

## 1 INTRODUCTION

- With the increase in cycling popularity, bike handling gains crucial importance to avoid falling off the bike, crashing into obstacles and to prevent injuries.
- It has been shown that people handle their bikes by steering and leaning, but no research has addressed the question on how can we improve it to cycle safer.
- The objective of my PhD is to examine what are the fundamental skills that people use to handle their bikes and how we can improve it to increase cyclist's safety on the road.



## 3 Study 1 - test protocol

- 12 cyclists and 12 non-cyclists were tested under three different conditions.

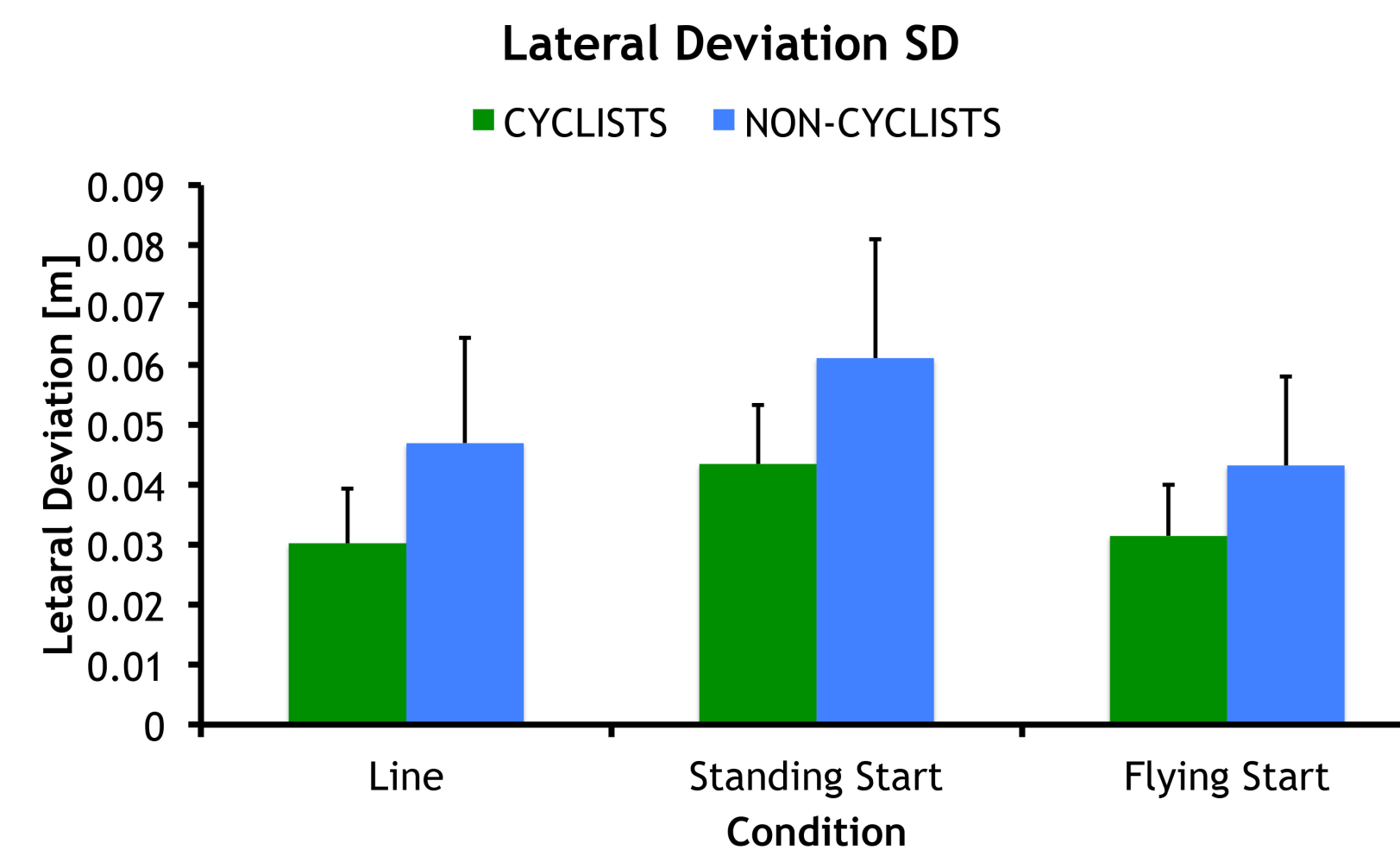


Figure 2: Lateral deviation of cycling for cyclists and non-cyclists at three different conditions (Line, following a line; Standing start, in the middle of the cycle lane from a standing start; Flying Start, in the middle of the lane from a flying start).

## 4 Study 2 - adjusting seat height

- 40 commuting cyclists were tested for bike handling at four different seat heights.

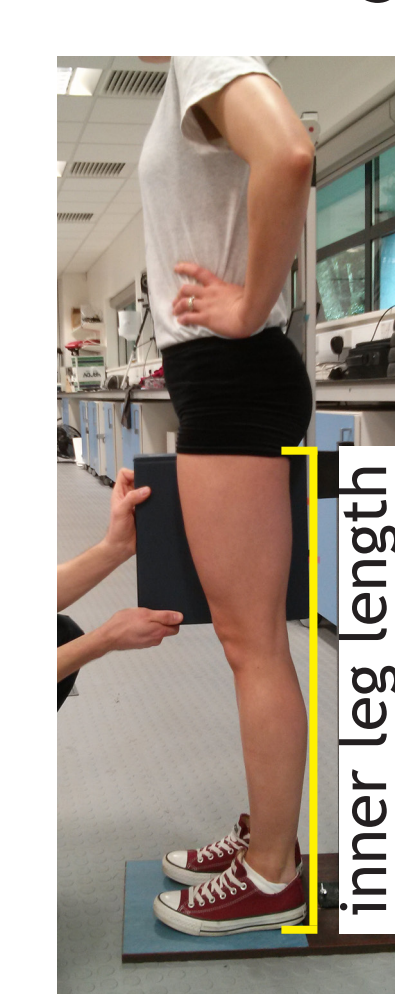


Figure 3: Inner leg length measurement to determine the initial seat height.

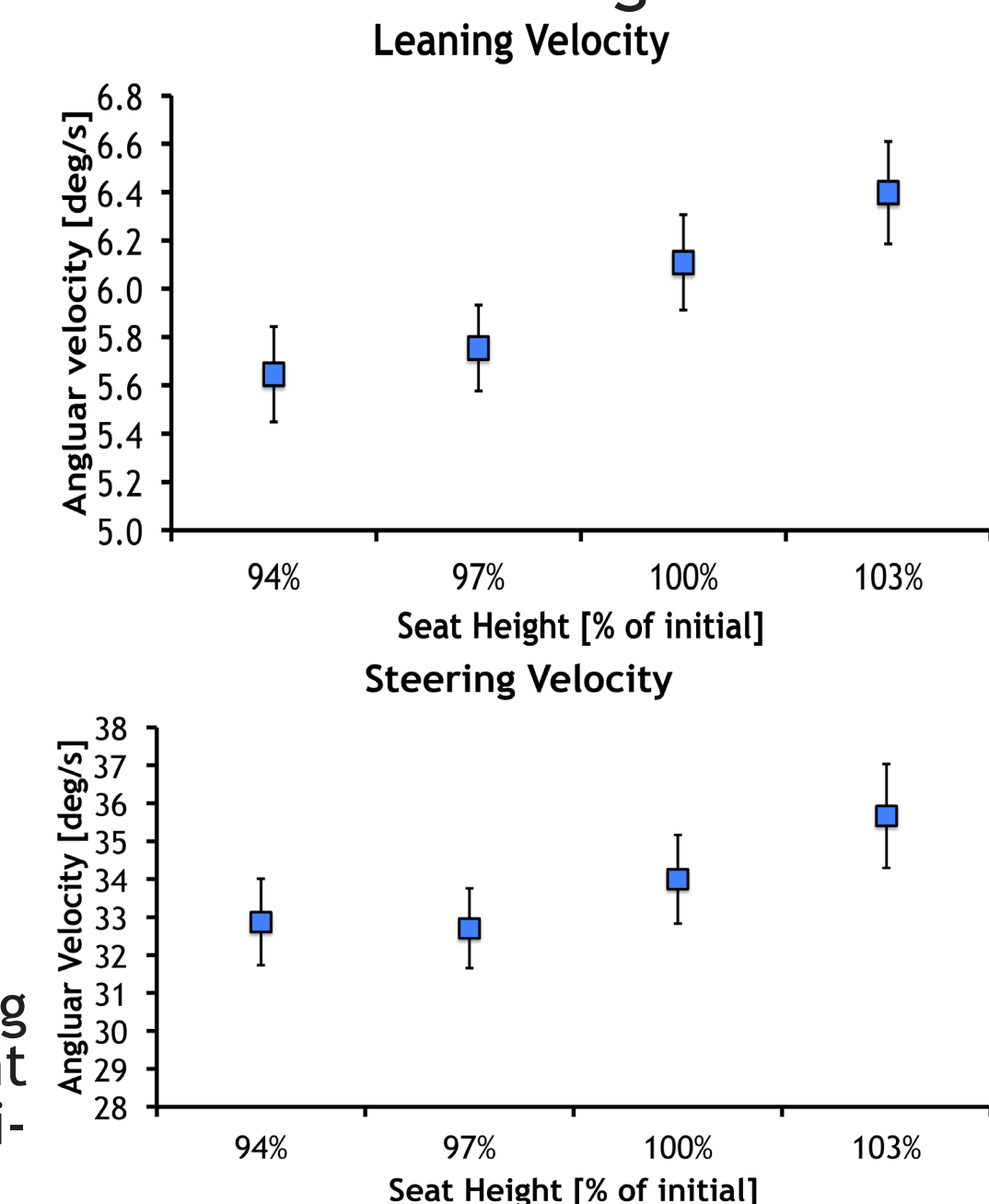


Figure 4: Leaning and steering velocity at different seat heights.

## 2 METHODS

- Participants are asked to ride in a straight line along a cycle lane.
- Cyclists' movement is being recorded with a 3D motion capturing system.

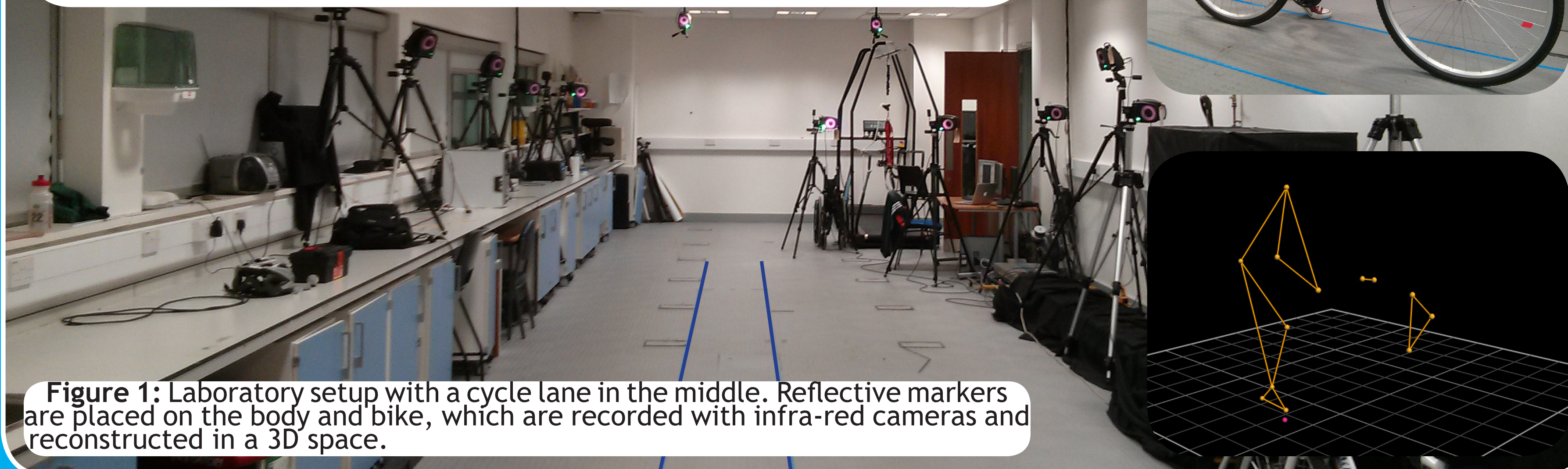


Figure 1: Laboratory setup with a cycle lane in the middle. Reflective markers are placed on the body and bike, which are recorded with infra-red cameras and reconstructed in a 3D space.

## 5 CONCLUSIONS

- Riding a bike in a straight line from a standing start is a valid and reliable protocol to assess the level of bike handling skills.
- Adjusting the seat height lower as currently recommended improves bike handling and has important implications for road safety.

## 6 FUTURE RESEARCH

- Developing a device that would allow us to quickly assess one's level of bike handling skills in outdoor conditions. That would enable us to detect cyclists with an increased risk of getting themselves injured due to loss of control.