

# **ECG and Activity Monitoring: what can we learn?**

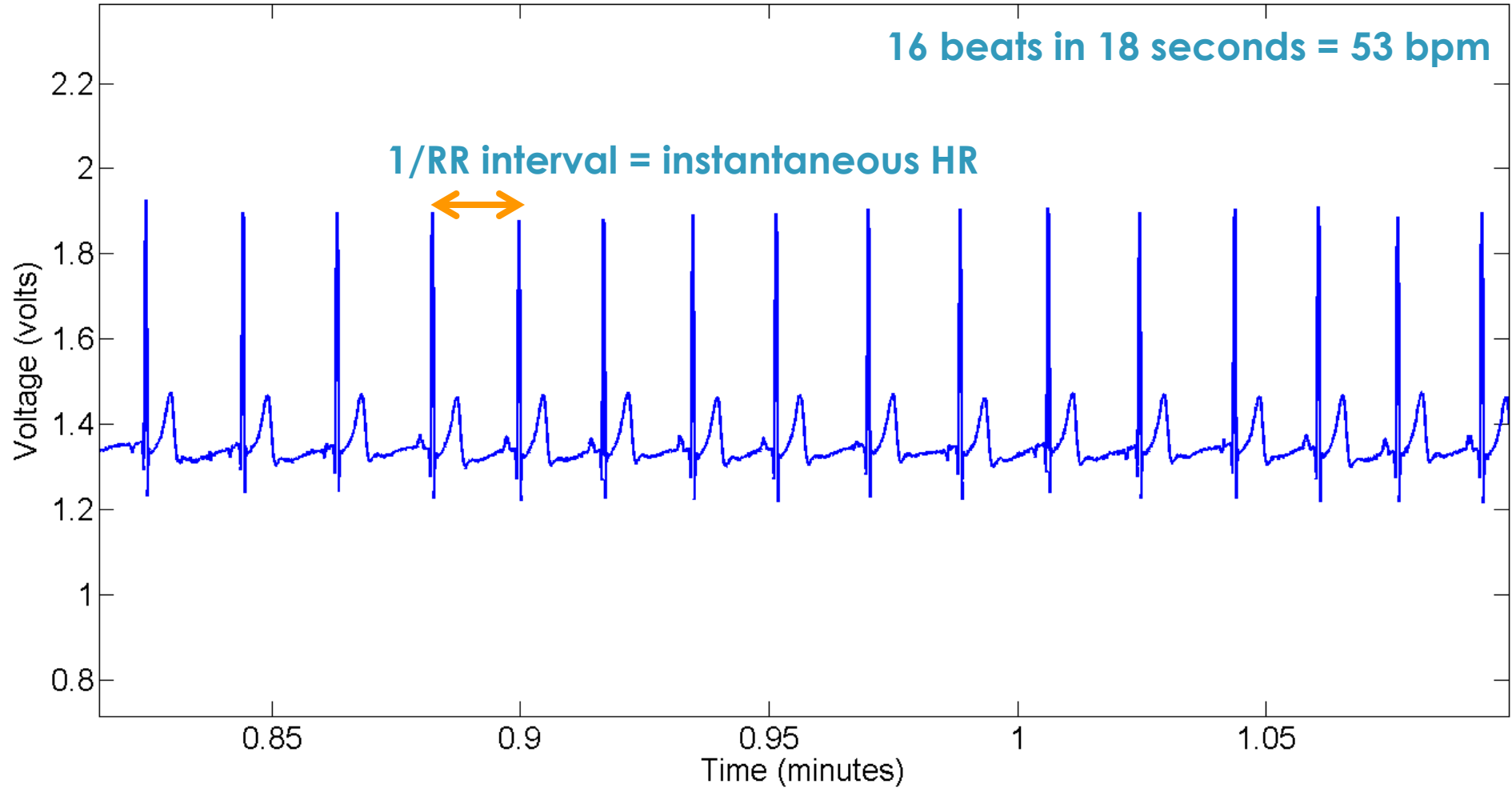
Maggie Delano  
maggied@mit.edu  
@maggied

**Electrocardiogram:  
electrical activity of  
your heart**

# My ECG at rest

16 beats in 18 seconds = 53 bpm

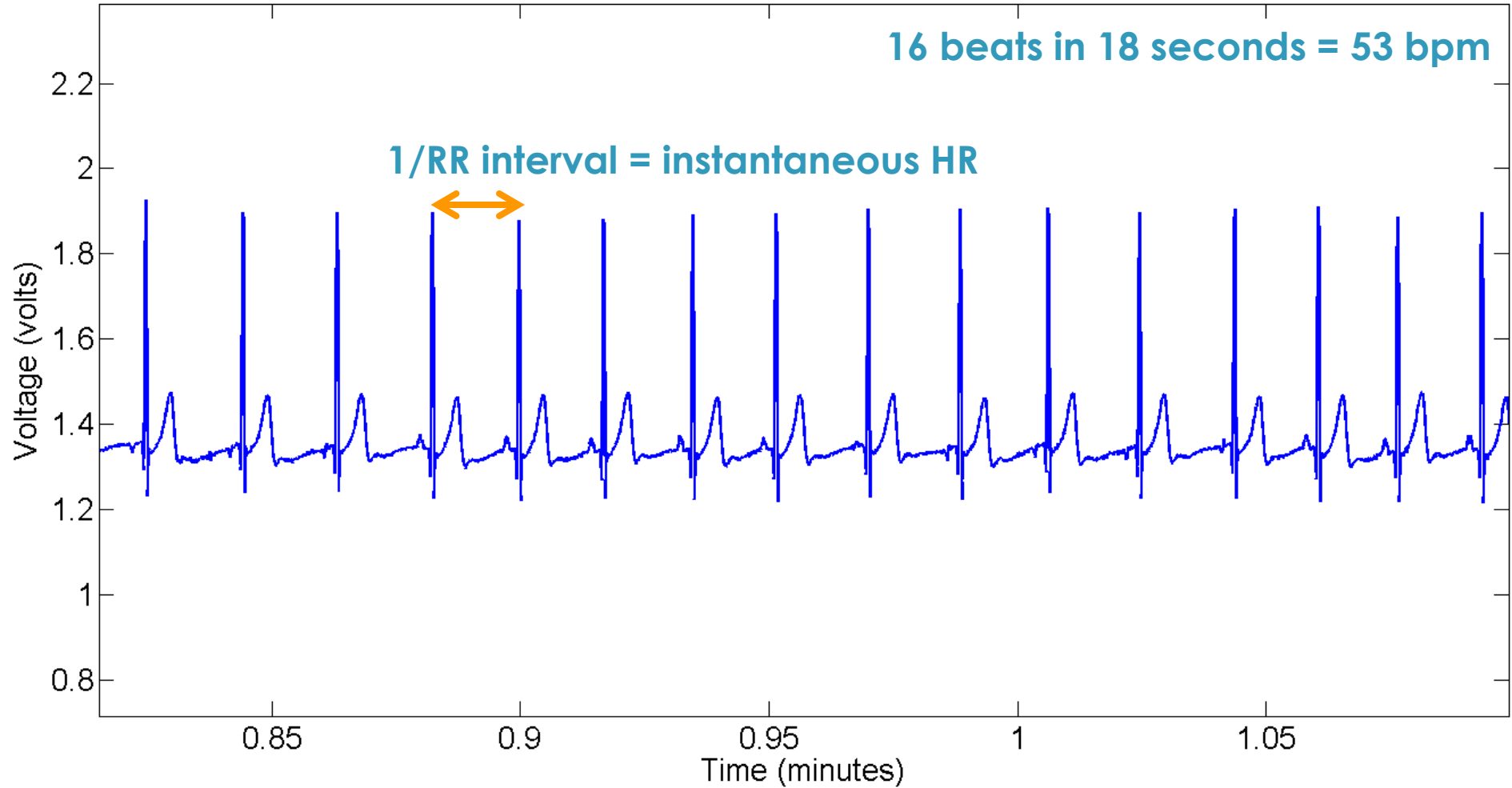
$1/RR$  interval = instantaneous HR



# My ECG at rest

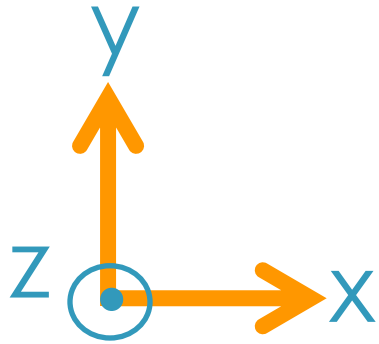
16 beats in 18 seconds = 53 bpm

$1/RR$  interval = instantaneous HR



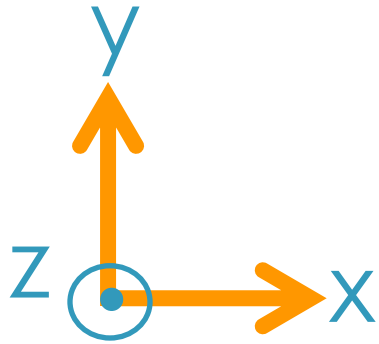
$$F = ma$$

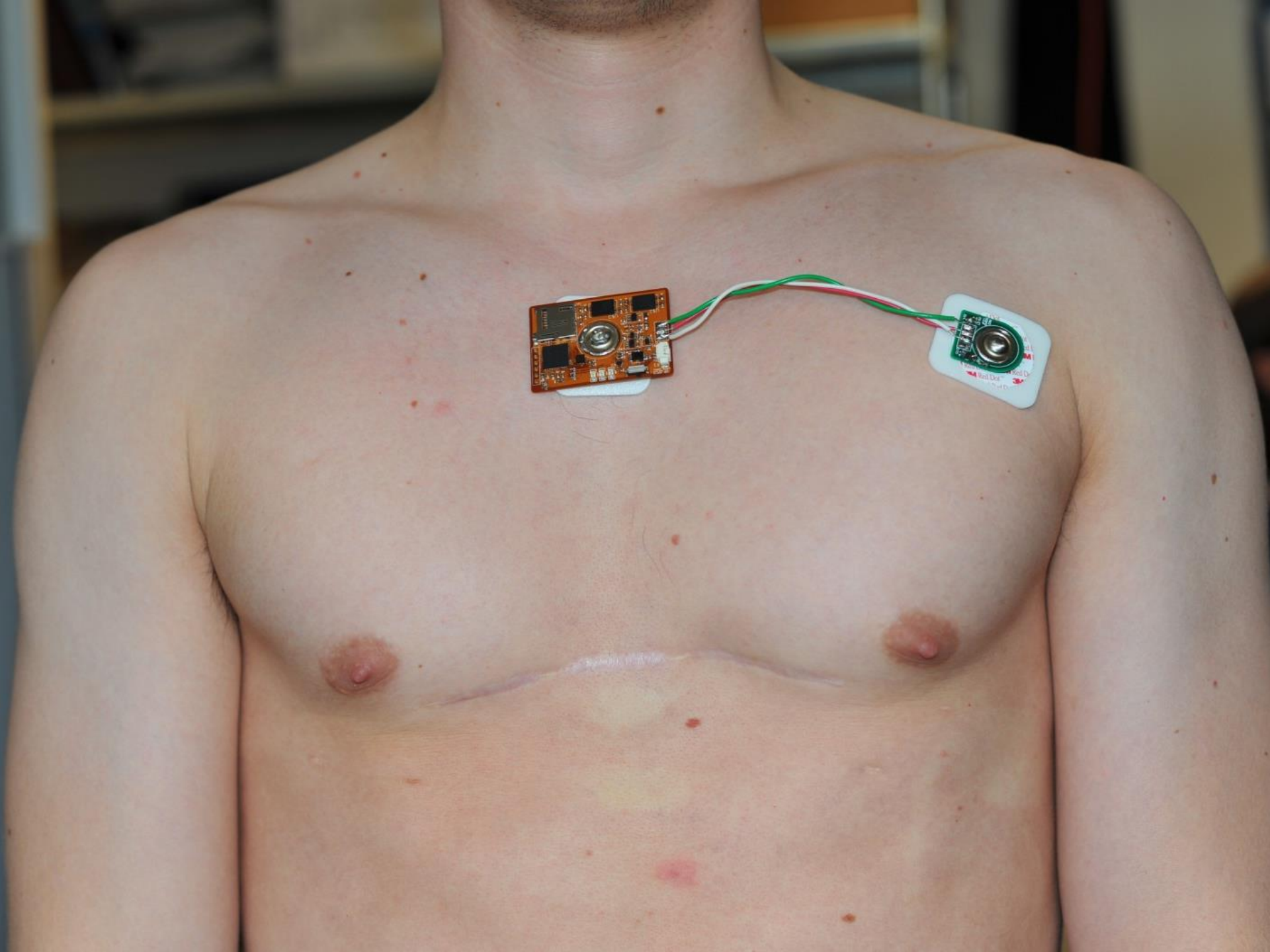
$$\text{Gravity} = -9.8 \text{ m/s}^2 = -1g$$

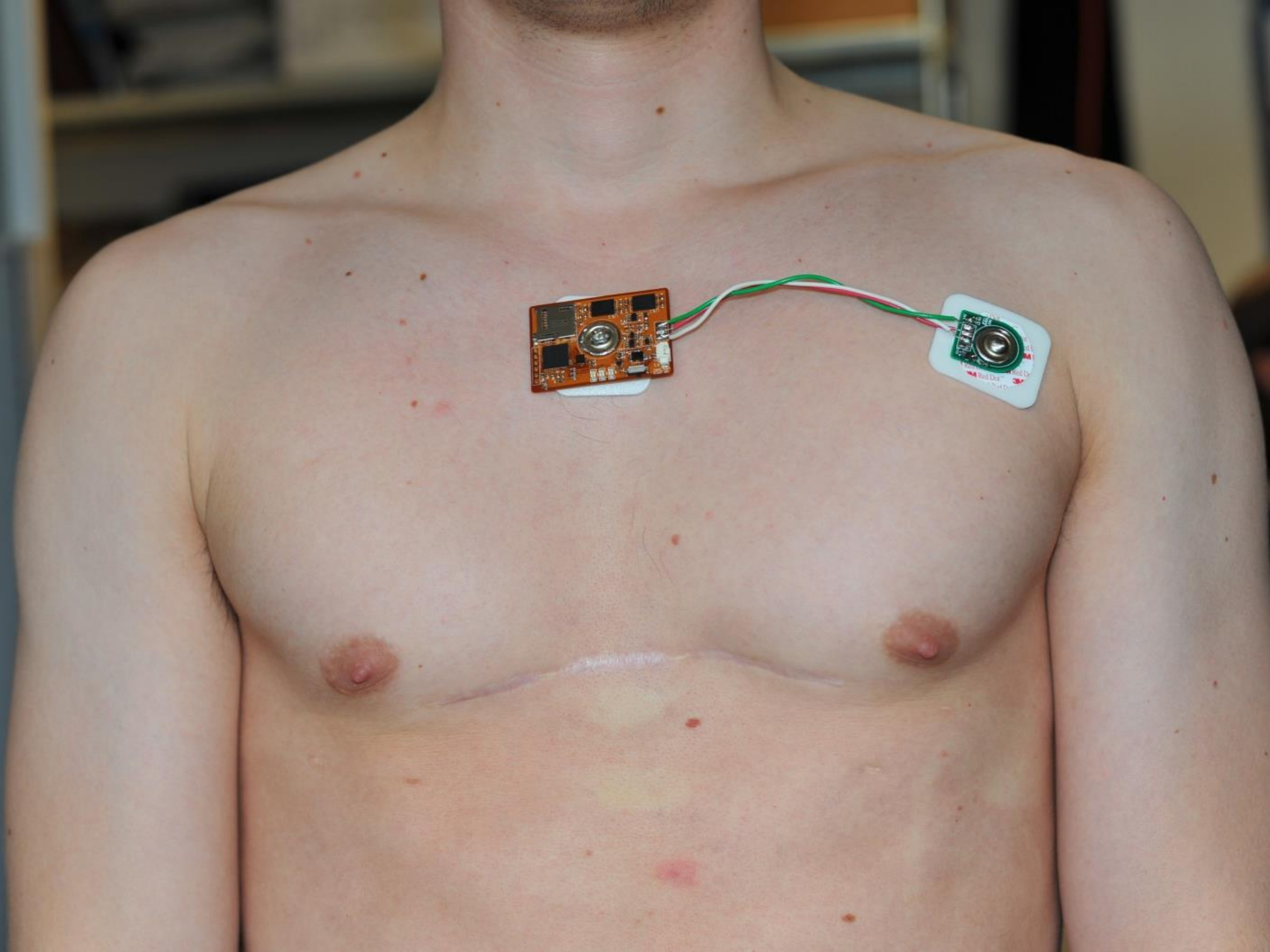


$$F = ma$$

$$\text{Gravity} = -9.8 \text{ m/s}^2 = -1g$$





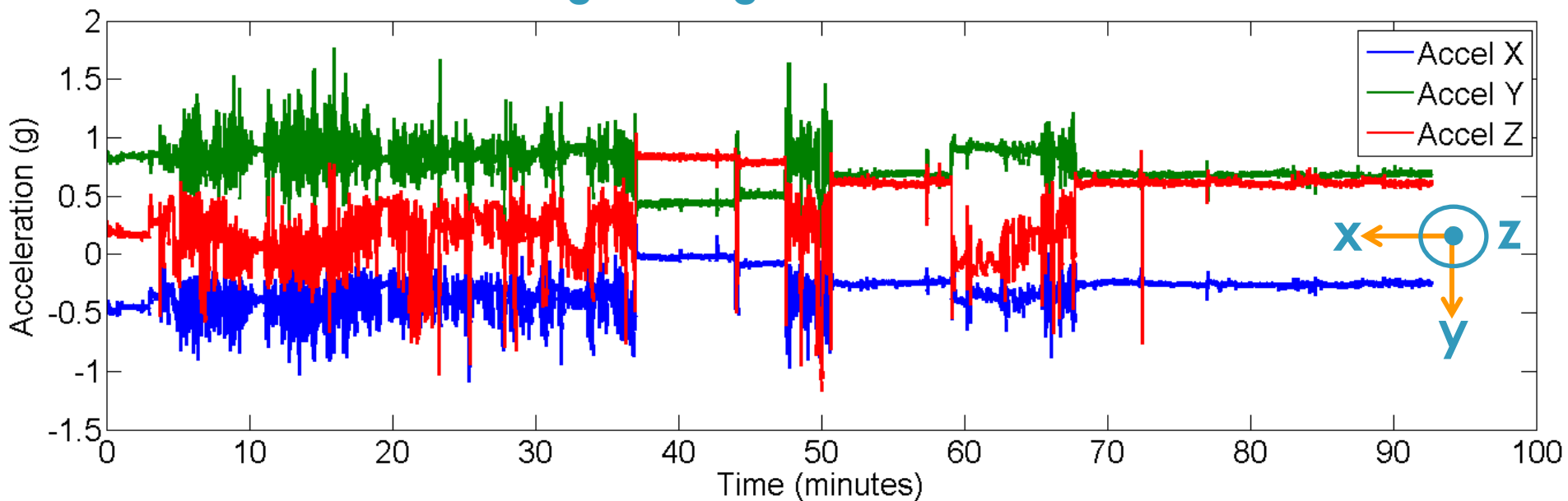
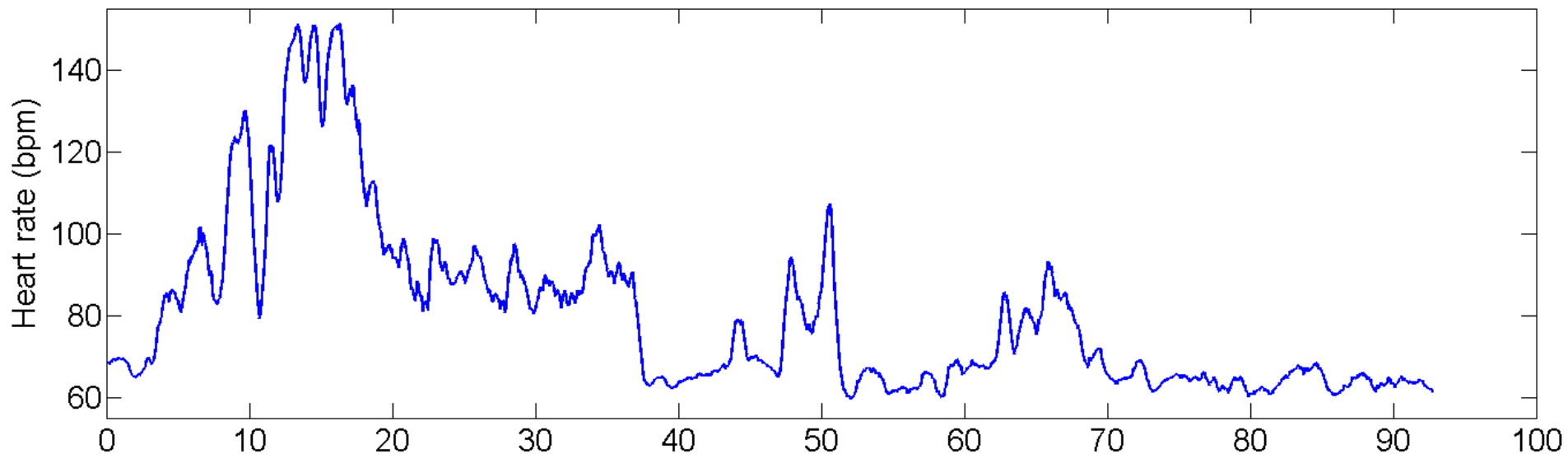




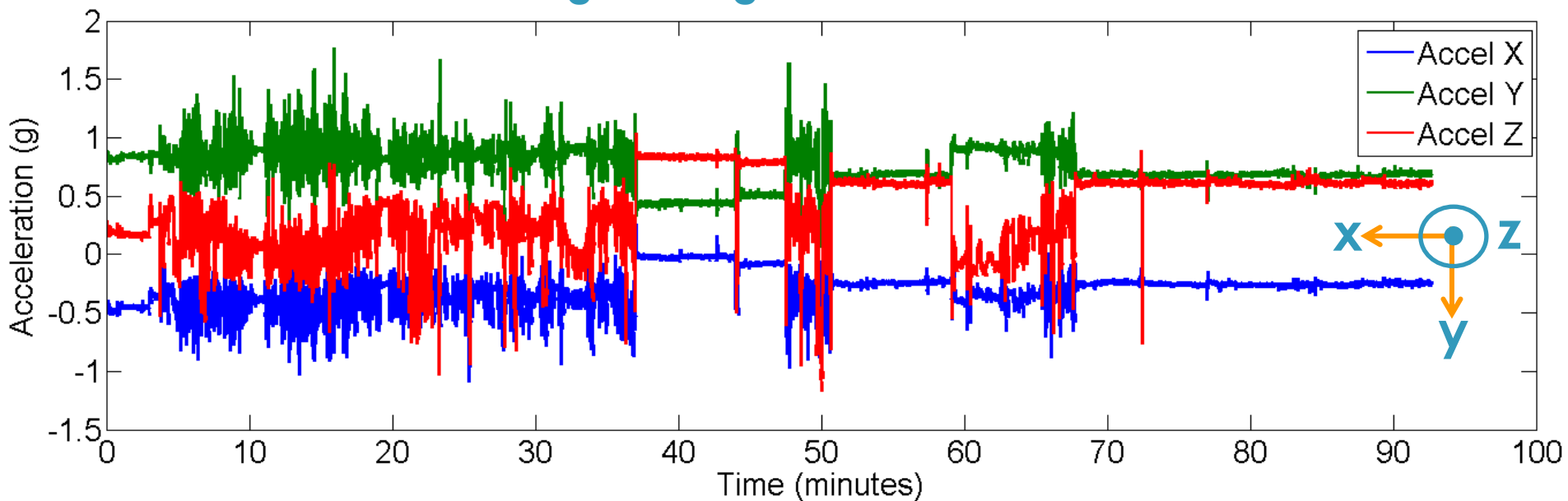
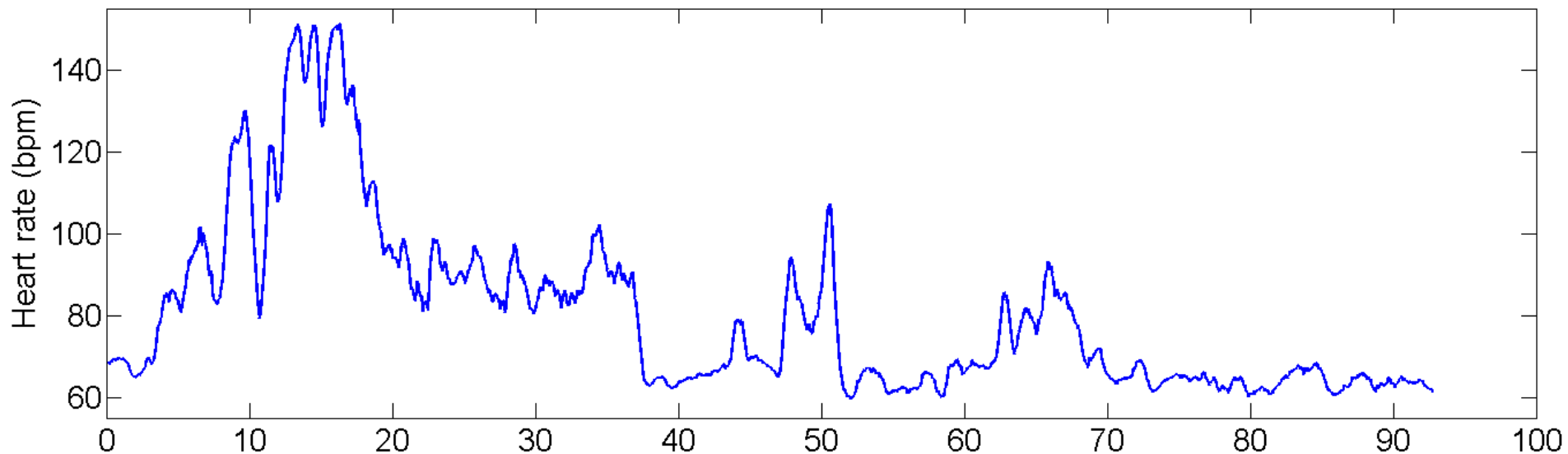
## **Data sets:**

- 1. Daily activities**
- 2. Sleep**

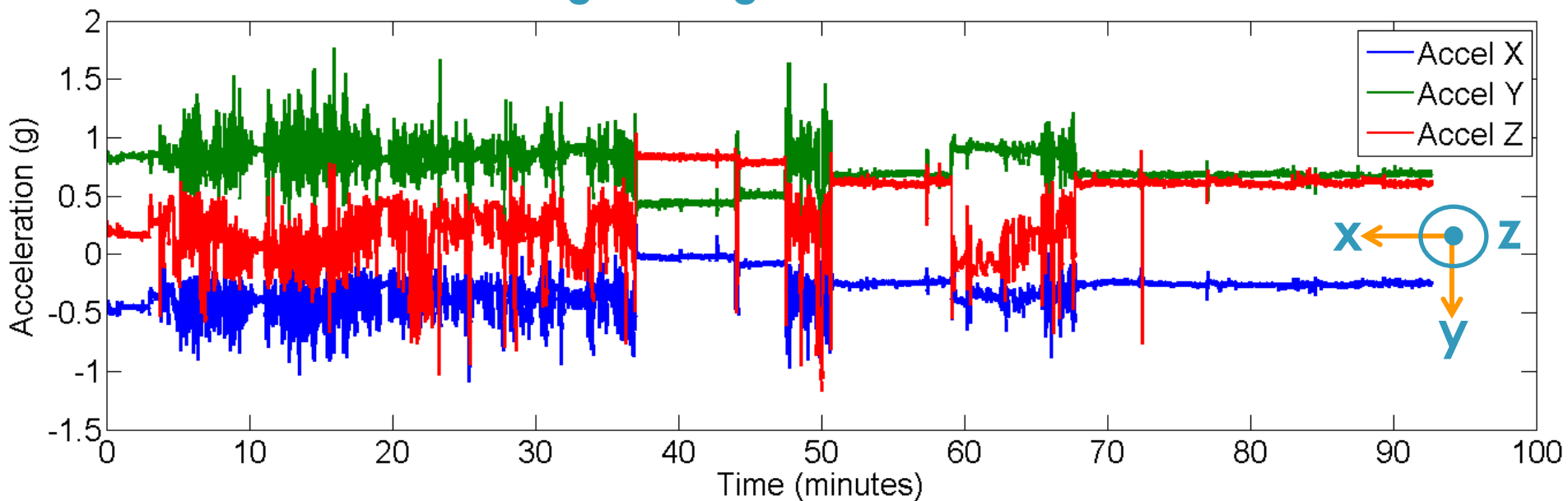
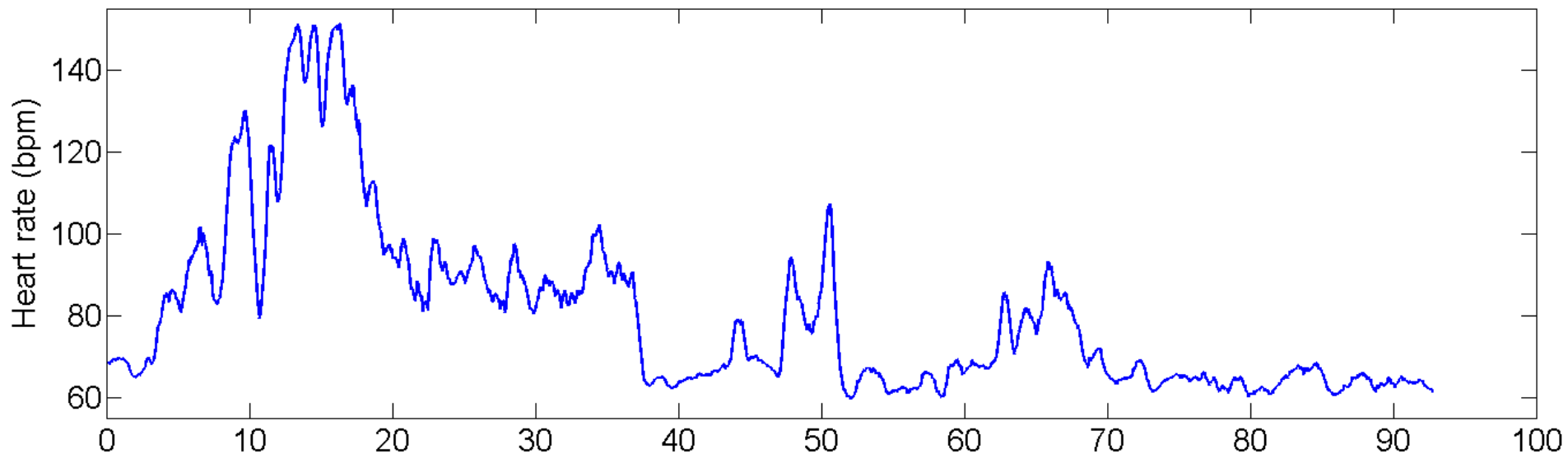
# An evening in data

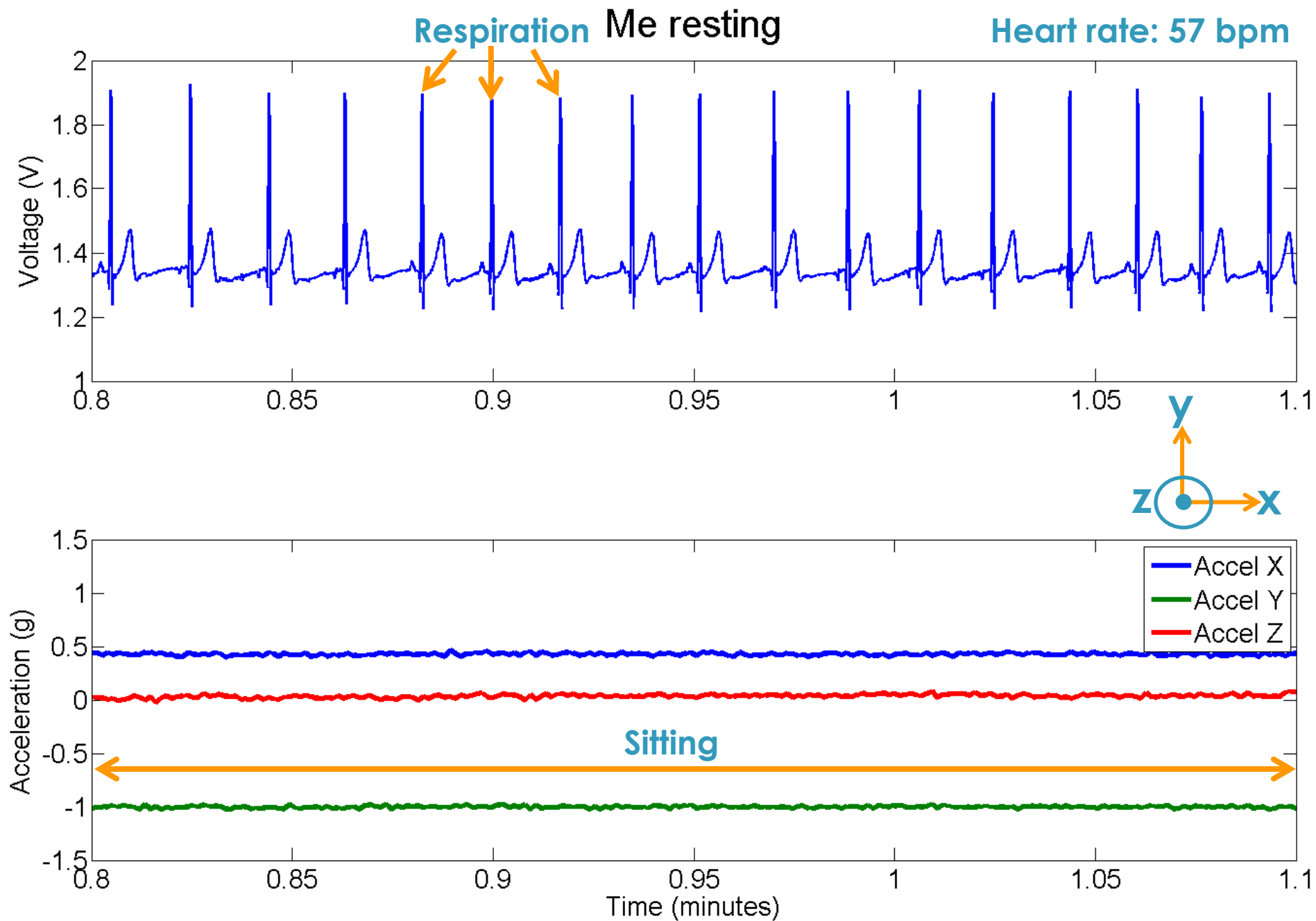


# An evening in data



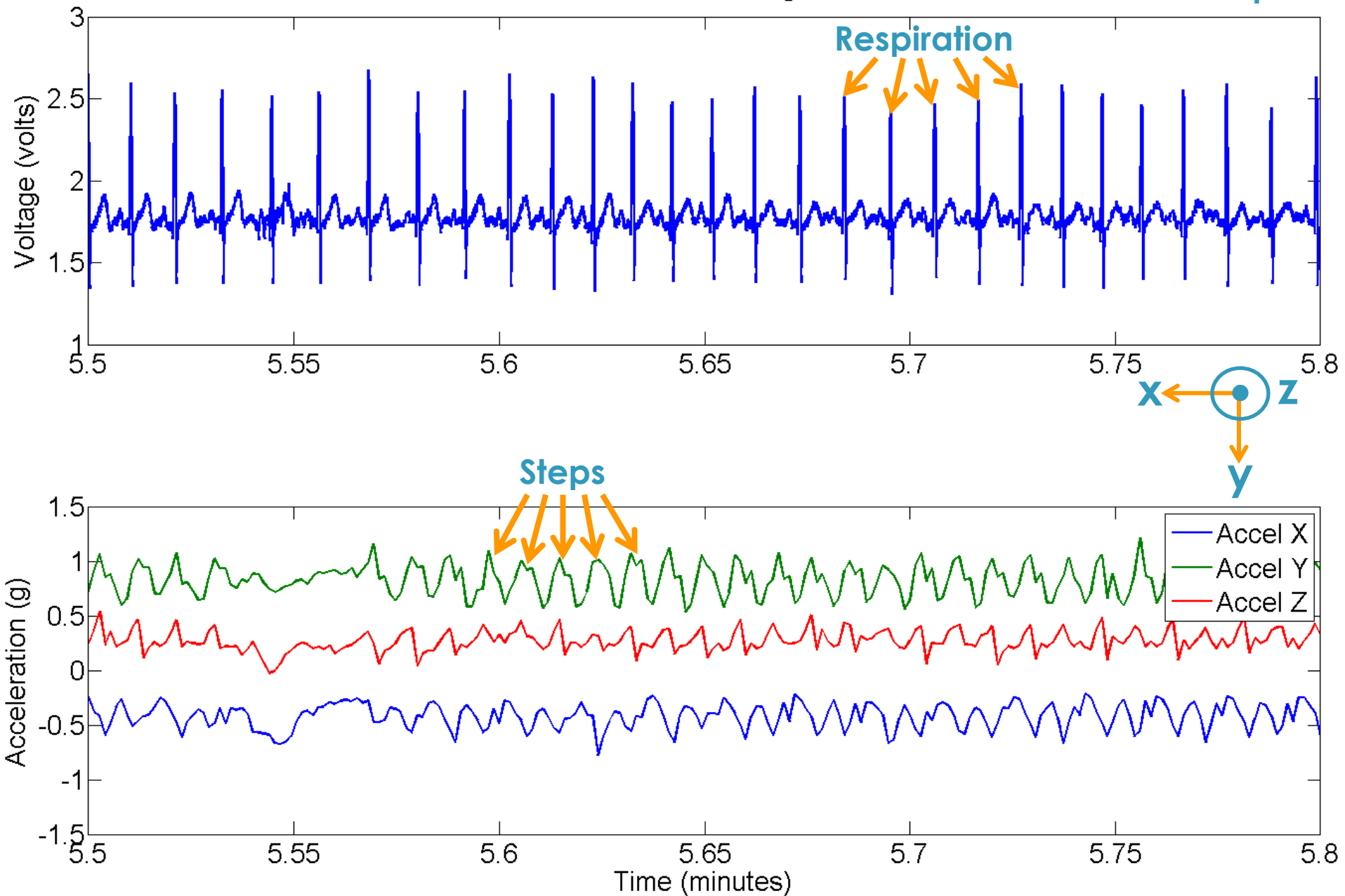
# An evening in data





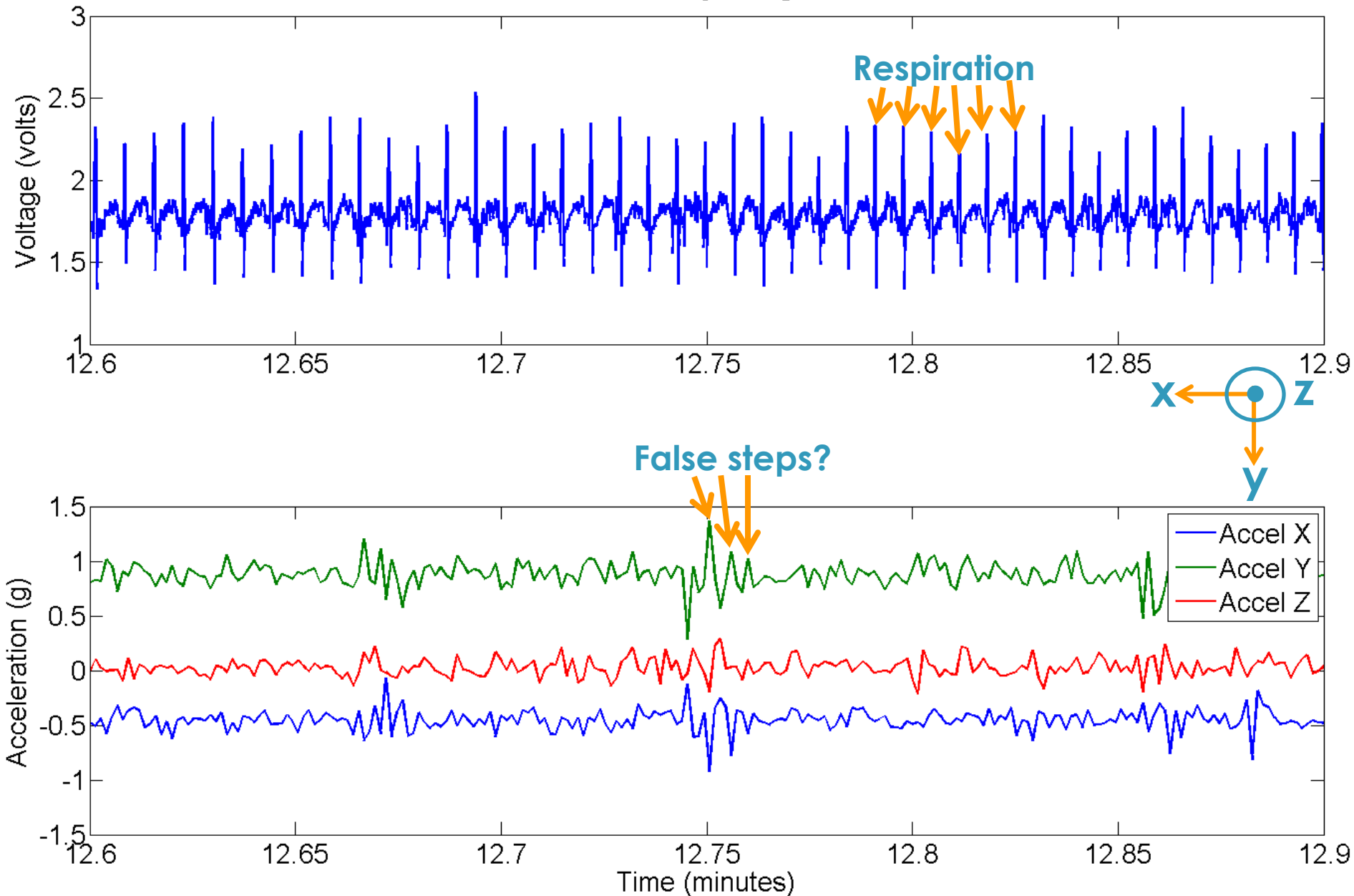
Me walking

Heart rate: 97 bpm



Me cycling

Heart rate: 147 bpm



**Lesson 1:**  
**HR changes a lot.**

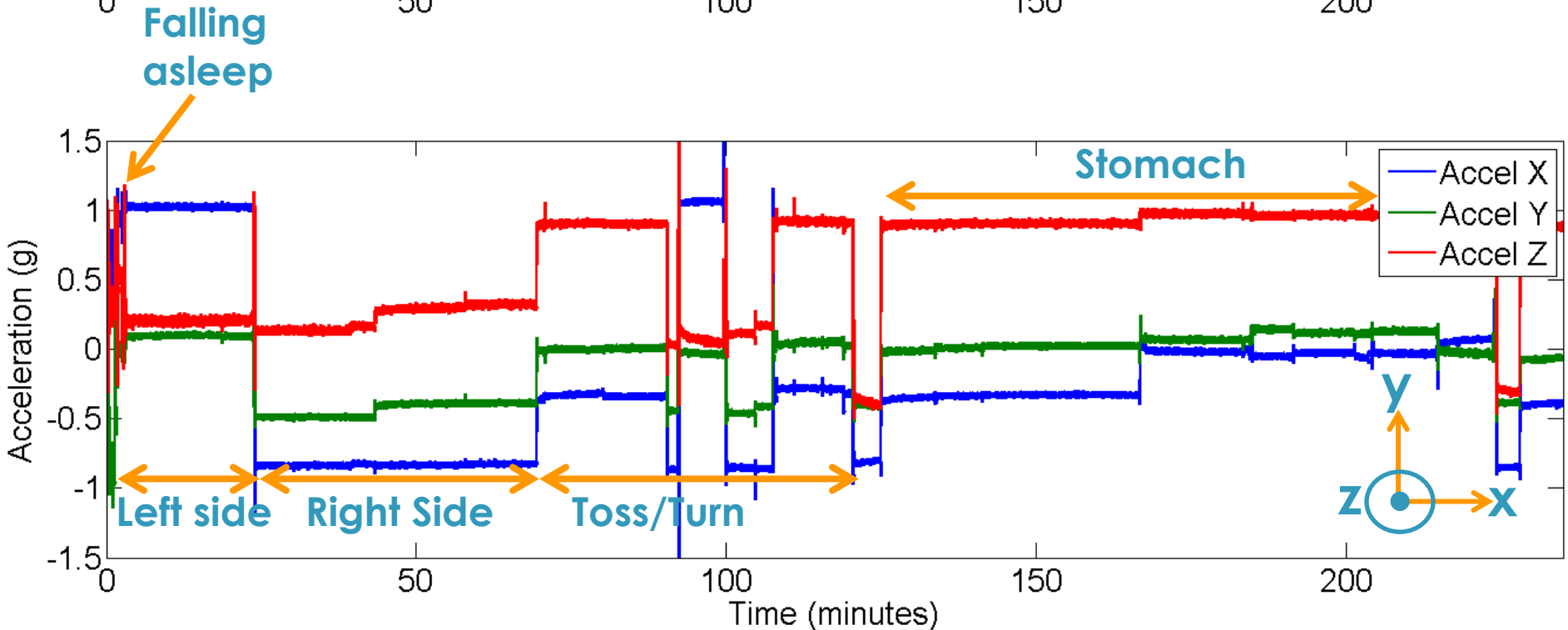
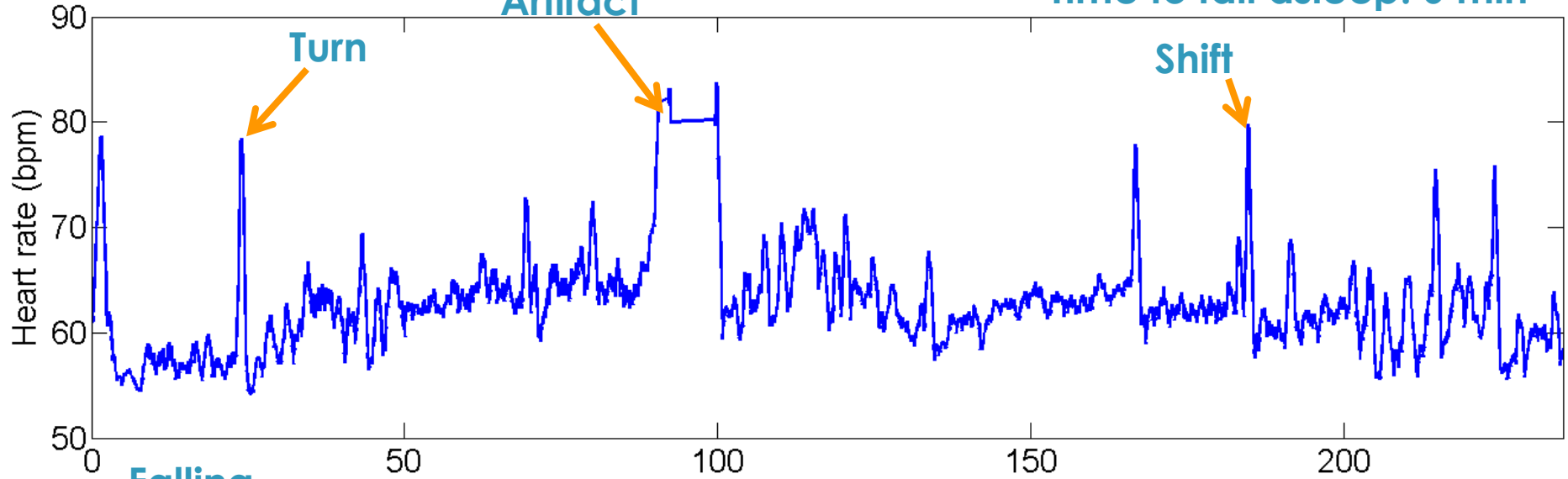


**Lesson 2:**

**HR changes are  
interesting, but need  
more data over time.**

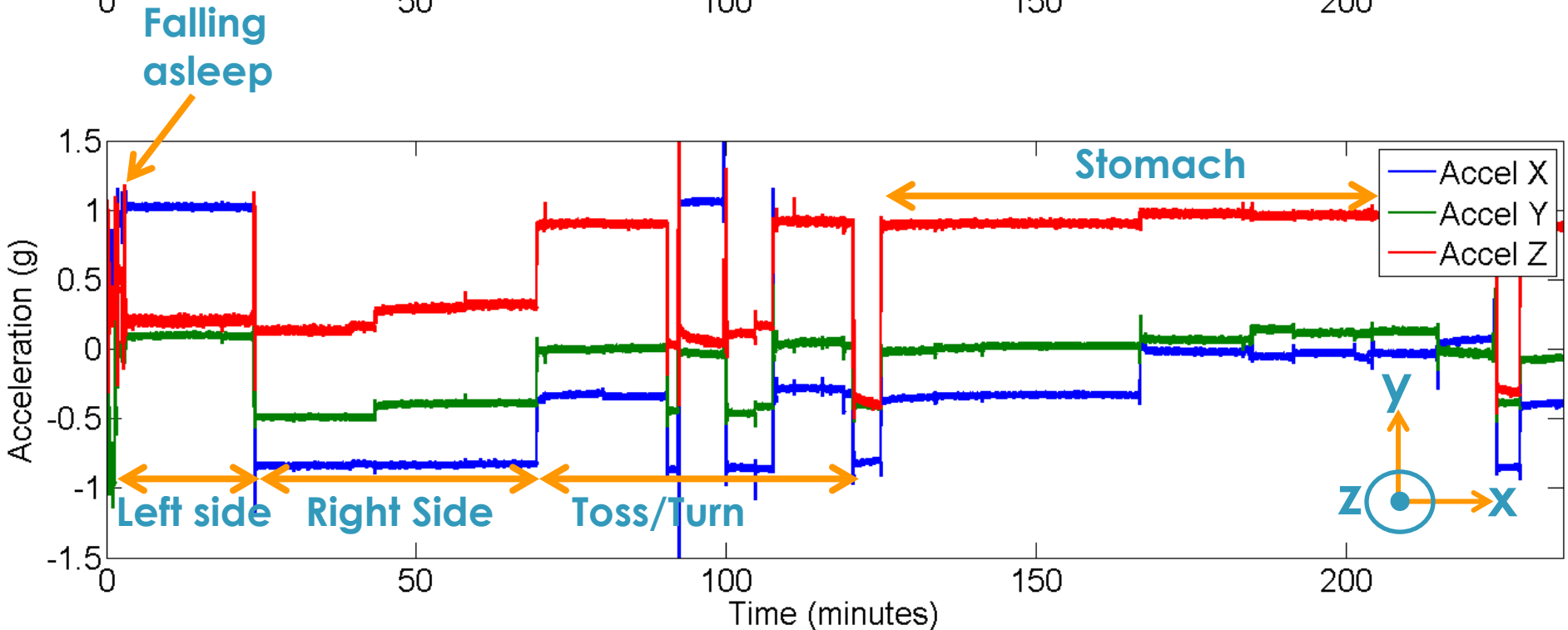
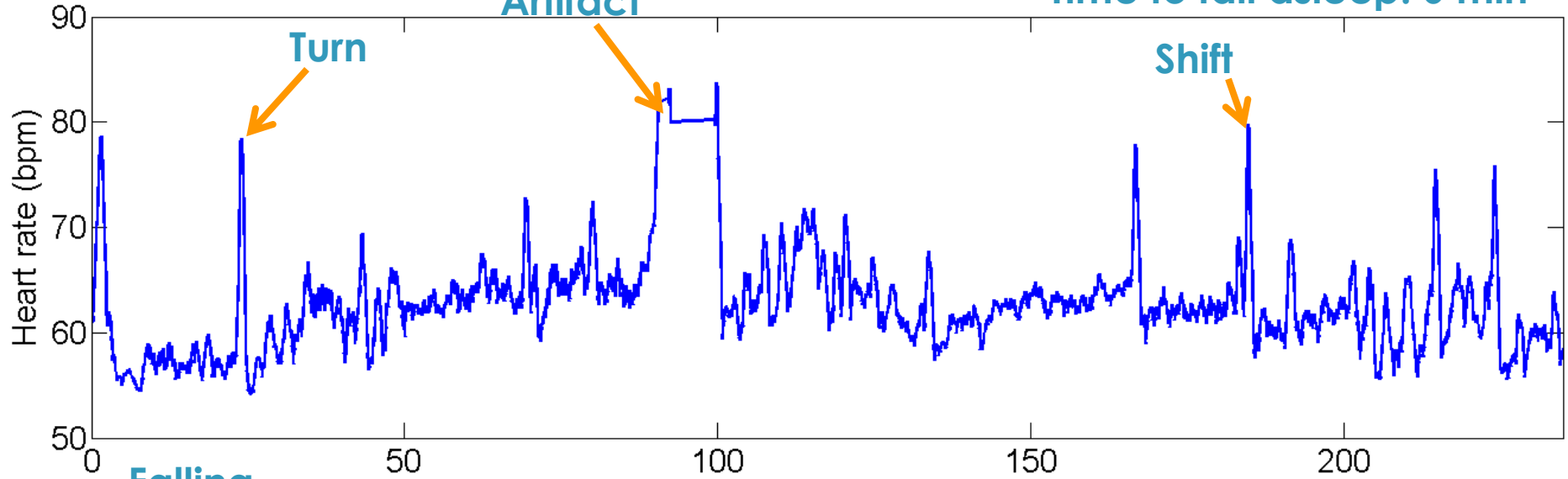
Fitbit sleep efficiency: 95%  
Time to fall asleep: 6 min

### Sleep - night one

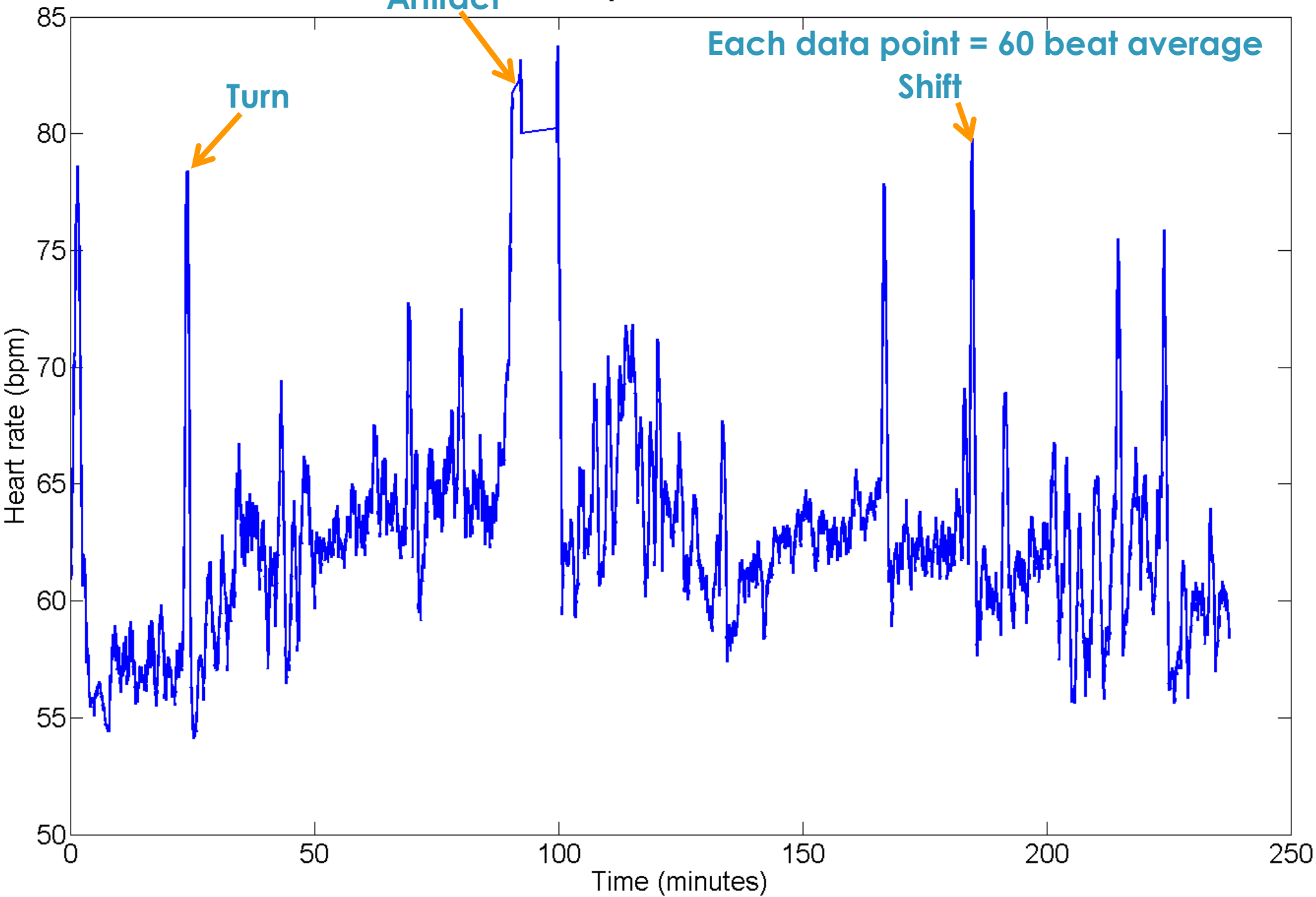


Fitbit sleep efficiency: 95%  
Time to fall asleep: 6 min

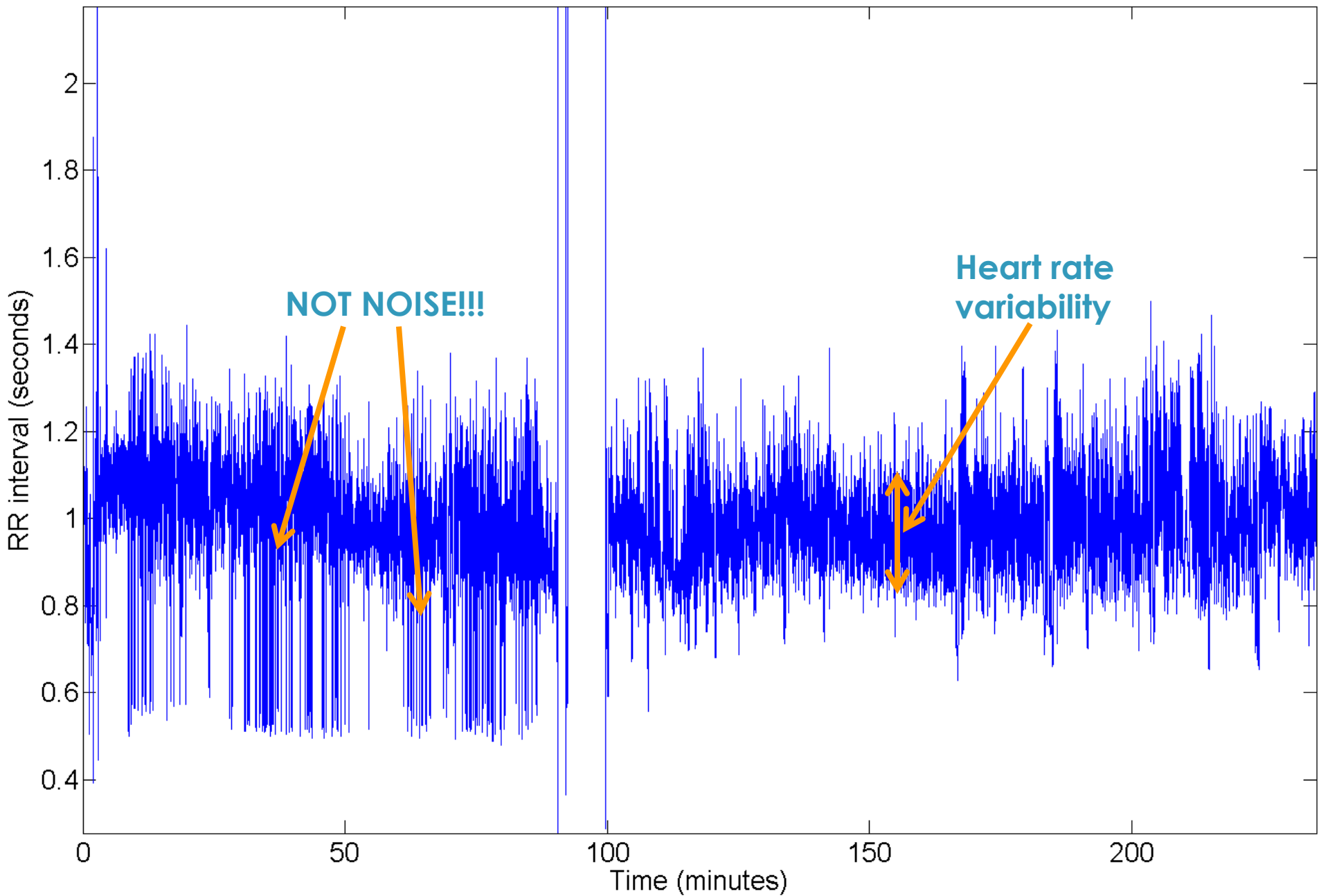
### Sleep - night one



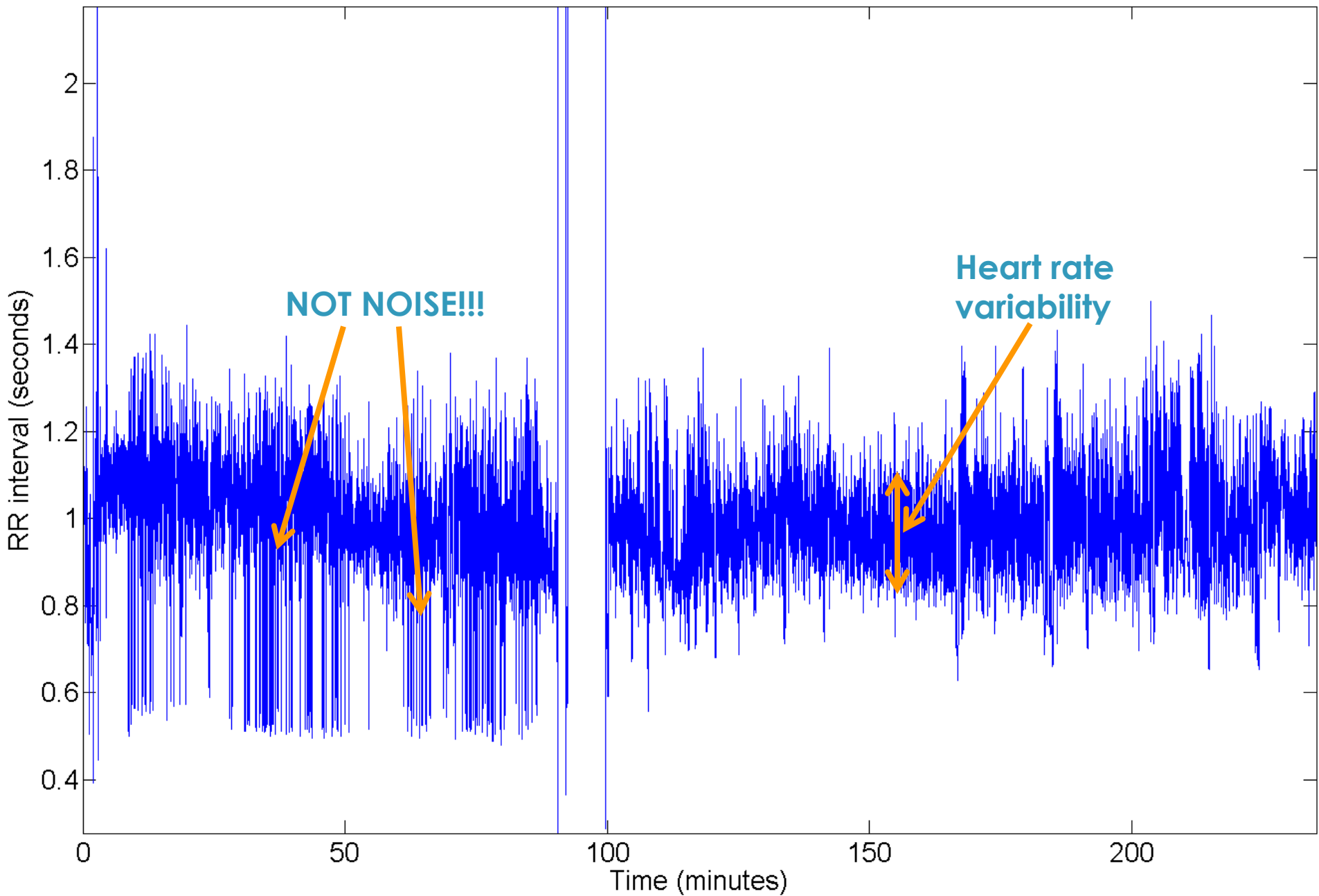
# Sleep - heart rate



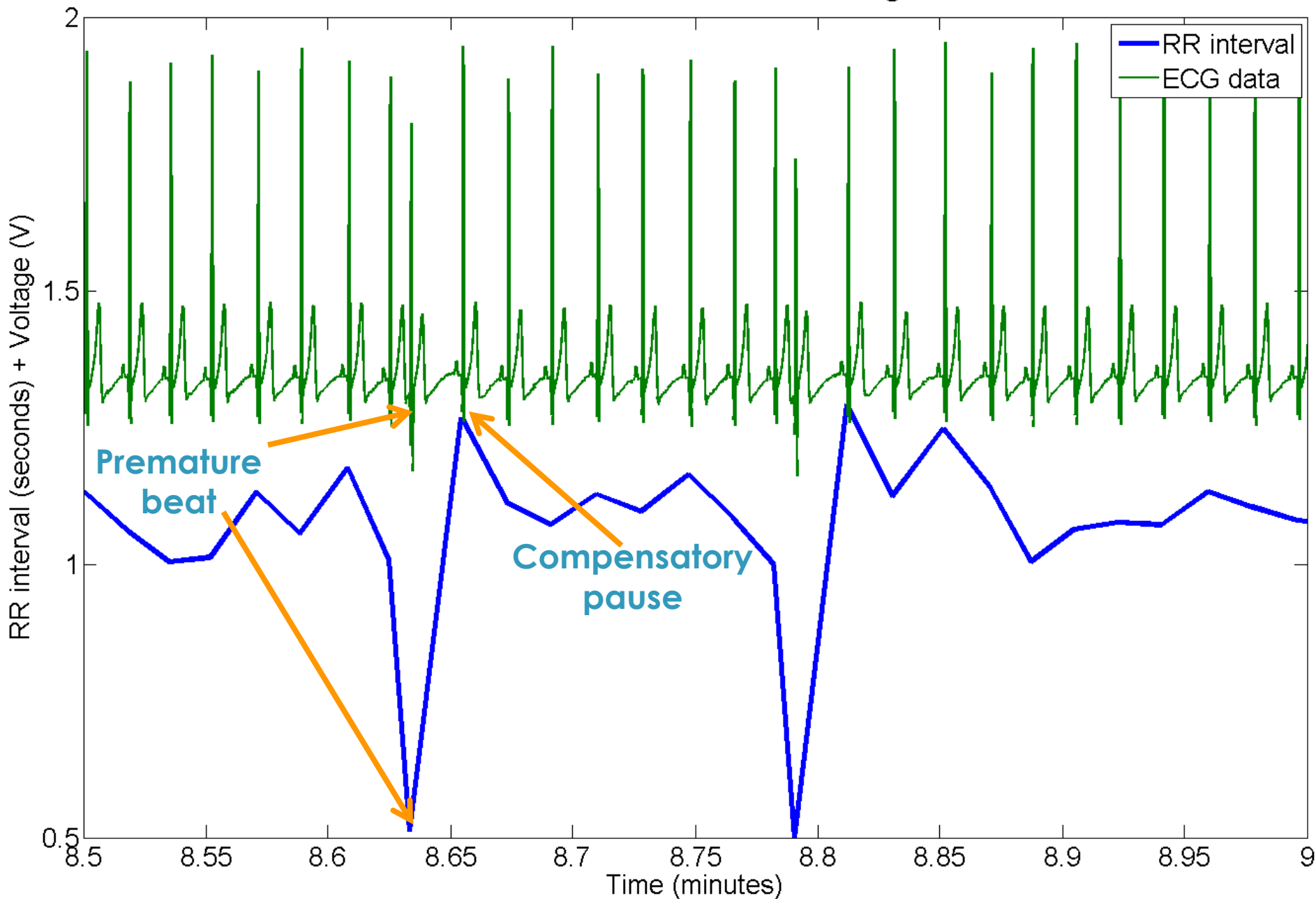
# RR interval - night 1



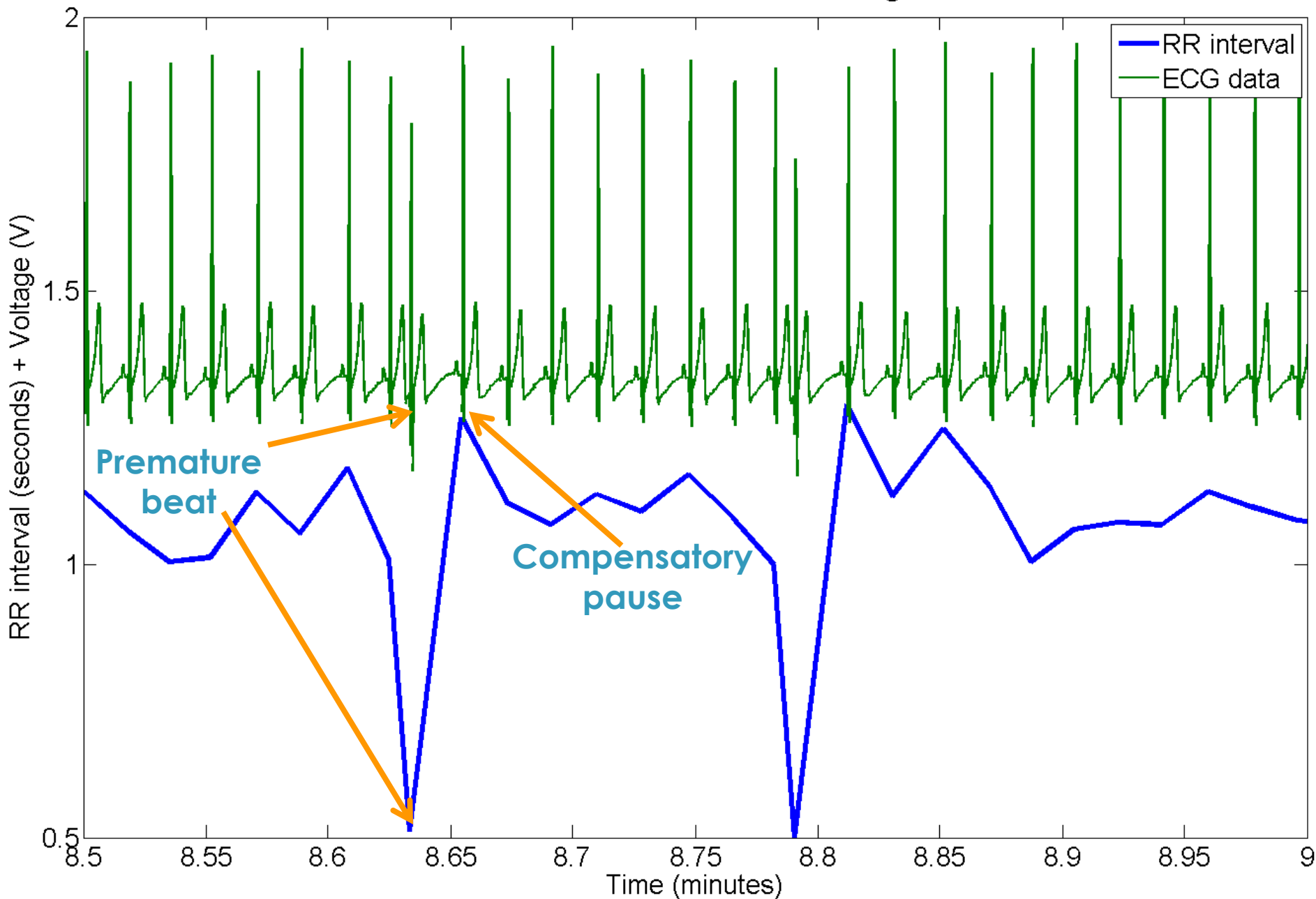
# RR interval - night 1



# Premature atrial contractions - night 1

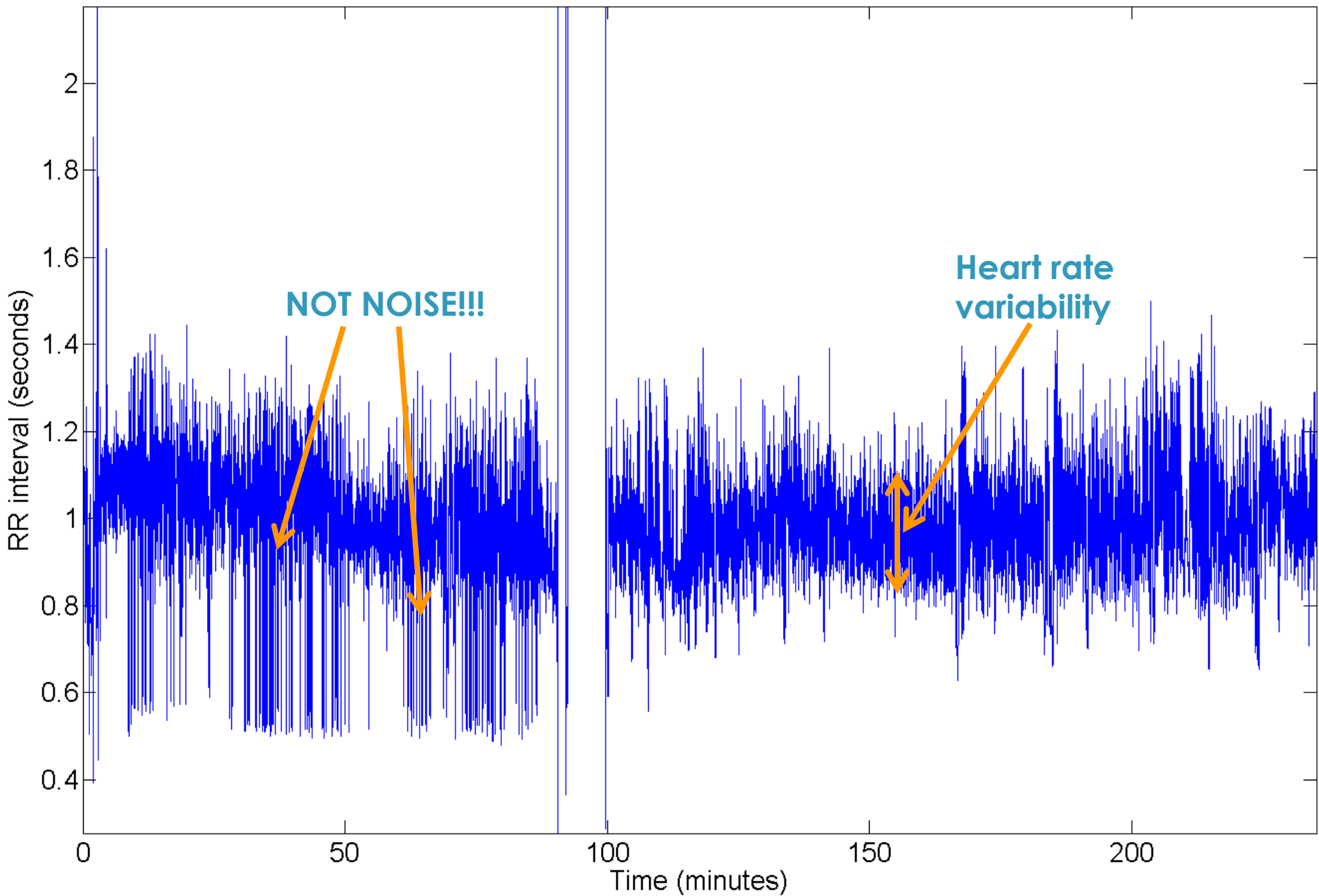


# Premature atrial contractions - night 1





# RR interval - night 1



**Lesson 3: ECG data  
reveals Premature  
Atrial Contractions,  
primarily during sleep.**

# Takeaways

# **Other cool stuff:**

- HRV**
- Resp. rate**
- CV dynamics**
- Trends over time**

# **Other cool stuff:**

- HRV**
- Resp. rate**
- CV dynamics**
- Trends over time**

# **ECG and Activity Monitoring: what can we learn?**

Maggie Delano  
maggied@mit.edu  
@maggied