

# using audio to convey more than sounds

Abhishek Sharma

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# Making Sense

- There is us and there is the world
  - Latin – *sensus* – faculty feeling/thought/meaning
    - awareness, sanity, reasonable, type, direction, unexplained awareness, detect
  - Maurice Merleau-Ponty - French philosopher
    - our perception of the world defines our human experience
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# HUMAN SENSES

REMOTE

TACTILE

SIGHT

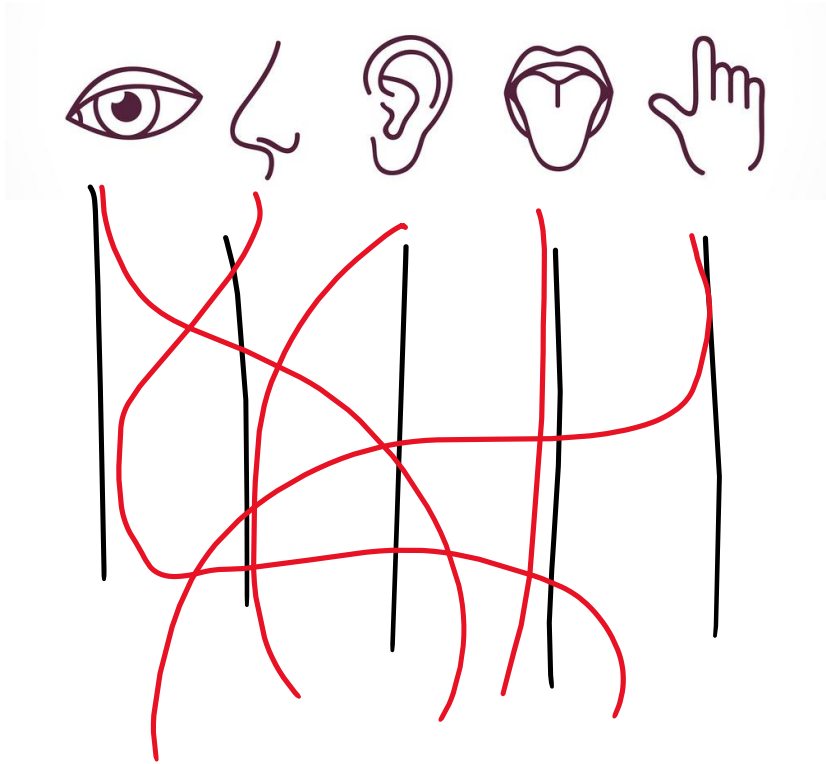
SMELL

HEARING

TASTE

TOUCH

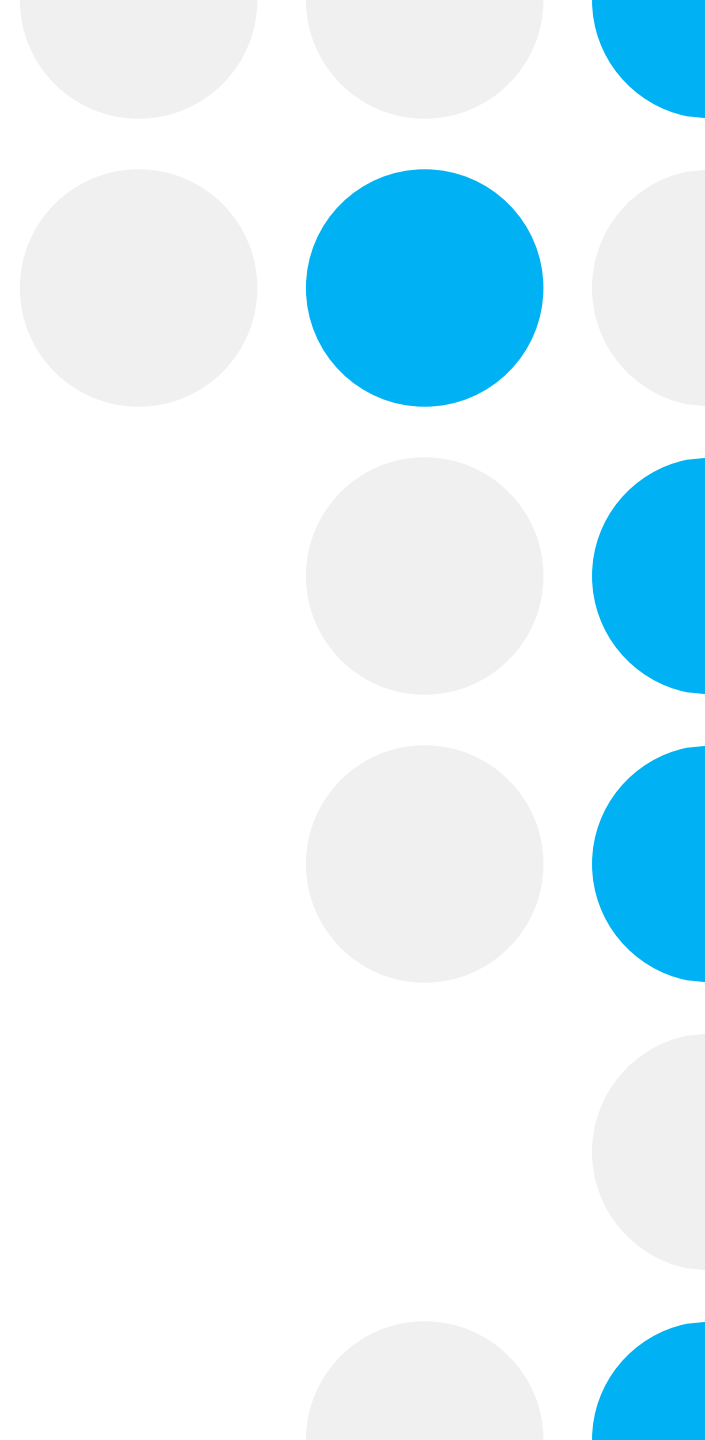




Our senses are not independent and isolated from each other

They interact

This is known as **cross-modality**

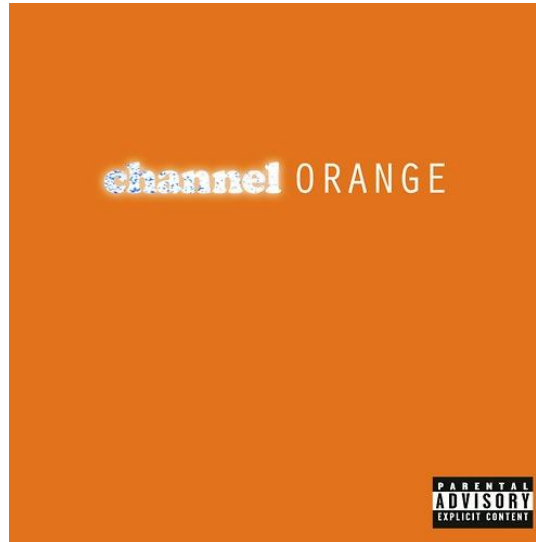


# Synesthesia

One sense or cognitive input gives rise to another



Frank Ocean

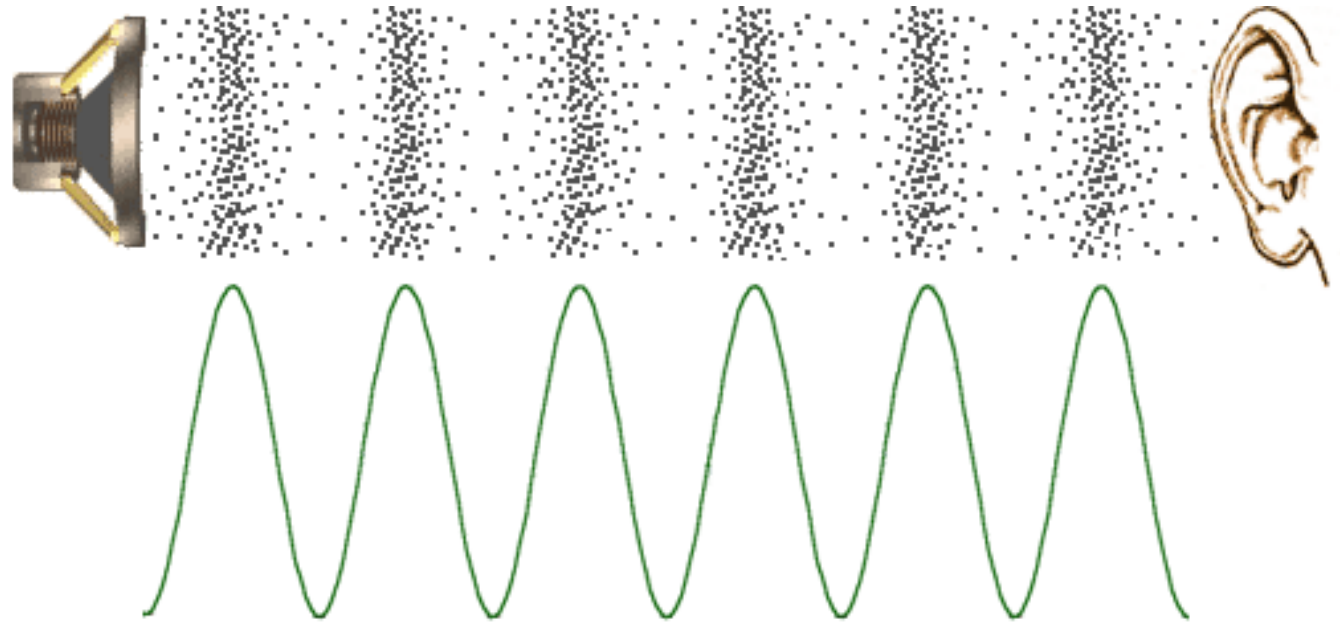


*“Ocean’s album name is influenced by grapheme-color synesthesia, a phenomenon in which individuals associate letters and numbers with colors. Playing on that phenomenon, he describes orange as the color he connects with falling in love during one summer. “*

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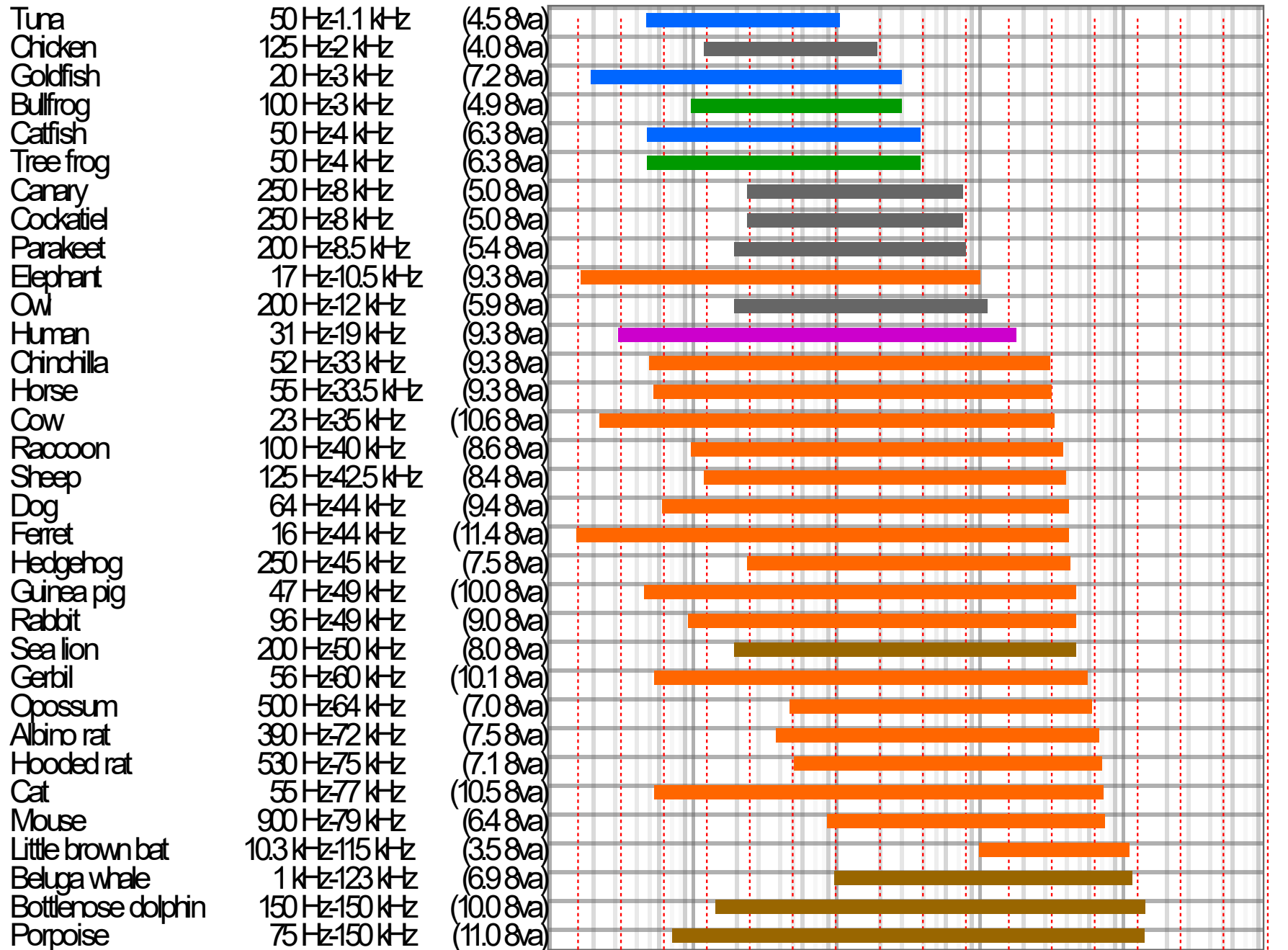
# Audio

- Latin – *audire* : to hear
    - Au – Proto-Indo European – to perceive
      - Audit, aesthetic, obey
  - Sound – Proto-Indo European – *swen* (to sound)
    - what is heard, logical, consistent
    - *sounen* "to be audible, produce vibrations affecting the ear,"
  - Pressure waves in air
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# Hearing

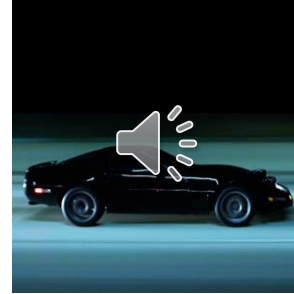
- We live around stuff (air, water), it would be a good idea to sense how it is being manipulated
  - We perceive vibrations according to frequencies
  - We are 20 Hz (twenty times per second) to 20000 Hz
  - We have a characteristic perception of frequencies – low (bass) and high (treble)
    - These are the colors of hearing
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# Music

- “*Music is organization of sounds*”  
– © Cal Smith 2022
- The organization can evoke emotions
  - consonance : dissonance :: happy : sad
  - smoothness vs staccato
    - Lullabies vs. marching band
  - glitch/noise/distortion
    - psychedelia, fractured emotions
  - The composition itself can evoke feelings

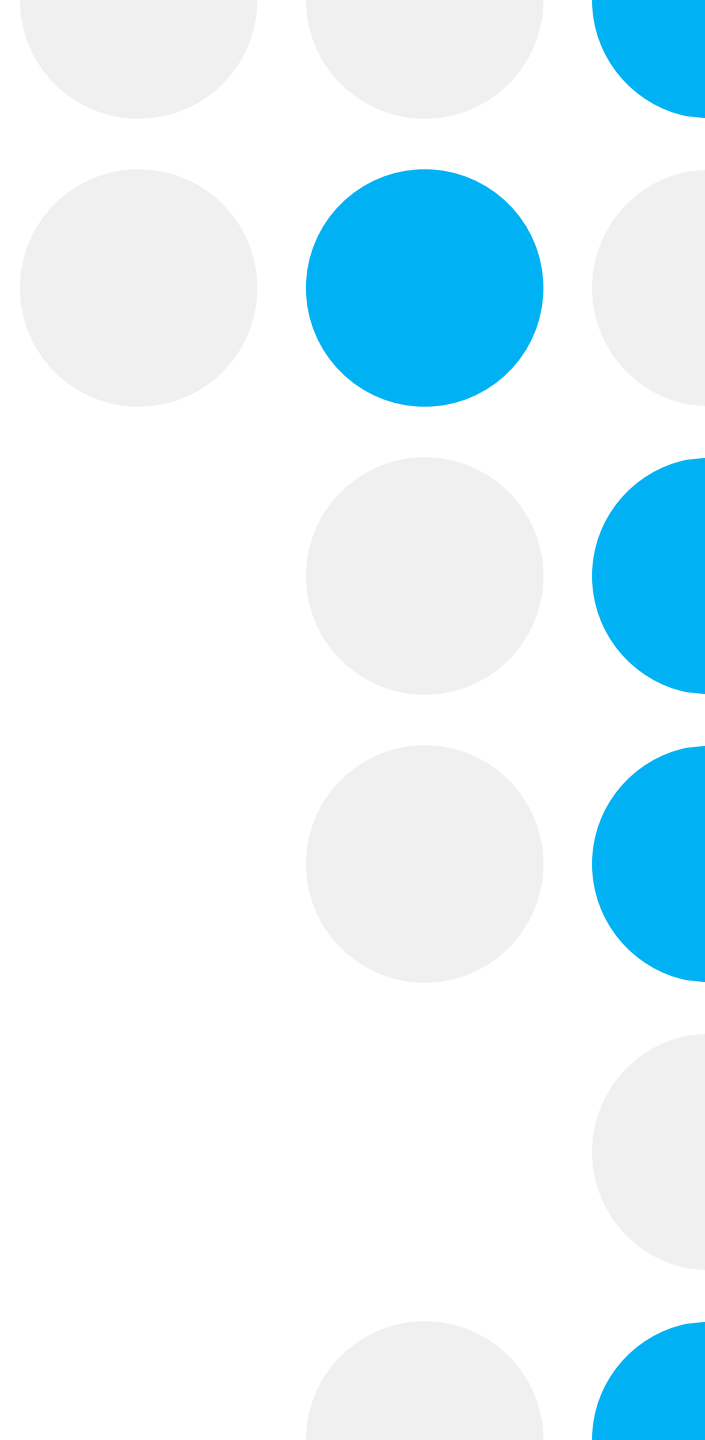
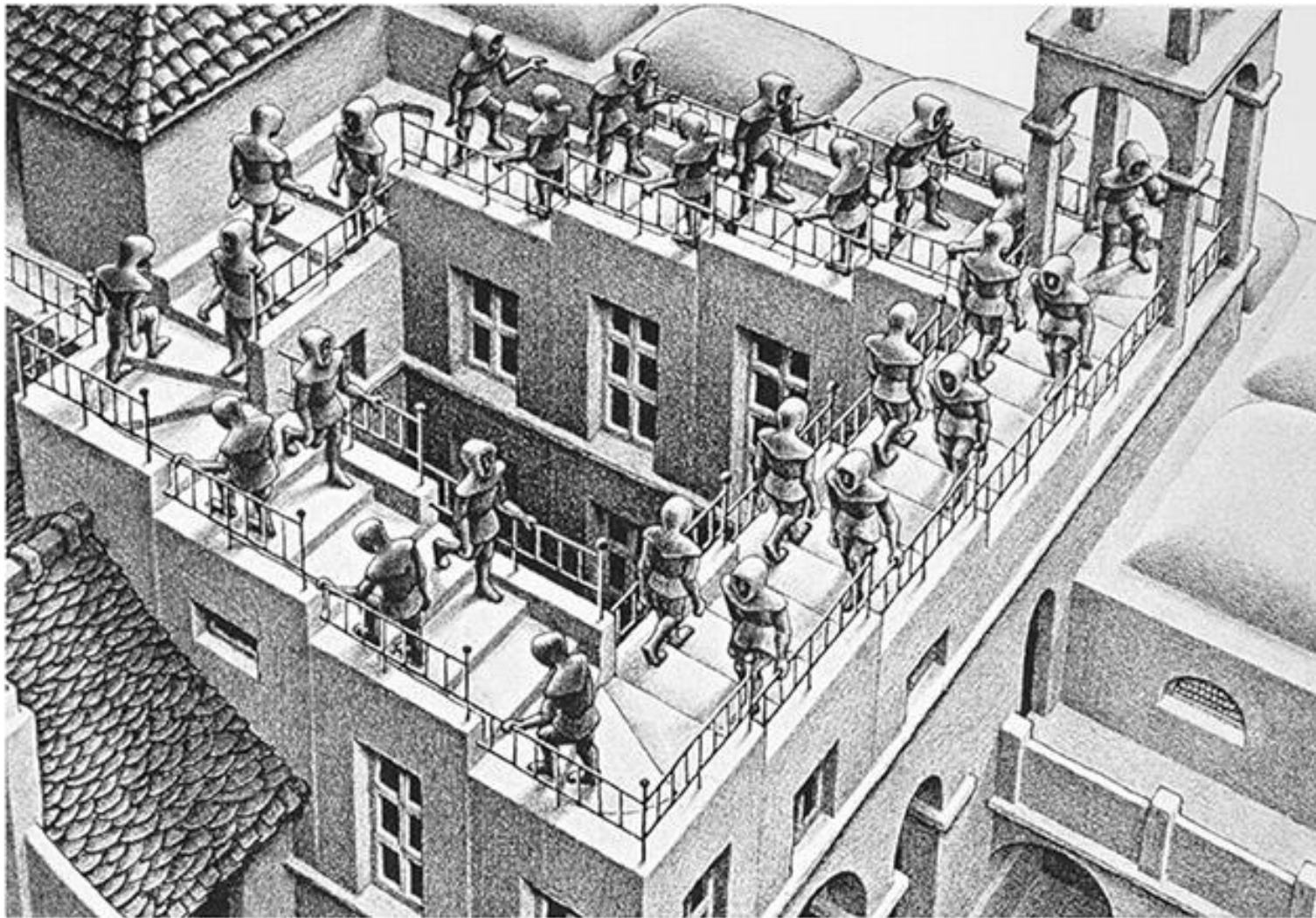


If The Car Besides You  
Moves Ahead – James Blake



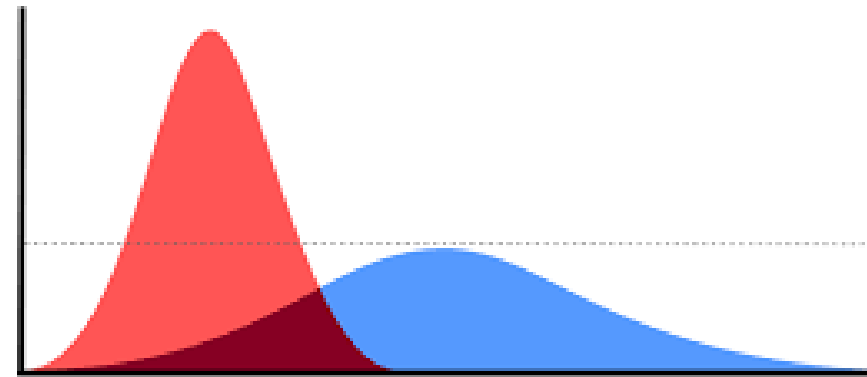
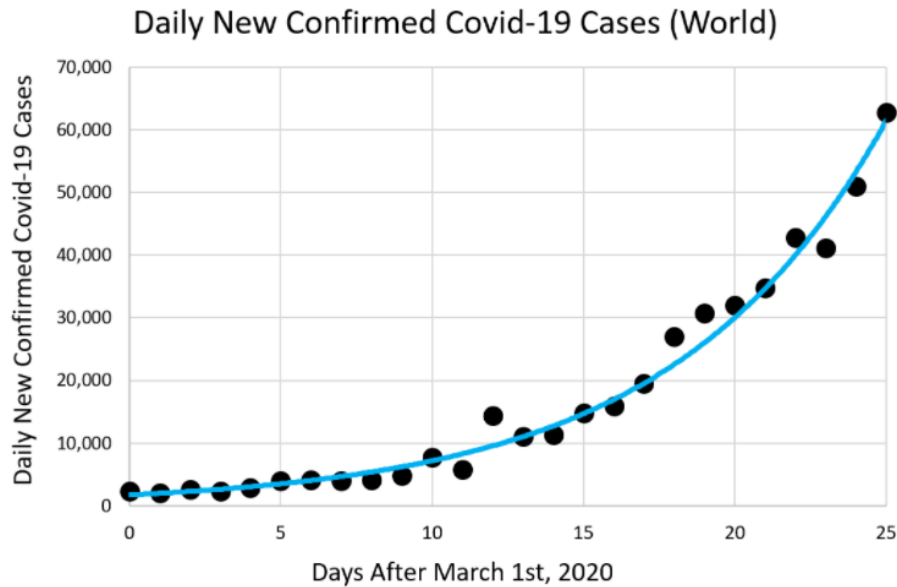
A Day In The Life – The Beatles

# Shepard's tone



# Audio for Science Metaphors

- Radiolab podcast is full of science and music nerds



# The Choral Color Experiment



# Questions and Thoughts

- What is a scientific concept you think could be best explained by audio?
  - Is there a cross-modal experience you'd like to share?
  - Tastes are often hard to describe
  - Interesting examples of synesthesia
  - Empathy and qualia
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# References and Further Exploration

- Radiolab
    - Dispatch 1: Numbers – March 2020
    - Colors – May 2012
  - Unexplainable
    - Making Sense: How sound becomes hearing – March 2022
  - VSauce, *Is Your Red The Same as My Red?* – February 2013
    - *By Michael Stevens, a UChicago alum!*
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# Colors Episode

