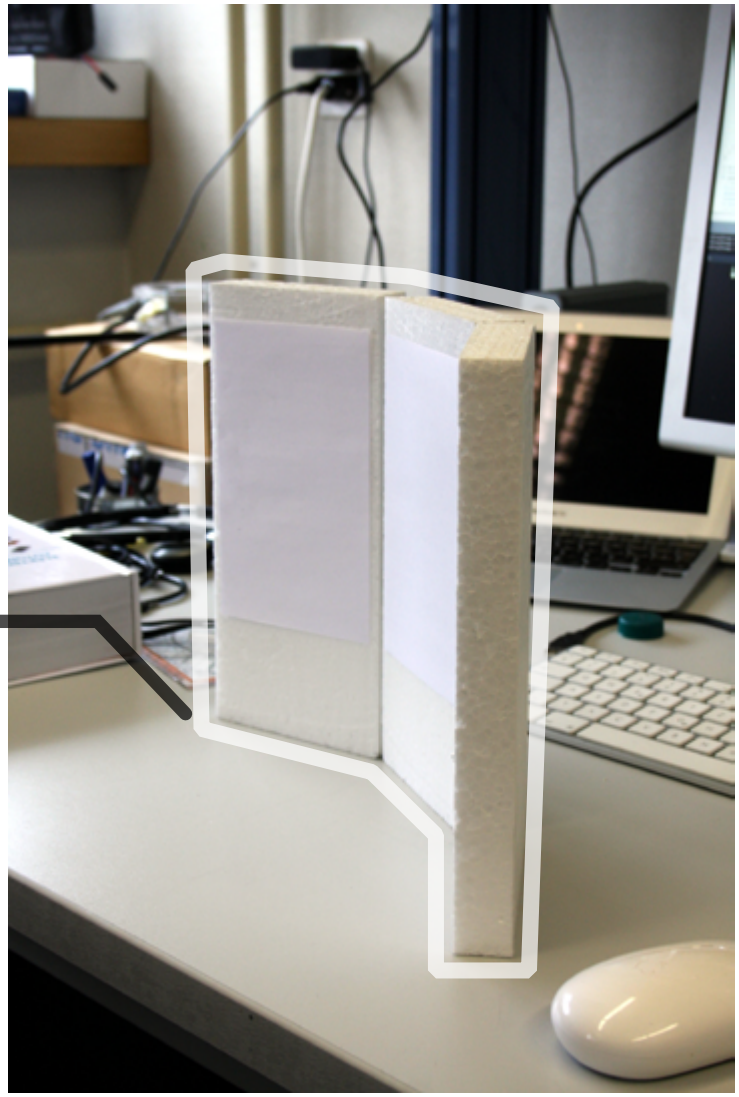
Moritz Kemper showed us the ideas behind ODI - „Orte des Informellen“ where people -students, teachers, visitors etc. can socialize, learn or show projects at a non defined, *informal* places with interactive tools.



One possible concept of ODI:

Modules of a defined structure using big flat panels, a touch pad and possibly a kinect camera would allow for students for example to login with their student card and show their projects. When left, it would go back to show a selection of random projects throughout the ZhdK.

An other possible scenario is to have one long interactive wall with different kinds of projects and informations abstracted in a visualization of some kind. When a person would approach the wall, the visualization would focus / zoom in to show some concrete information.

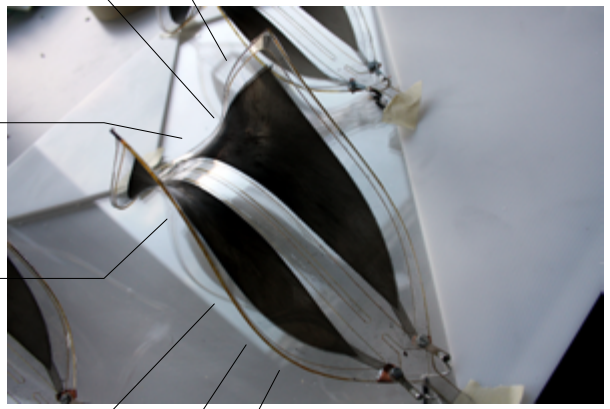


2. Technology Based Contextualization

As I was interested in smart materials, we went to the CAAD which is situated at the department for architecture at the ETHZ.
I was especially interested in how they worked with the electroactive polymers, which dificulties they encountered as well as what is not.

very fragile, as a membrain or skin

no presision when activated in contrast to stepper / servo motors



no noise when bending

needs extensive tests and trails

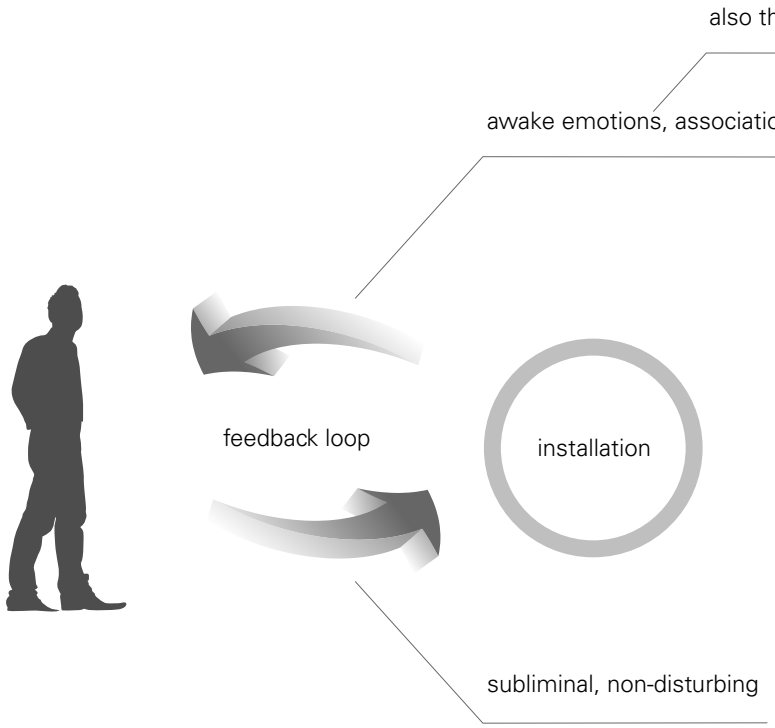
no very precise when bending in contrast to stepper / servo motors

can also be used as pressure sensor (they have not tested it)

conveys emotions due to its organic movements and fragility

2. Technology Based Contextualization

Due to its fragility, objects built with electro-active polymer can easily awake emotions or associations to nature or biological organisms. This can be reinforced with sound and perhaps light. But it should not be dominant and should take a more subliminal, non-disturbing role

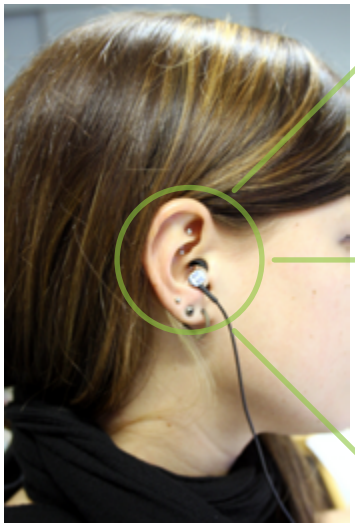


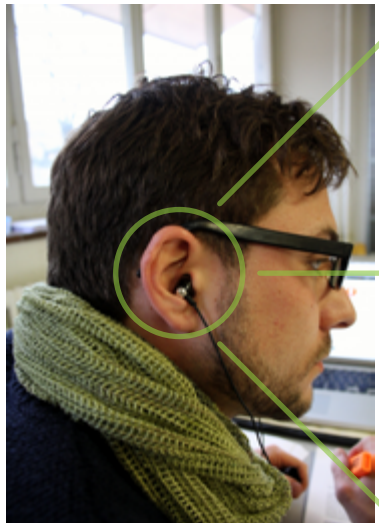
analogies

3. User-Centered Contextualization

What are people doing in the hallway? Why are they sitting on the benches? And why are they sometimes working there? Are they waiting for someone? Or do they just need a place of serenity?

We observed, that many people were wearing headphones for several reasons:





3. User-Centered Contextualization

One common thread was to be immersed in a different place so as not to be disturbed, to feel different or to be able to work better. It is a kind of paradox to be in a class room and wanting to be alone. This is in fact a very common issue as each person has their on strategy of concentration through some kind of immersion. This is known as ***flow***.

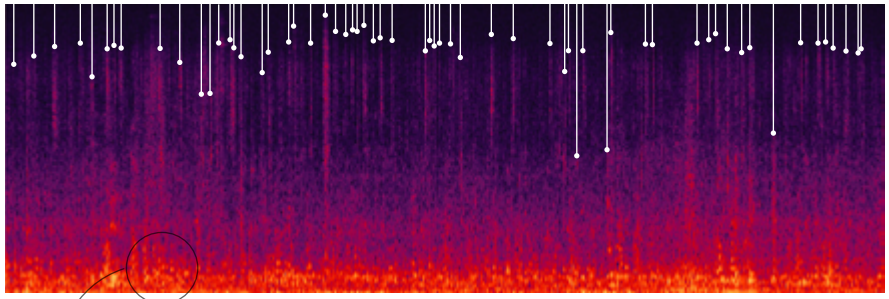
Several factors involve the experience of flow:

- intense and focused concentration on the present moment
- merging of action and awareness
- a loss of reflective self-consciousness
- a sense of personal control or agency over the situation or activity
- a distortion of temporal experience, one's subjective experience of time is altered
- experience of the activity as intrinsically rewarding, also referred to as autotelic experience

4. The Quality of Noise

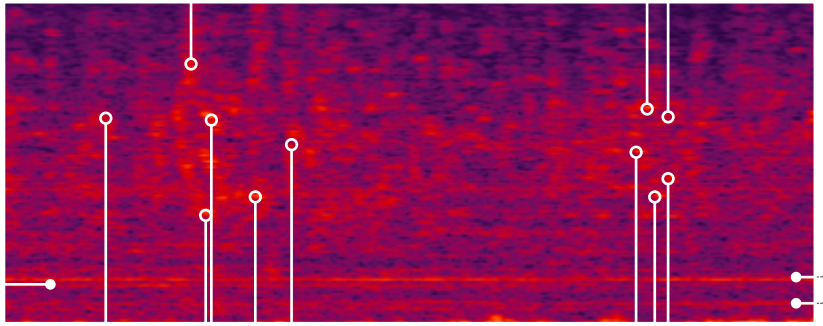
Out of curiosity, I did a spectral analysis of the ambient recordings of the ZHdK main building at different locations to visualize if there were any interesting aspects of the quality of noise in the building. The goal was to not just *hear*, but also *see*.

chaotic chit-chating patterns



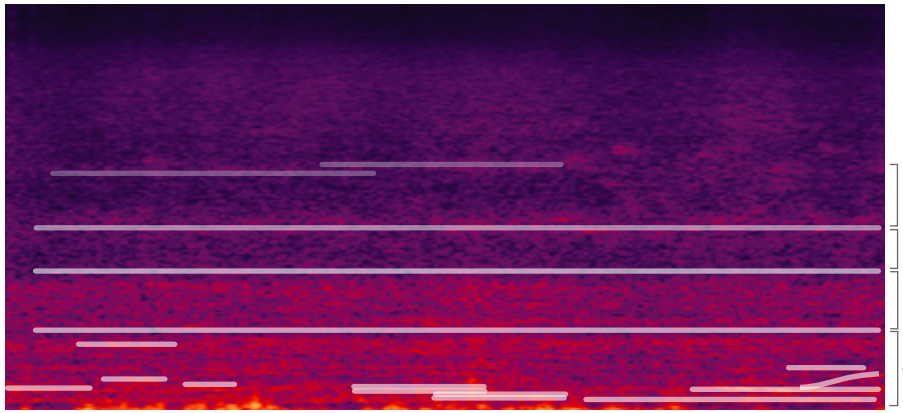
At the cafeteria we can see that the vocal harmonics are very present at the bottom part of the frquency range. Also, as shown with white lines, the arrhythmic characteristics are notable.

zooming in the vocal range

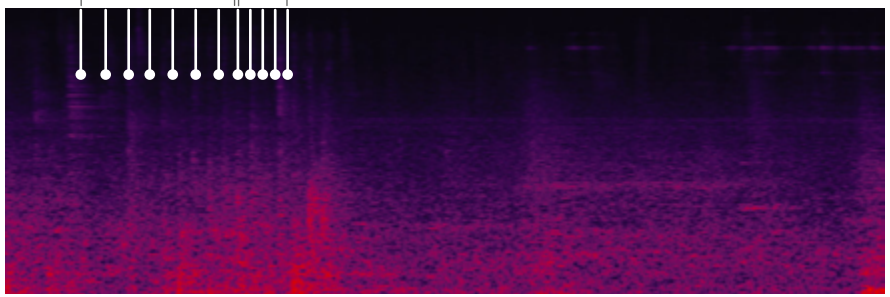


If we zoom in a bit in the human-centered frequencies, we can see some prominent voice characteristics at certain times.
Furthermore, at the very bottom, we can see a contant low-frequency humming which would have gone under if just listened to.

4. The Quality of Noise



On the stairs near the window, a mainly static noise is audible. Looking more in the details, we see some patterns appearing for a prolonged amount of time which is shown by the white lines. There are also main frequency bands barely visible.



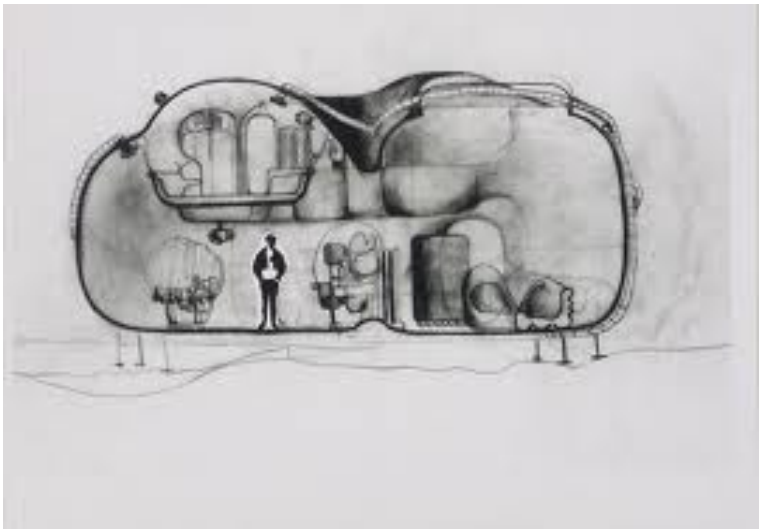
Someone walking in the corridor (regular) or down the stairs (regular, then accelerating) is easily recognisable.

5. Future Scenario

In *Vermilion Sands*, written by James Graham Ballard, the short story *The Thousand Dreams of Stellavista* (1971) introduces a very peculiar type of house entitled **psychotropic** (ethymologically: stimulated by the mind). Those houses physically reacts to their inhabitant's mood and stress and thus adapt their spatiality to them.

In the Thousand Dreams of Stellavista, the narrator buys a psychotropic house that used to belong to a couple whose wife killed her husband. The house remembers the crime and tries to reproduce its conditions in the same way that a patient in psychoanalysis can reconstitutes his trauma under hypnose. The narrator, in an obsessive curiosity associated by a tendency for masochism, follows this architectural 'crisis' until its climax when the house attempts to assassinate him.

"Then suddenly the room grew calm. A second later, just as I had raised myself on one elbow, a violent spasm shook it, twisting the walls and raising the bed off the floor. The whole house began to tremble and twist. Caught at the center of this epileptic seizure, the bedroom alternately contracted and expanded like the ventricles of a dying heart."



5. Future Scenario

In Alastair Reynold's *Revelation Space* universe, the **Melding Plague** is a nanotech virus that attacks anything that has nanotechnology present within it and does not discriminate between human and machine. It attempts to meld the nanomachines and implants that are commonly present in the bodies of humans, with the structure of their body on a cellular level. This results in horrific, uncontrollable modifications to the body of whoever is infected and almost inevitably leads to death.

The most extreme example of a Plague outbreak is encountered in **Chasm City**, in which Chasm City, the capital of Yellowstone, has been infected by the Plague. The buildings and even the inhabitants of the city were capable of modifying themselves. The coming of the Plague changed all this and reduced the city and its inhabitants to a level of technology that the Plague could not attack. By the time that the worst of the Plague had passed, the city was almost unrecognisable, its buildings were twisted and deformed and the population decimated by the Plague.

6. Where Does All This Converge?

Different kinds of aspects were introduced of what it could feel like if a building were looking at us in its own „eyes". With smart materials, sensors and such, buildings could feel us in some way. With neural-like networks, they could remember, learn and anticipate our moves, watching and observing us as we work or play in its innards.

If we start thinking forward in time, in a future scenaro, we could start saying that a building would heal itself instead of repair. What would happen if it were sick and catch a virus of some sort. How would this disease manifest itself? Perhaps we would start seeing ulcers or growth prolifirations of some kind in certain corners of the buidling until it cures. How would it express itself if people would shout at it.