

# Wearable Technologies and Applications (Wearable Informatics)

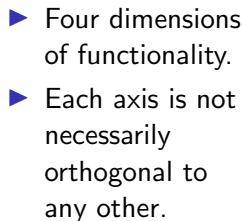
Winfree

Lecture 2

## Winfree

Δύο

## Dimensioning Examples



## Dimensions of Functionality

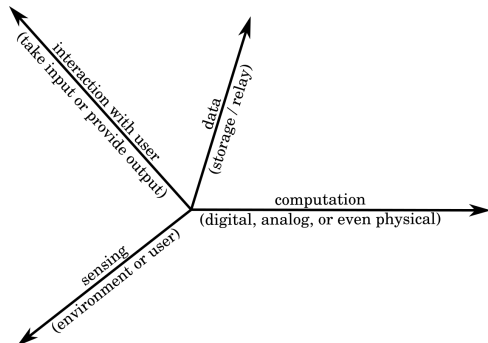
Δύο

## Early Examples

## “Recent” Examples

## More Examples

## Dimensioning Examples



- ▶ Environmental
  - ▶ Temperature (not skin)
  - ▶ Location
  - ▶ Air quality
- ▶ Wearer (user)
  - ▶ Temperature (eg skin)
  - ▶ Heart Rate
  - ▶ Physical Activity Level

## Dimensions of Functionality

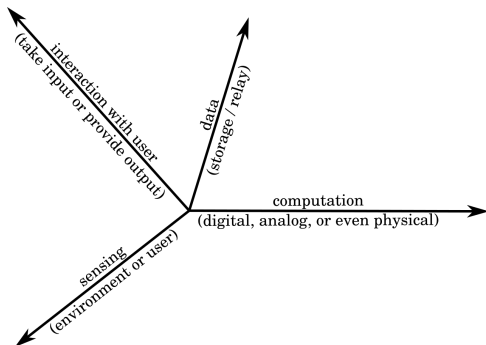
Δύο

## Early Examples

## “Recent” Examples

## More Examples

## Dimensioning Examples

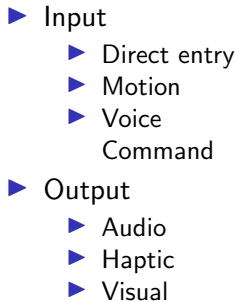


- ▶ Storage
  - ▶ Local
  - ▶ No storage - process and throw away
- ▶ Relay
  - ▶ Physical storage - SD card
  - ▶ Wired on command
  - ▶ Wireless
  - ▶ Continuous or Staged

## Winfree

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## Dimensioning Examples



## Dimensions of Functionality

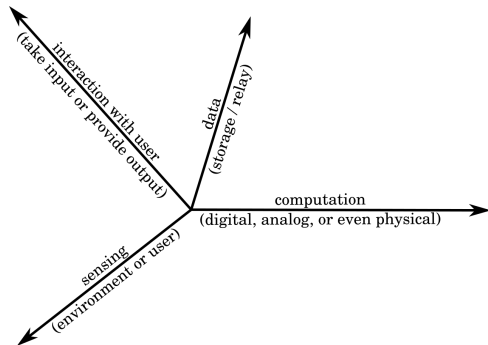
## Axes

## Early Examples

## “Recent” Examples

## More Examples

## Dimensioning Examples



- ▶ Mechanical
- ▶ Analog
- ▶ Digital



# Countess of Lovelace

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(EE499/EE599)

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Dimensions of  
Functionality

*Axes*

Early Examples

Rivet Glasses

**Countess of Lovelace**

Roulette

"Recent"  
Examples

Computing on the Wrist

Environmental Sensing

Human Sensing

More Examples

Fashion

Communication

Mobility

Implantables

Dimensioning  
Examples

"Augusta Ada King-Noel, Countess of Lovelace (Ada Lovelace) was an English mathematician and writer, chiefly known for her work on Charles Babbage's early mechanical general-purpose computer, the Analytical Engine. Her notes on the engine include what is recognized as the first algorithm intended to be carried out by a machine. As a result, she is often regarded as the first computer programmer." <sup>a</sup>



<sup>a</sup>[https:](https://en.wikipedia.org/wiki/Ada_Lovelace)

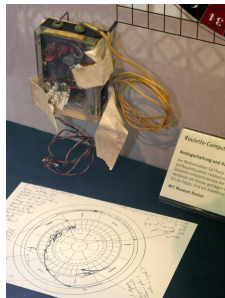
[//en.wikipedia.org/wiki/Ada\\_Lovelace](https://en.wikipedia.org/wiki/Ada_Lovelace)



# Roulette Computer

August of 1961 Edward O. Thorp and Claude Shannon, of MIT

"They worked as a team. Shannon watched the wheel, clandestinely clocking the speeds of the rotor and the ball by flipping micro switches in his shoe with his big toe. The signals coursed through wires that ran up his pant leg to a small computer strapped to his waist. The machine calculated the ball's final resting position and then transmitted this prediction wirelessly to a receiver under Thorp's shirt. Through a tiny speaker in his ear, Thorp heard one of eight distinct tones that advised him on how to bet."<sup>a</sup>



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Dimensioning  
Examples

<sup>a</sup><http://spectrum.ieee.org/consumer-electronics/portable-devices/wearable-computers-will-transform-language>



## Winfree

## Environmental Sensing

## Dimensioning Examples



<sup>1</sup><http://www.treehugger.com/clean-technology/environmental-sensors.html>

# Human Sensing



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## Dimensions of Functionality

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## "Recent" Examples

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## More Examples

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## Dimensioning Examples

# Little Boots Cyber Cinderella LED Dress

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Dimensions of  
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Early Examples

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*Countess of Lovelace*

*Roulette*

"Recent"  
Examples

*Computing on the Wrist*

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More Examples

**Fashion**

*Communication*

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*Implantables*

Dimensioning  
Examples

See '1 - Little Boots Cyber Cinderella LED Dress [HD, 1280x720p].mp4'

# Signing

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“Recent”  
Examples

*Computing on the Wrist*

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*Fashion*

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Dimensioning  
Examples

See ‘2 - SignAloud Gloves that Transliterate Sign Language into Text and Speech [HD, 1280x720p].mp4’

# Orthotics and Prosthetics

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Early Examples

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See ‘3 - Can Prosthetics Outperform Real Limbs Cyborg Nation [HD, 1280x720p].mp4’

# Neural Prosthetics

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*Fashion*

*Communication*

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Dimensioning  
Examples

See ‘4 - Amputee Makes History with APL’s Modular  
Prosthetic Limb [HD, 1280x720p].mp4’



# Cochlear Implants

See '5 - How A Cochlear Implant Works by Advanced Bionics [HD, 1280x720p].mp4'

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*Mobility*

**Implantables**

Dimensioning  
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# Cochlear Implants

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**Implantables**

## Dimensioning Examples

See '6 - Kai hearing hearing her voice for the first time [Low, 480x360p].mp4'

# Dimensioning Examples

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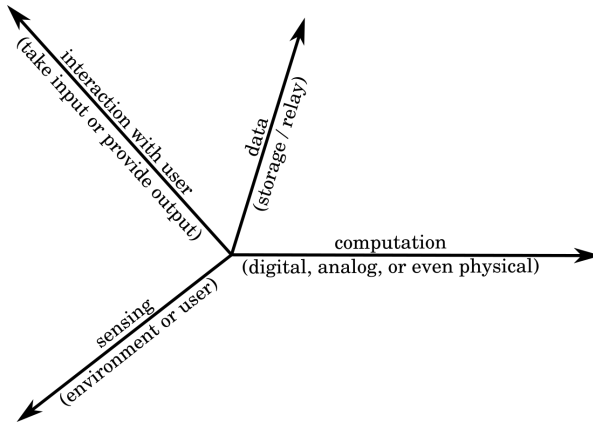
Fashion

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Dimensioning  
Examples



ACTIVITY  
TRACKERS



SPORTS & GPS  
WATCHES



SMART  
WATCHES



VIRTUAL  
REALITY



SMART  
TRACKING



WEARABLE  
CAMERAS

