

# T1.2 – Motivação

Proc. Sinal e Imagem  
Mestrado em Informática Médica

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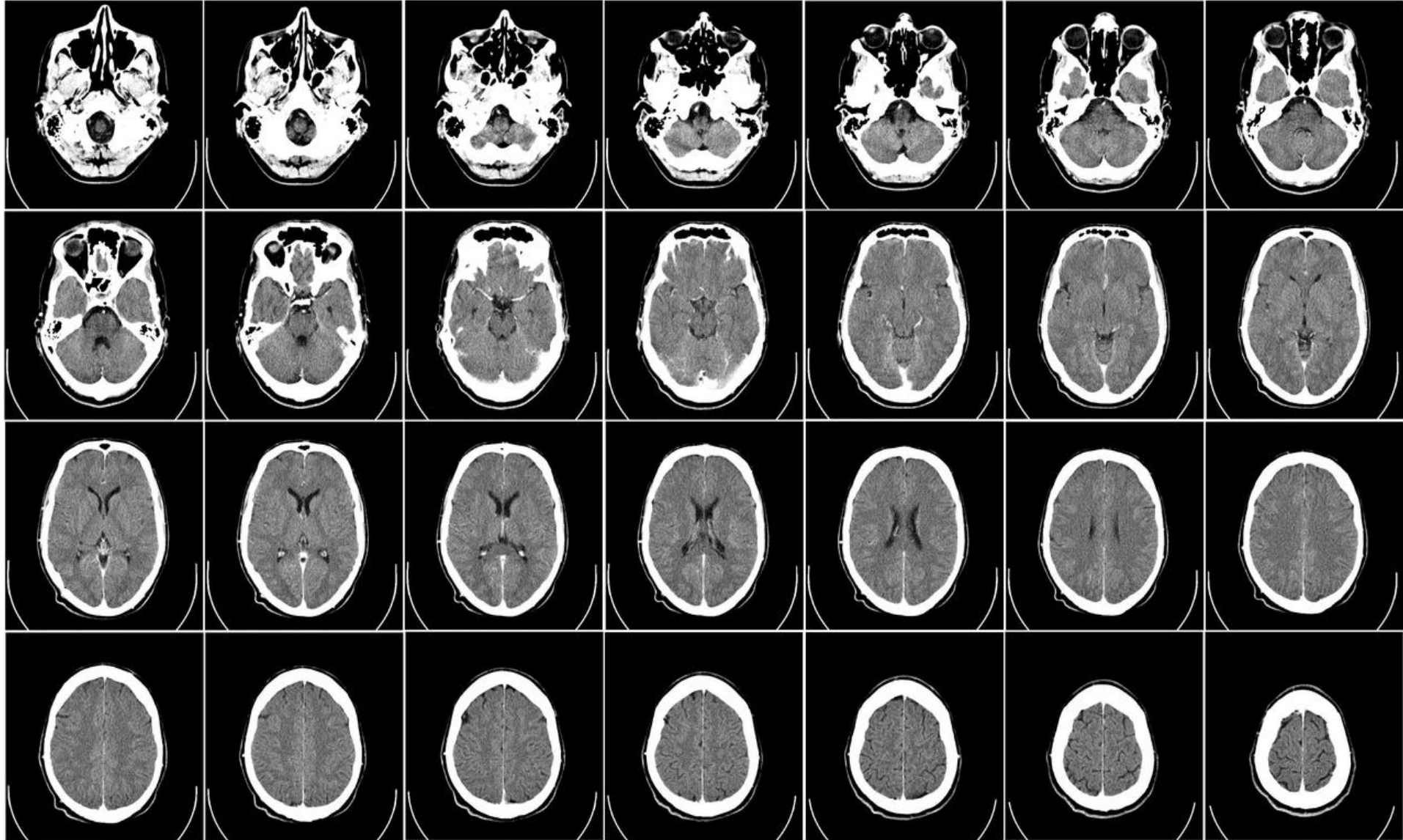
Qual a motivação para processarmos sinal?

# Sinal e Imagem Médica

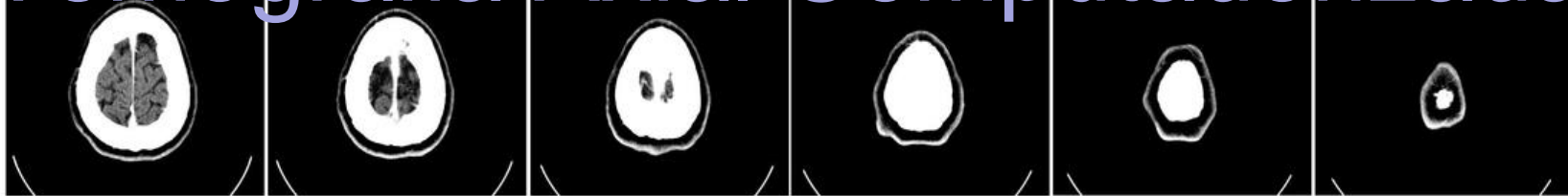
(aos quais já estamos bem habituados...)

# Radiografia





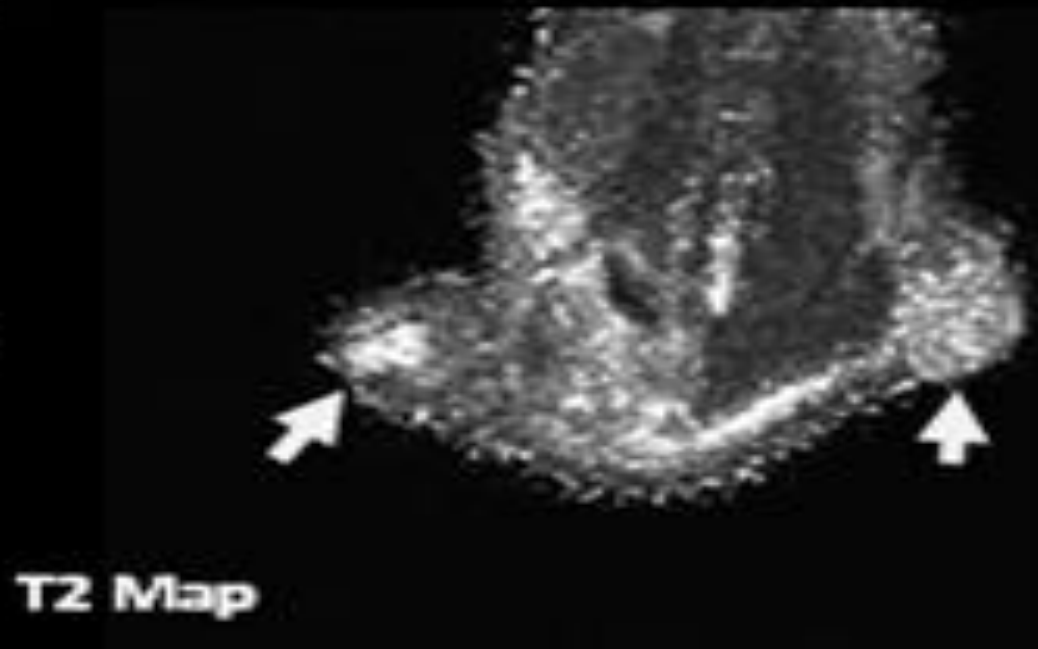
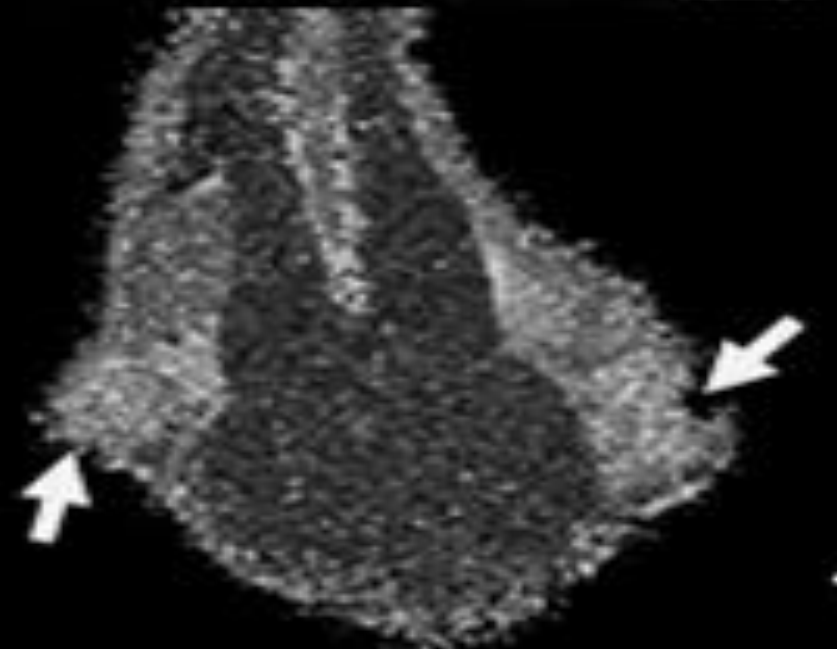
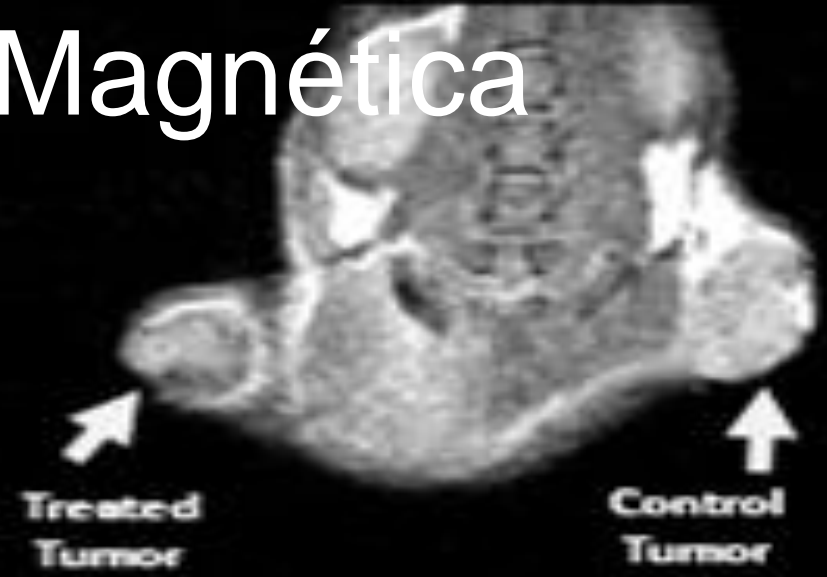
# Tomografia Axial Computadorizada



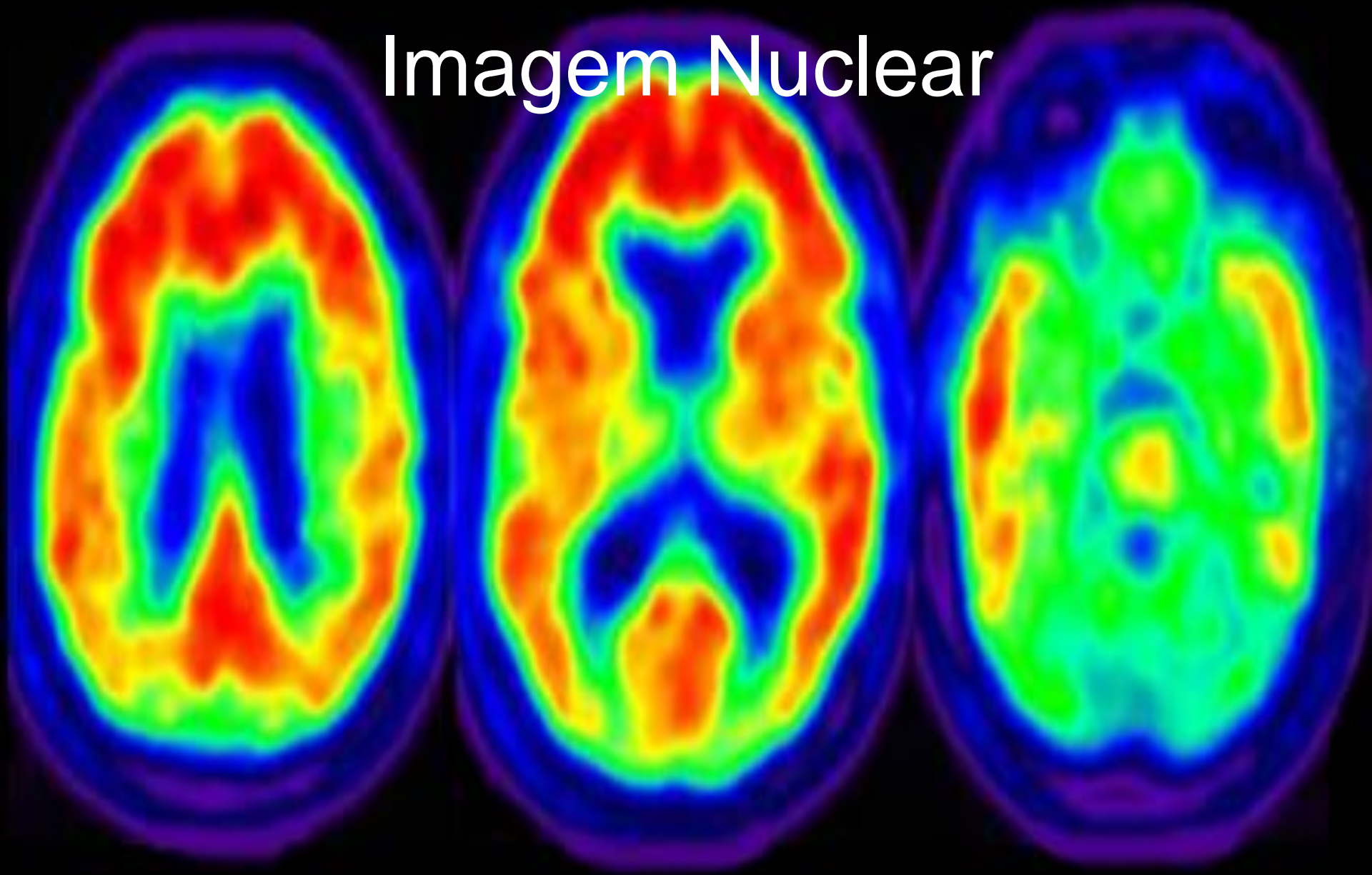
Pre-PDT

24-hr

# Ressonância Magnética



# Imagem Nuclear



# Microscopia





# Ultrasound

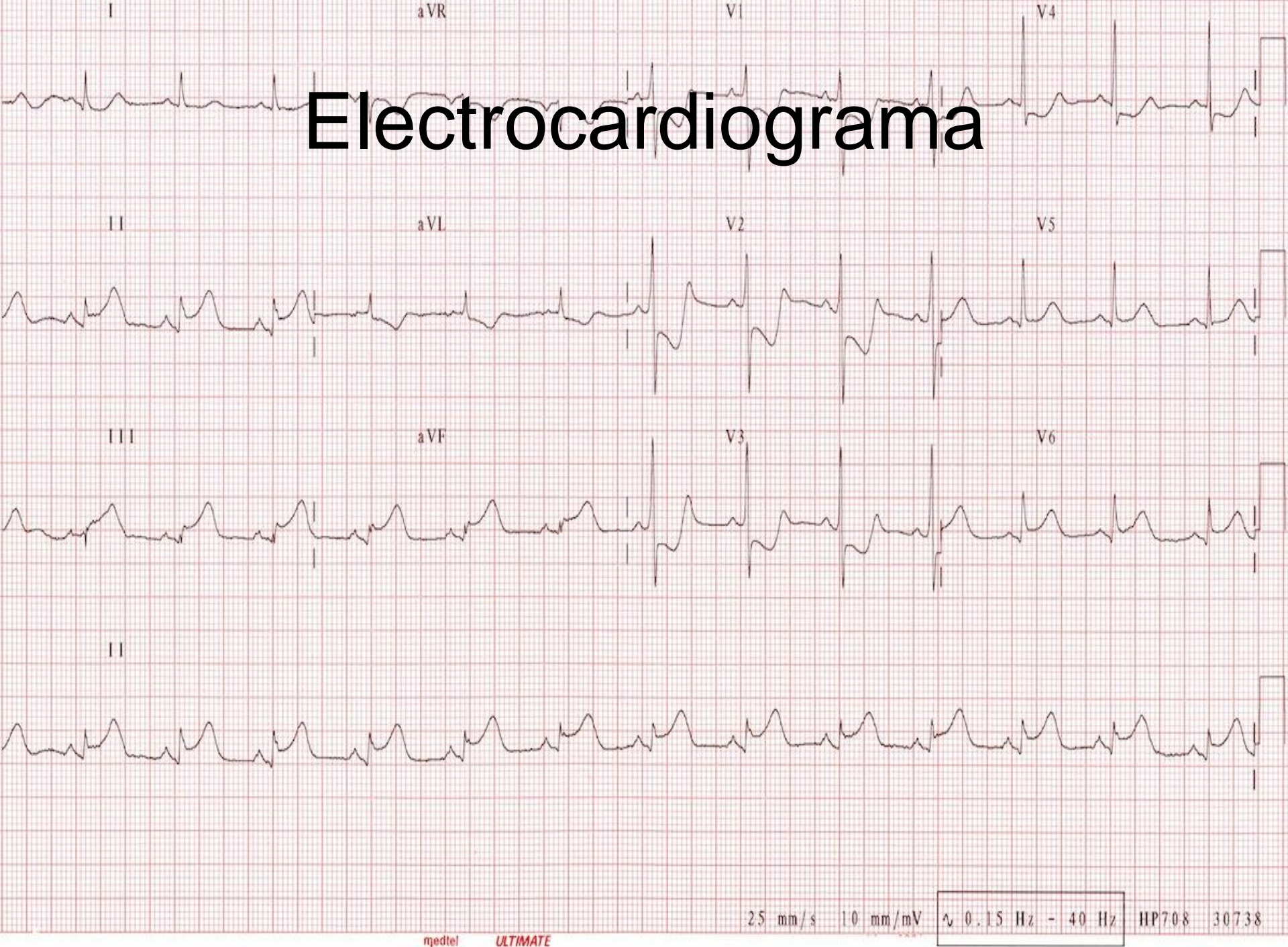
Voluson  
E8

Routine  
Har-high  
97  
Gn 10  
C6 / M7  
P5 / E3  
SRI II 5



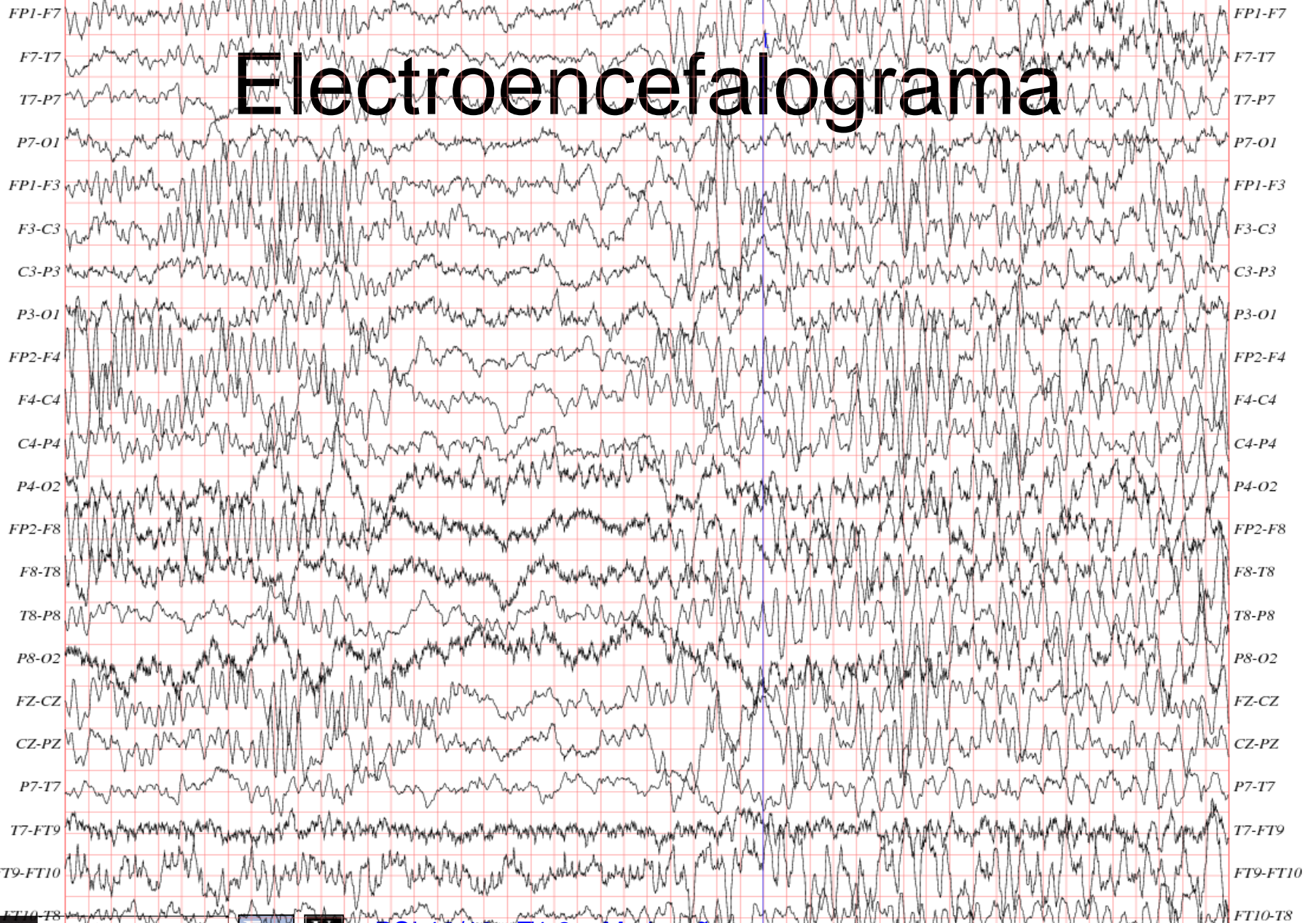
CRL 6.51cm  
GA 12w6d 71.8%

# Electrocardiograma



2.5 mm/s 10 mm/mV  $\approx 0.15 \text{ Hz} - 40 \text{ Hz}$  HP708 30738

# Electroencefalograma




# Sinal e Imagem Médica

(que pareciam ficção científica há poucos anos atrás...)

# Erik Topol, 2009

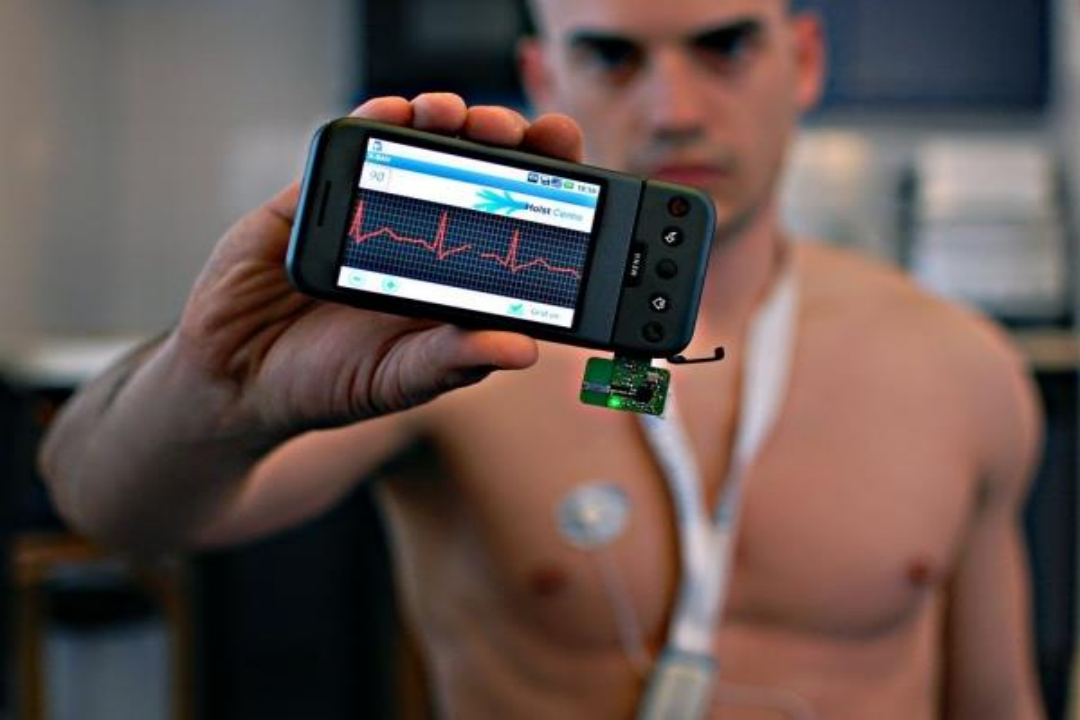
Wired, July 2009



**Know Thyself**  
The personal metrics movement goes way beyond diet and exercise. It's about tracking every facet of life, from sleep to mood to pain, 24/7/365.

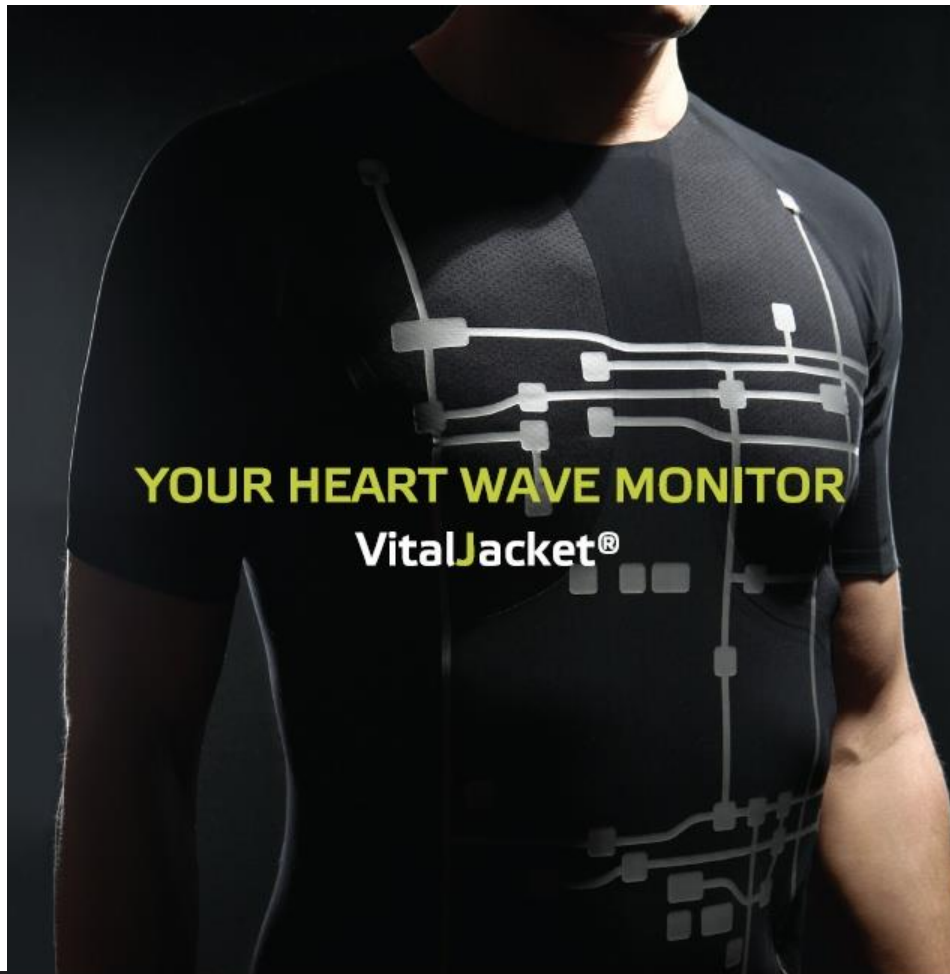
"O movimento de medidas pessoais vai além





# Estudo de Caso: Vital Responder

## Monitoring Stress Among First Responder Professionals







# ital **R**esponder

00:30



# Electrocardiograma 2.0

**VitalJacket® HWM**  
**YOUR HEART WAVE MONITOR**

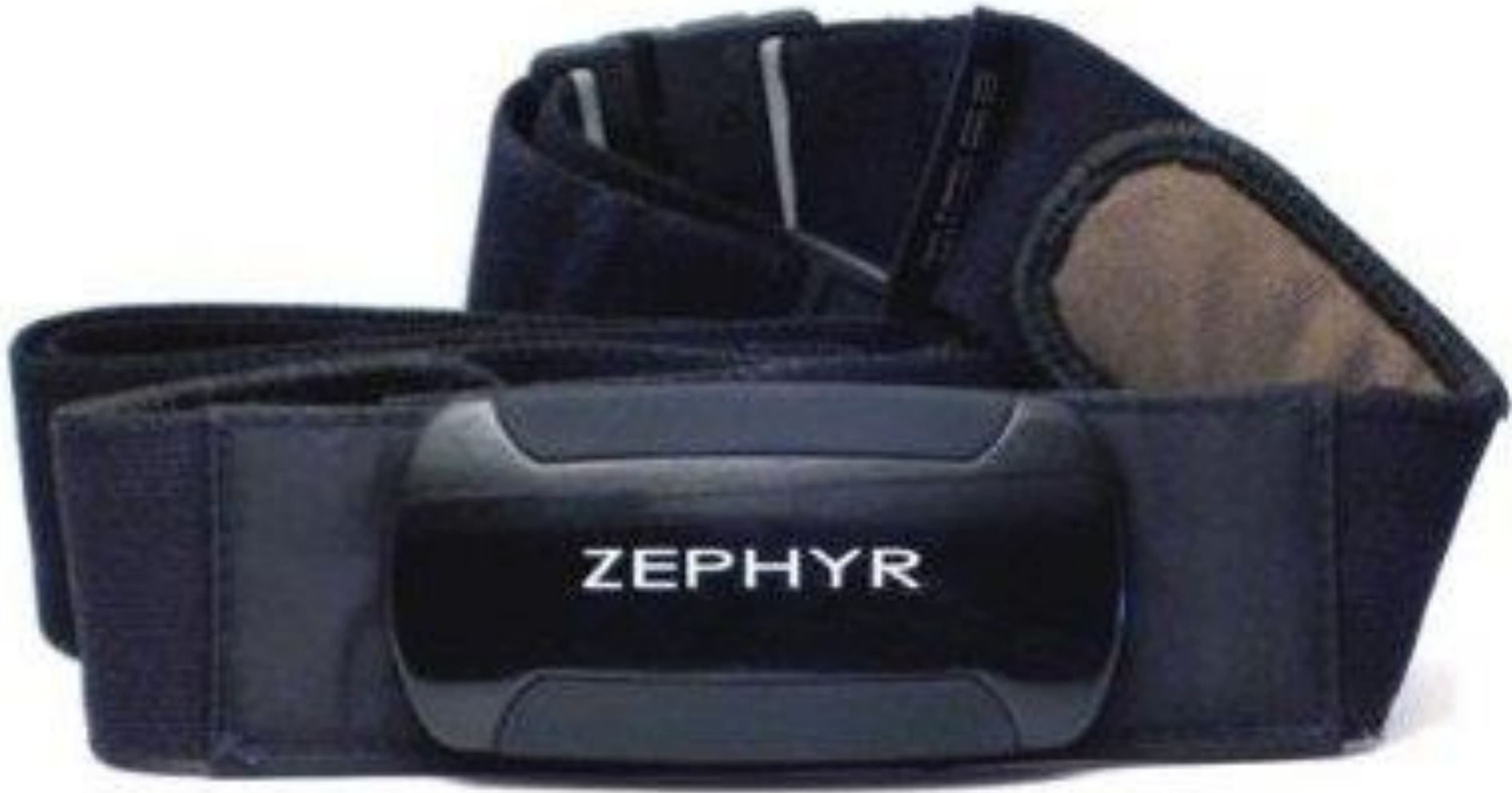
Medical equipment  
**DO DOVCOM**

*pitaval*

# Electrocardiograma



# Variabilidade RR



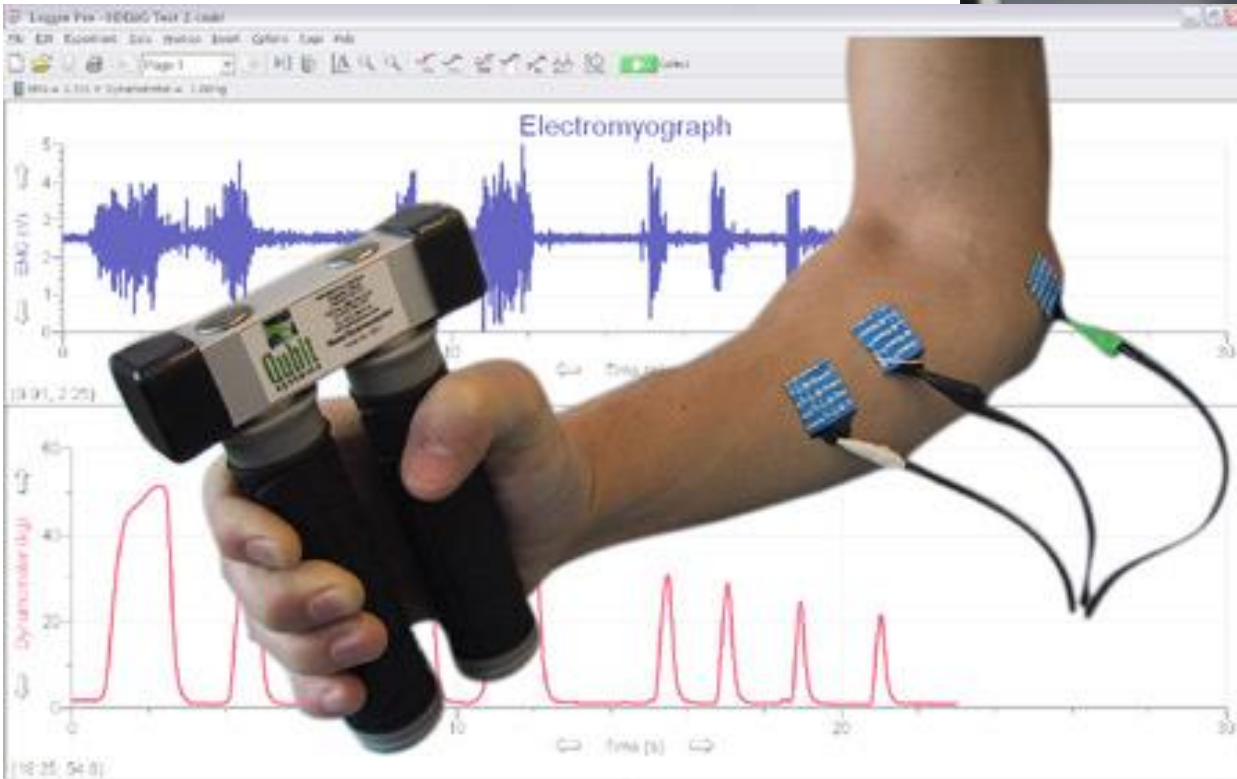
# EEG



<https://www.youtube.com/watch?t=55&v=T7CiiWBwMgw>

# EMG

Wearable EMG



Very Famous Person

# Smartphone Sensing

## Samsung S4

- Accelerometer
- Gyroscope
- Light
- Magnetic Field
- Atmospheric Pressure
- Proximity
- Temperature
- Humidity
- Sound Levels
- GPS



# Smartwatch Sensing





# Como usamos todo este sinal em benefício da Saúde?

Processar, processar, processar,  
processar, processar, processar,  
processar, processar ....

# 'The Big Picture'

# Realidade



# Quantificação da Realidade

Rain

Stress

Wind

Heart Rate

Emotions

Fatigue

Muscle strength

Body posture

PSI 18/19 - T1.2 – Motivação  
Ball Speed



# Para um Mundo Digital



# Quero transformar variáveis reais em informação digital

Em tempo real, não obtrusivamente, em situações reais, por períodos de tempo longo, com elevada precisão

# Sistemas Ciber-Físicos

Bridges between physical and cyber worlds

