Immersive Sound & the Construction of Presence in Digital Media

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TABLE OF CONTENTS

What is presence?

PRESENCE = Realism + Transportation + Immersion

- **Realism:** social believability + perceptual fidelity
- **Transportation:** “you are there” / “it is here” / “we are together”
- **Immersion:** sensory enclosure + deep involvement

At the heart of it all: The concept of presence (Lombard & Ditton 2006)

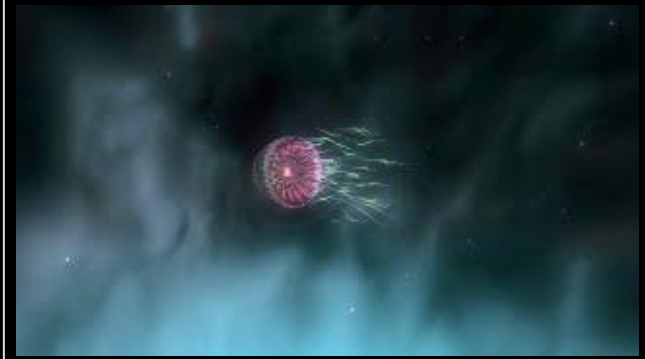
Role of audio

- **Anchors spatial awareness** (direction, distance, environment)
- **Creates perceptual realism** (material, scale, atmosphere through sound cues)
- **Enhances emotional immersion** (mood, tension, calm, intensity)
- **Enables interactivity** (sound responds to user movement/voice)
- **Supports transportation** (“you are there” through continuous, enveloping sound)

Brümmer & Jain

Cardiff & Miller

Mousset & Fouilloux



SPATIAL PRESENCE (Agents)

Interactive audiovisual installation where algorithmic digital creatures perceive visitors through depth cameras and mics → respond with seemingly complex behaviours and spatialised sounds as people move through their multi-sensor habitat.

EMOTIONAL PRESENCE (Janet Cardiff)

→ Night Walk in Edinburgh (1:16 - 2:00)

→ Her Long Black Hair
https://www.publicartfund.org/exhibitions/view/her-long-black-hair/

EMBODIED PRESENCE (Singing with the Jellyfish)

Transforms participant's body and voice into the primary interface → movement, gaze, and vocalisation directly shape a responsive ecosystem of jellyfish that mirror, harmonise, and co-create sound.

Historical Roots

1930s–1940s – The Birth of Electronic Sound

- **Oskar Fischinger – *Studie Nr. 7* (1931)**
  Early abstract animation synchronised with sound → explores visual–audio relationships.

- **László Moholy-Nagy – Sound Experiments (1930s)**
  Drew sound directly onto film strips → one of the first attempts to *produce sound visually*.

1950s – Experimental Soundscapes & Tape Manipulation

- **Pierre Schaeffer – *Étude aux chemins de fer* (1948)**
  First work of musique concrète; uses recorded sounds as musical material

  → Recording, manipulating, and arranging a variety of sounds produced by trains.

1960s–1970s

- **Neuhaus – Listen (1966):** Sound walks (listening as embodied practice).

- **Takis – Electro-Magnetic Musical (1966)**

- **Tudor – Rainforest:** Objects resonating as speakers / resonating sound sculptures.

1980s–1990s

- **Rokeby – *Very Nervous System* (1982–91):** Full-body movement → sound.

Takis – Electro-Magnetic Musical (1966)

“One of Takis' first musical works, also uses electromagnetism: it comprises a taut metal wire and a needle that moves as an electromagnet switches on and off.

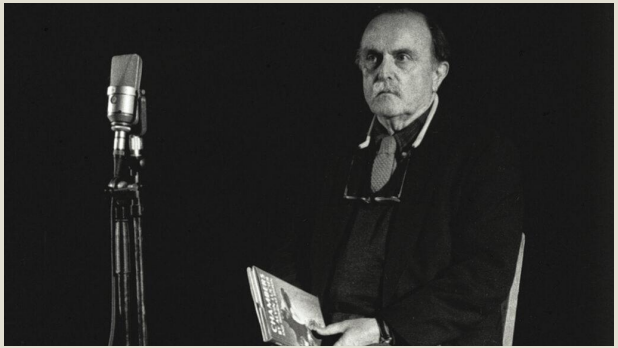
As the needle strikes the wire sound is created (and is amplified through speakers).

Takis harnessed fundamental forces in his work aiming to make visible the energy fields that surround us.”

- **Electric Dreams, page 55**

Sound as Environmental Architecture

Alvin Lucier - “I’m Sitting in a Room” (1969)



Uses room resonance to slowly erase the spoken voice.

The architecture itself becomes the instrument

Demonstrates how space actively transforms sound.

Janet Cardiff - The Forty Part Motet

→ 00:48 - 1:07

40 speakers arranged in a circle (visitors walk through a spatial choir).

Demonstrates how sound creates navigable architecture (spaces of voices).

Psychoacoustics & Embodiment

- Localisation, distance cues
- Body as mediator
- Acoustic realism

Sound in AR/VR

- Ambisonics (full-sphere surround sound)
- Binaural audio (two mics to mimic human ear)
- Interactive sound

We Live in an Ocean of Air
by Marshmallow Laser Feast

Interactivity

- **Real-time feedback loops:** The system reacts immediately to users, (e.g. responsive and adaptive soundscapes).
- **Multisensory engagement:** Audio interacts with visuals, haptics, and spatial cues
- **Natural interaction paradigms:** Interfaces rely on intuitive actions (walking, turning, speaking, touching).
- **Co-presence and collaboration:** Multiple users influence the soundscape together (shared immersion).

David Rokeby: Very Nervous System (1982–91)

References

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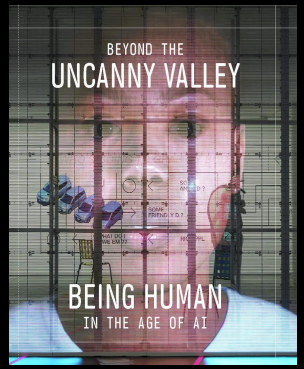

THANK YOU