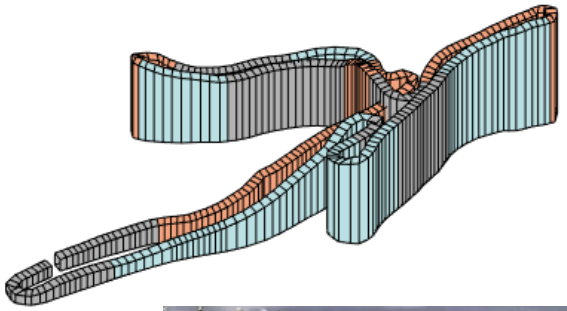
NTNU
Centre for Elite Sports Research

Norwegian University of Science and Technology

Using sensor technology to track performance in Para XC skiing: time well spent or time wasted?

Para XC skiing



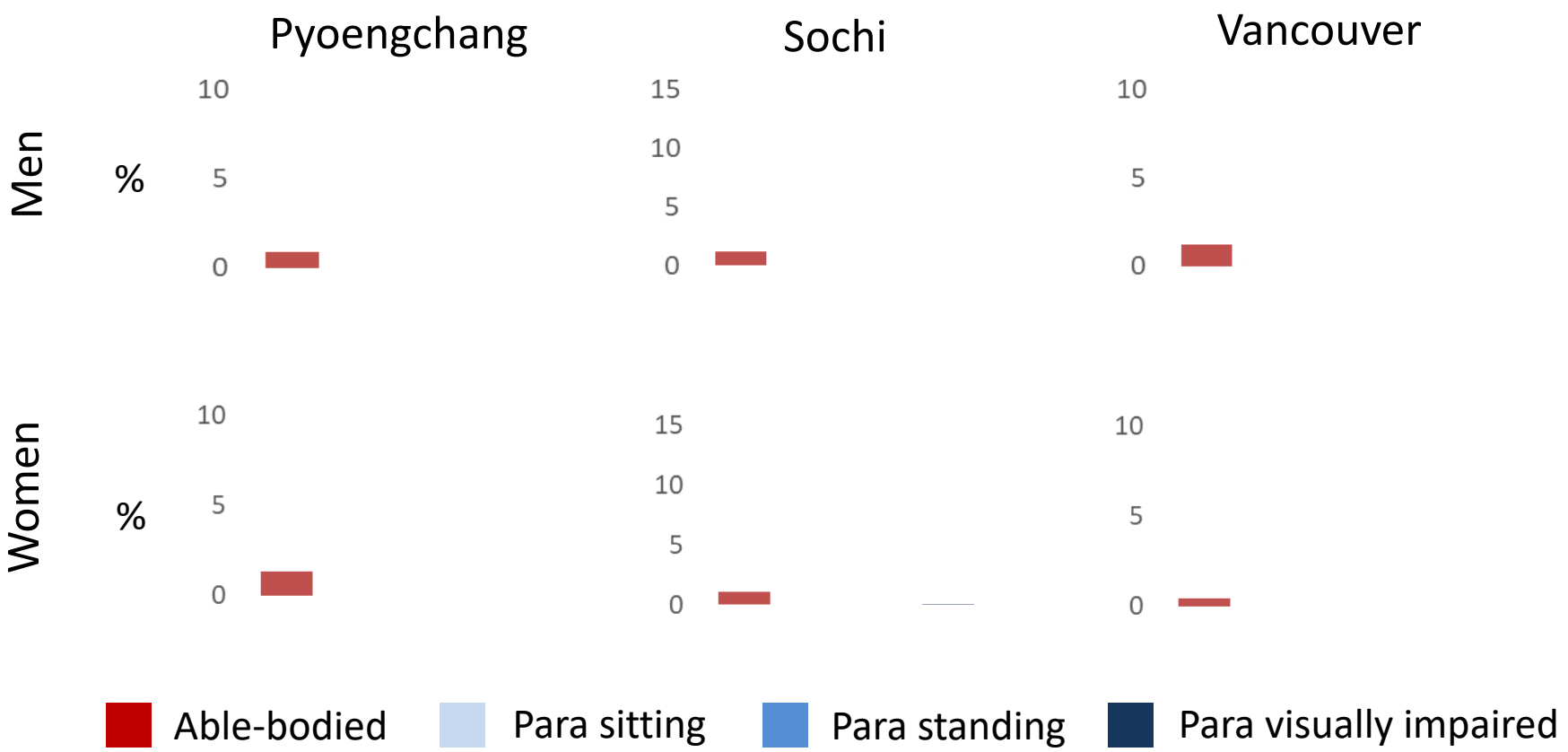
Varying race courses

- Terrain
- Speed
- Condition

Physically impaired sitting	
Class	**Classic**
LW10	86
LW10.5	89
LW11	93
LW11.5	95
LW12	100

*World Para Nordic Skiing Championship, Prince George 2019

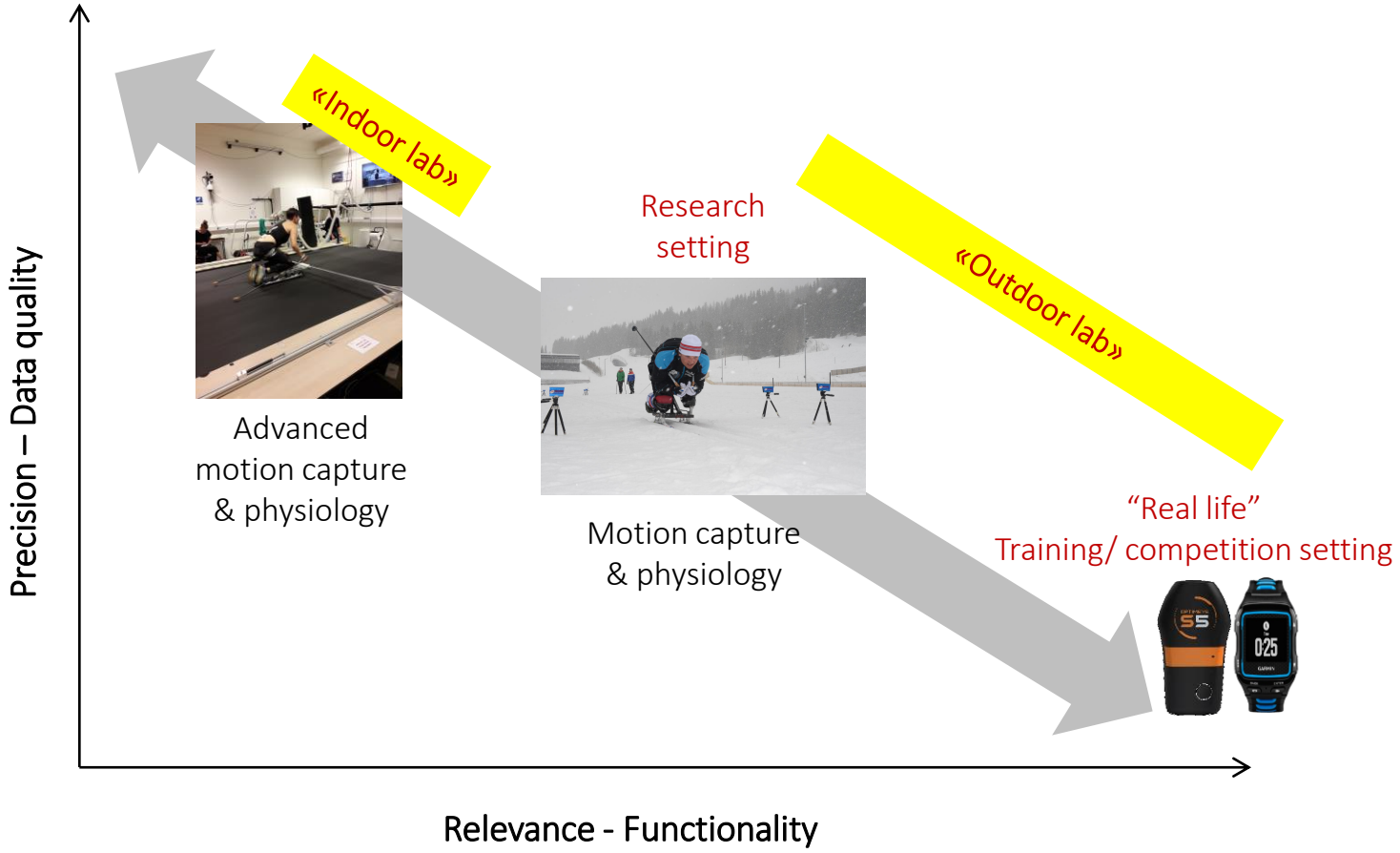
Difference between 1. and 2. place



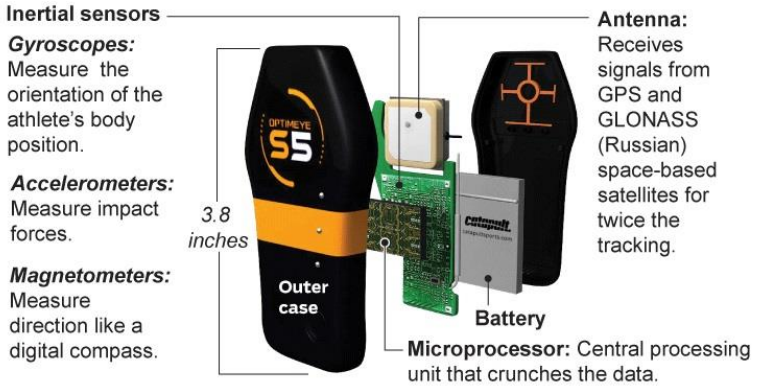
Overview of todays presentation

- Value of outdoor lab testing
- Sensor technology used
- Two examples from Para XC skiing
- Reflections – coach Norwegian Para XC skiing team
- Outlook in the future

Establishment of a scientific foundation



Sensors



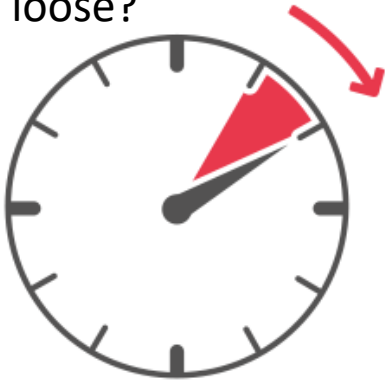
- ✓ 53 gram
- ✓ GPS: 10 Hz frequency
- ✓ IMU: 100 Hz frequency

GPS + IMU + HR

1.step

Determine difference in performance/time

How much time does Ola loose?



2.step

Determine cause of differences

Why does Ola loose time?

3.step

Implementation to coaches and athletes

Get Ola to understand!

Example 1

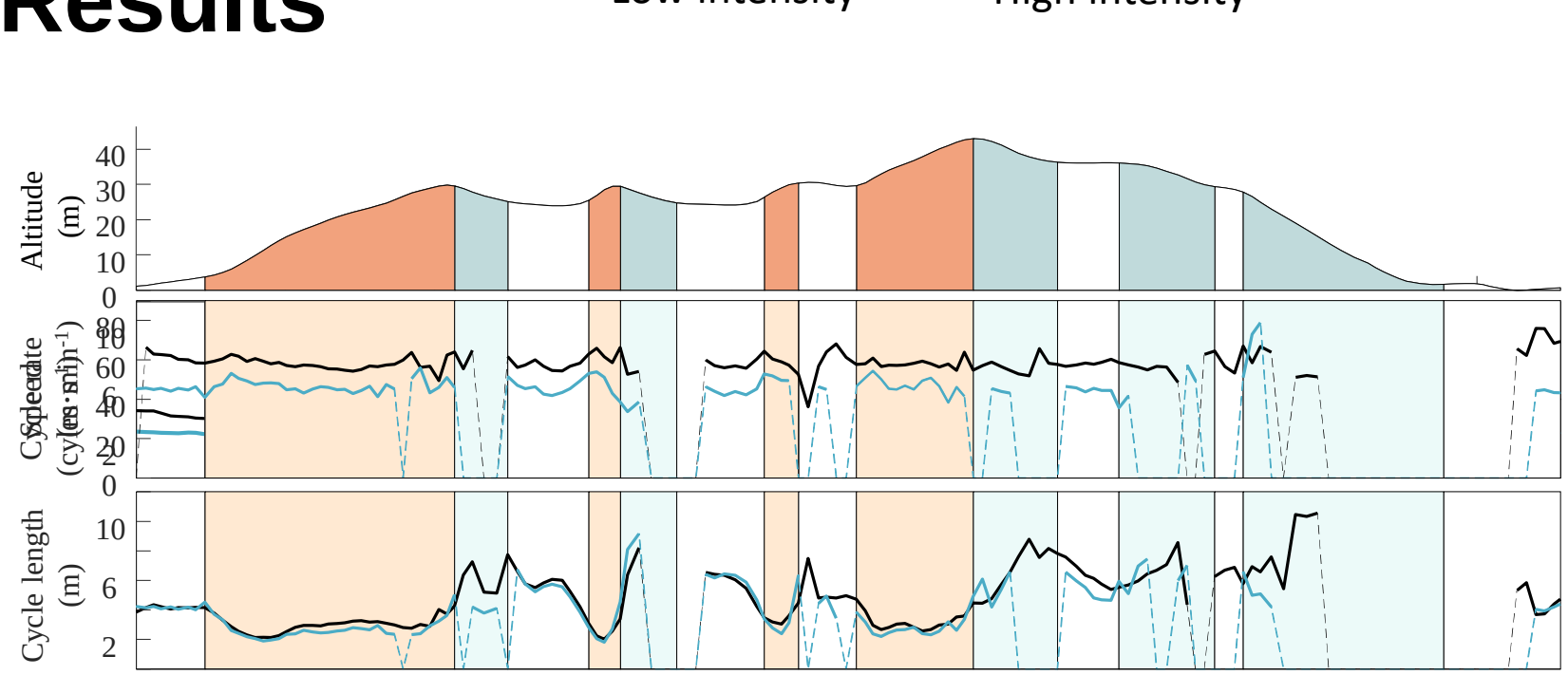
Comparison standing Para vs able-bodied XC skiers

Example 1 has been removed because of possible publication

Example 2

Para XC sit skiing

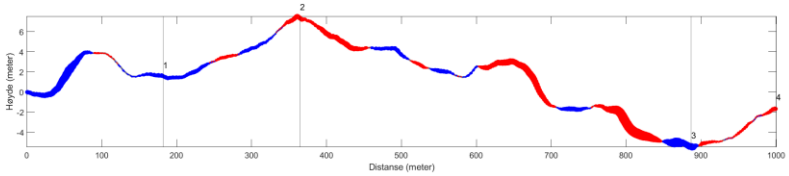
Results

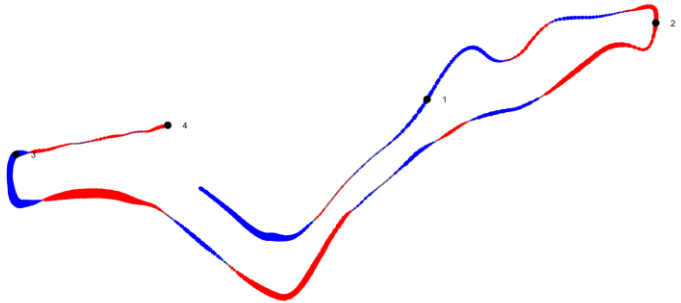


NTNU

Quick athlete feedback

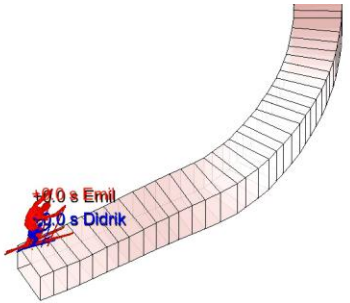
Quick athlete feedback - visualization





Blue faster

Red faster



VITENSKAPEN
BAK MEDALJEN

Reflections – Coach Para XC skiing

- Use of sensor technology very valuable during training and competitions
- Works best when feedback happens the same day
- Simplicity is sophistication
- Animations instead of graphs

Outlook in the future

Team

Jan Kocbach
Algorithm & software guy

Julia Baumgart
Project coord. Para SenTIF

Cecilia Severin
Researcher Para

Camilla Carlsen
PhD candidate Para XC skiing

Gertjan Ettema
Professor & Manager SenTIF

Øyvind Sandbakk
Professor & Manager SenTIF

Roy Mulder
Staff Engineer

Pål Haugnes
PhD candidate XC skiing

Work in progress…

NTNU
Senter for toppidrettsforskning

NTNU Senter for Toppidrettsforsking

@toppidrettsforskning

www.ntnu.no/toppidrettsforskning