

CMSC 498W

Lecture 16

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Haptics Rendering

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Haptics

- From the Greek word for “touch”
- Generally, senses that provide information about adjacent objects
- Not strictly defined

Sense Receptors

- Sight
 - Red
 - Green
 - Blue
 - Gray-scale

Sense Receptors

- Taste
 - Sweet
 - Sour
 - Salty
 - Bitter
 - Umami (meaty)

Sense Receptors

- Touch (approximately)
 - Pressure
 - Vibration
 - Stretching

Sense Receptors

- Temperature
 - Hot
 - Cold
- Internal temperature senses
- Pain temperature sense

Haptics Devices

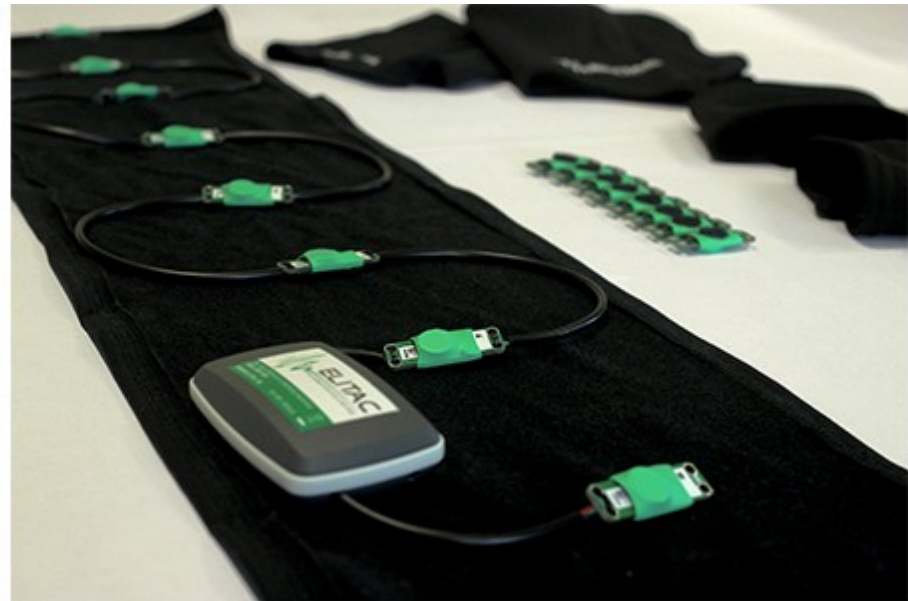
- Wearable
 - Suit, Gloves
 - Cover wide area
 - Inconvenient
- Hand-held
 - Stylus, Controller
 - Limited region of sensation
 - Shape can mimic virtual object

Haptic Stylus



<http://www.geomagic.com/en/products/phantom-omni/overview/>

Haptic Suit



Haptic Ultrasound Device



<http://www.stuff.tv/news/ces-2015-ultrahaptics-lets-you-feel-objects-arent-there>

Haptic Ultrasound Device



Rendering

- Haptics are rendered
- Generally 1 kHz is desirable
 - Less for soft surfaces
 - Compare with graphics, 60 Hz
- Insufficient rate can cause “buzzing”