

# Experimental testing of motorcyclist kinematic behaviour for model validation

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**Director:**       **Schuller Erich**

**WP4 leader:**   **van Rooij Lex**

**Objectives and introduction**

**Experiments in lab**

**Interaction with other WPs & partners**

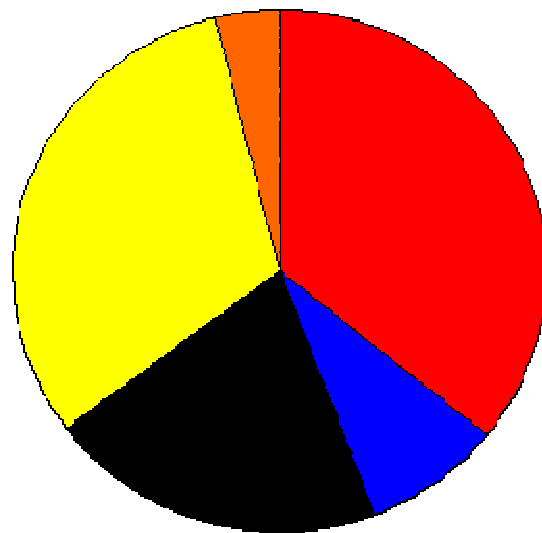
**Closing work and conclusions**

# Objectives

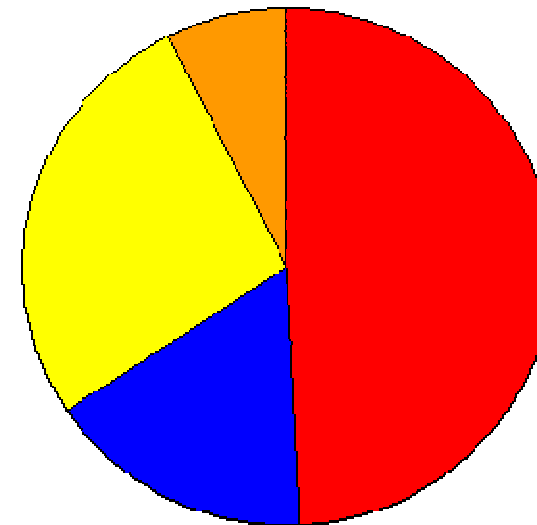
- Kinematics of motorcyclists in pre-crash phase and during the accident.
  
- Mechanisms behind injuries.
  
- New knowledge specifically for motorcyclists based on the current knowledge of car occupants and pedestrians.

# Introduction

NHTSA 1981

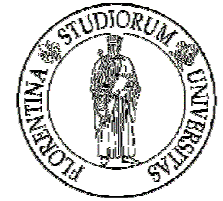


MAIDS 2003



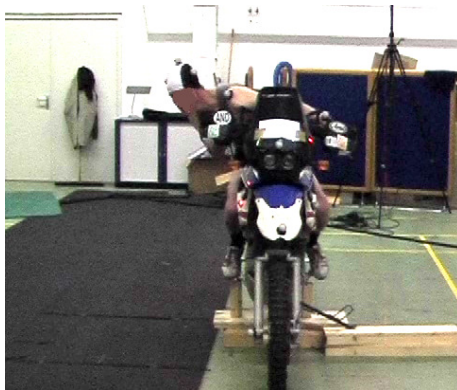
# swerve maneuver

Kinematic study with motion capture system

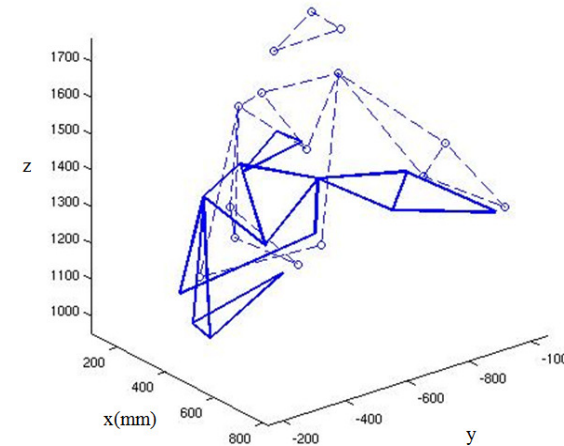
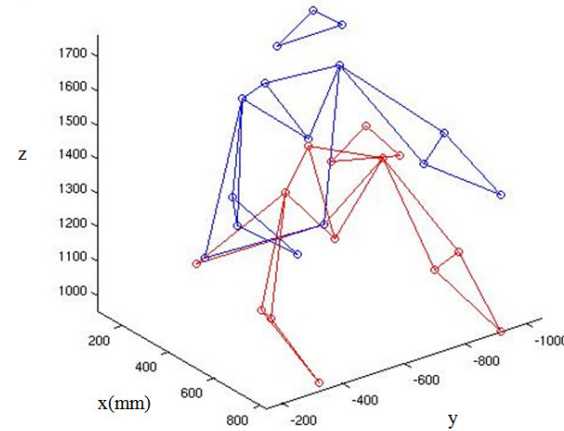
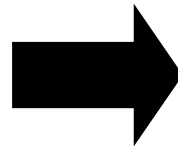


## Motorcycle types

- touring
- sport



Brenna et al.



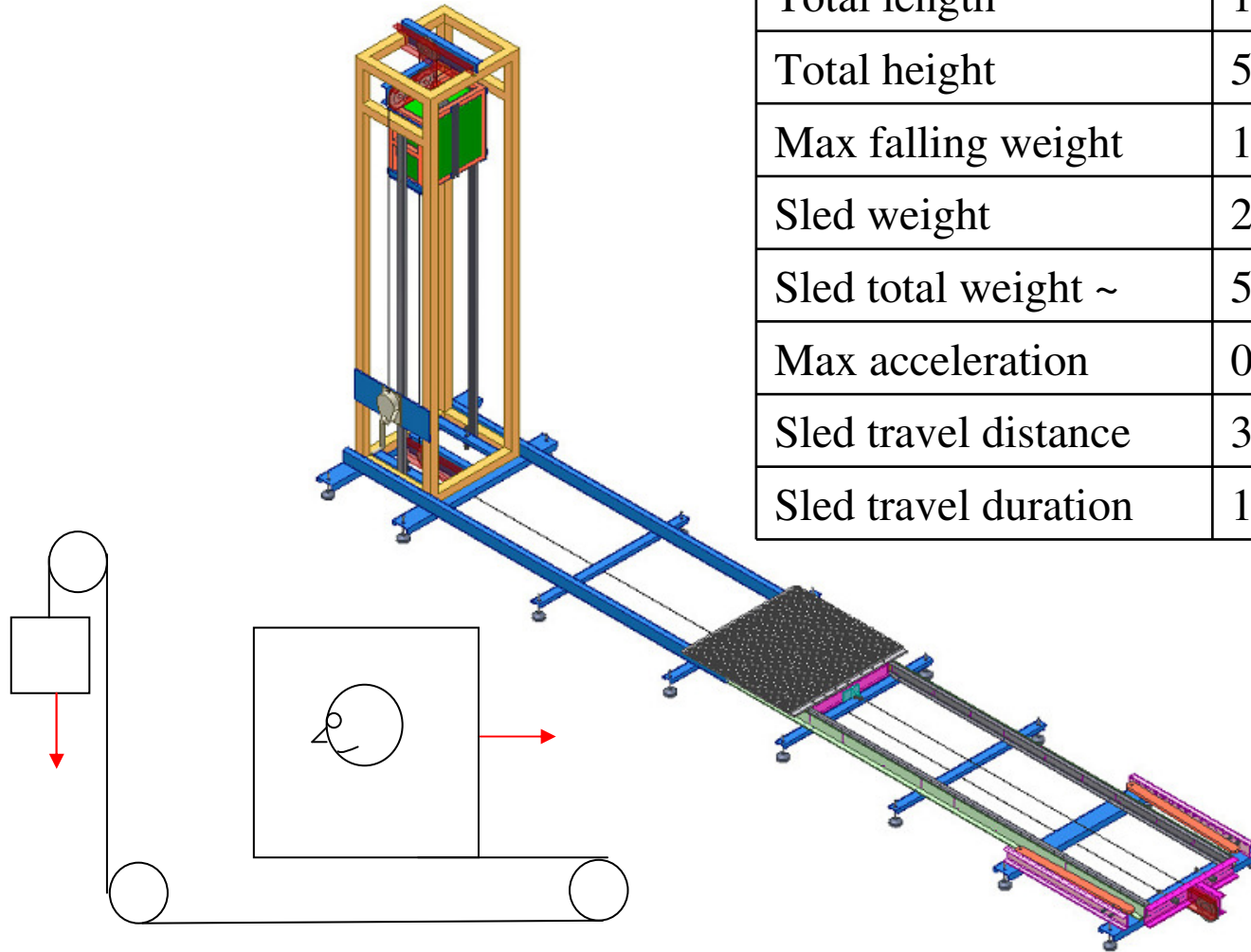
swerve

braking

real

# braking maneuver

|                      |             |
|----------------------|-------------|
| Total length         | 11 m        |
| Total height         | 5 m         |
| Max falling weight   | 1900kg      |
| Sled weight          | 250 kg      |
| Sled total weight ~  | 500 kg      |
| Max acceleration     | 0.79G       |
| Sled travel distance | 3 m (4.5 m) |
| Sled travel duration | 1.3-1.6 s   |



swerve

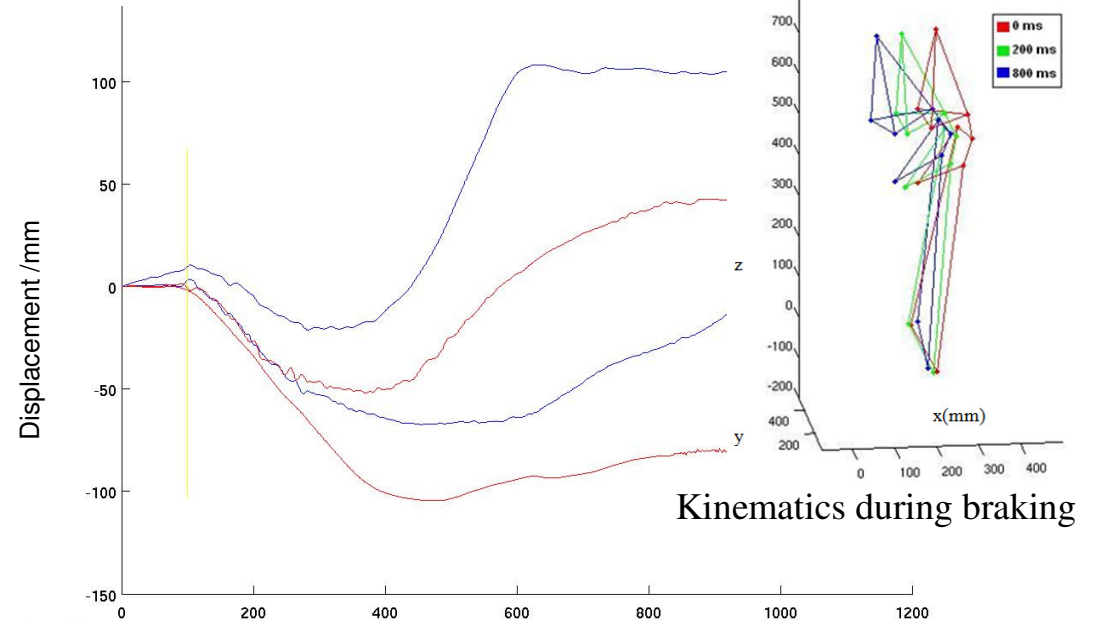
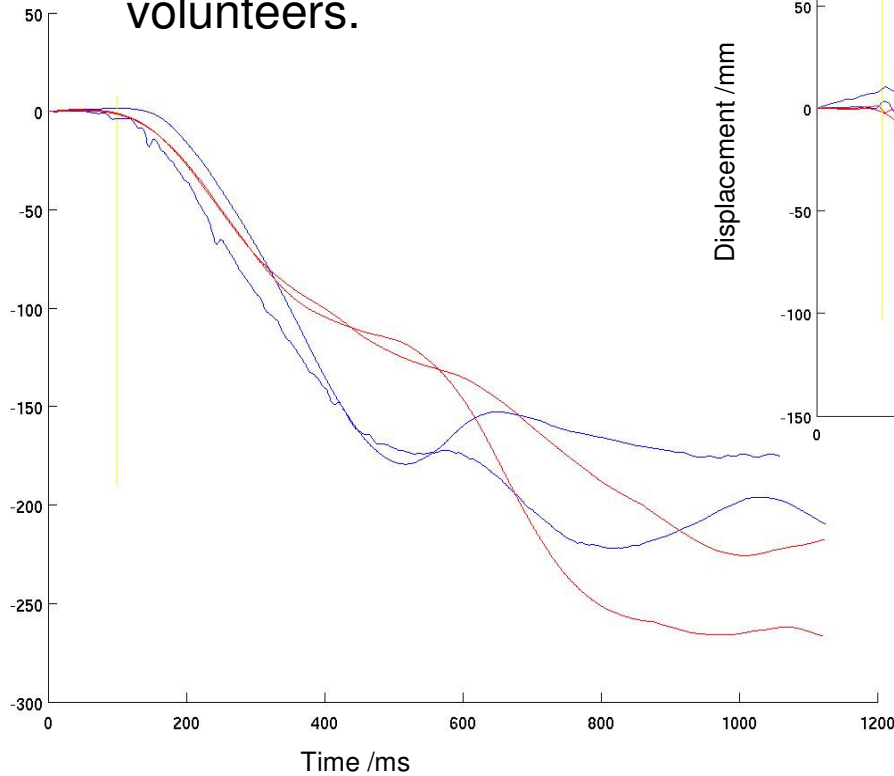
braking

real



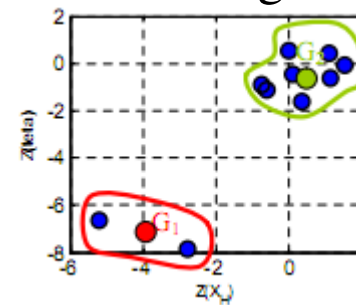
# braking maneuver

Sternum horizontal displacement during braking between different volunteers.

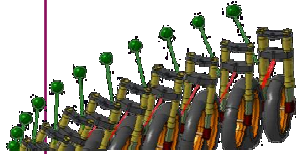


Kinematics during braking

## Clustering



T. Robert (Ph. D. Thesis)  
*Biomechanical analysis for the maintenance of standing equilibrium during horizontal acceleration of the contact surface*



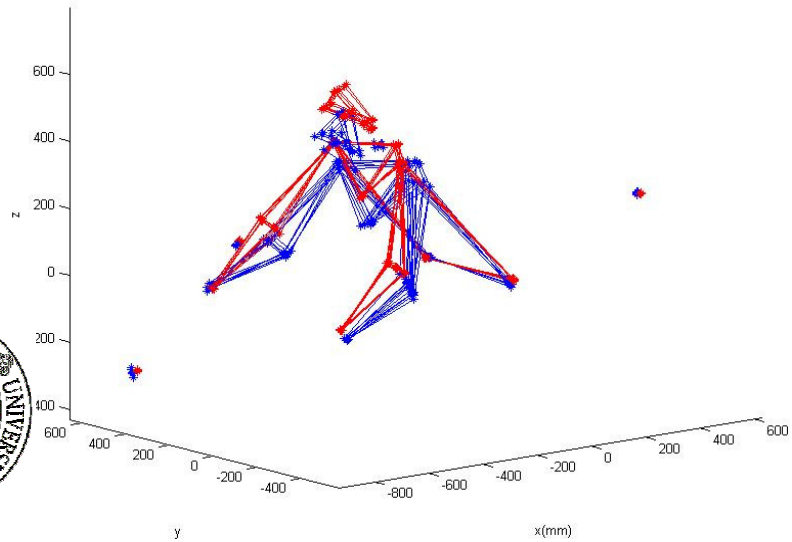
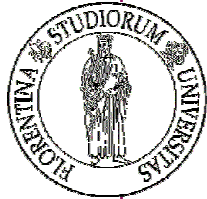
WP1 : Lateral motion of motorcyclists.



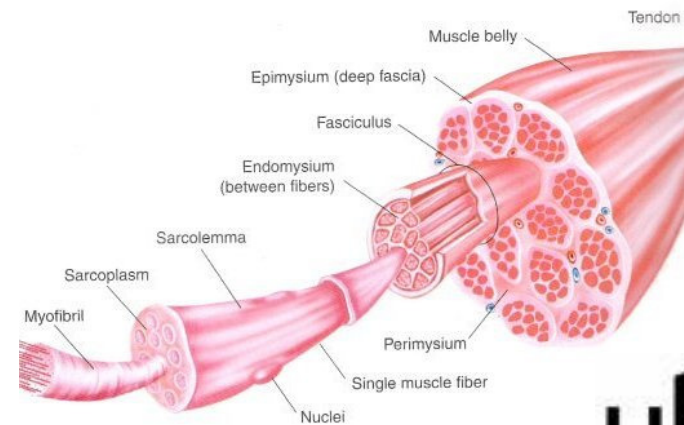
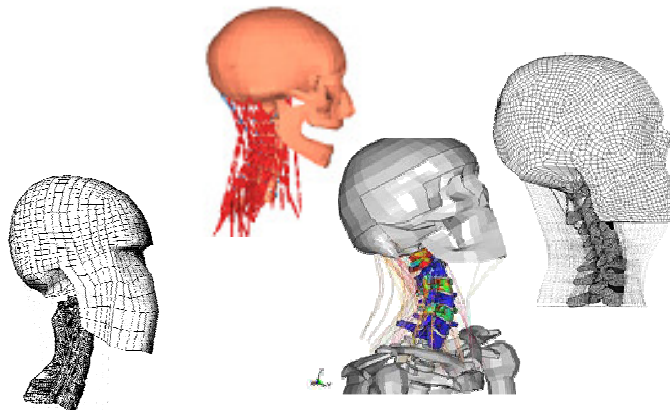
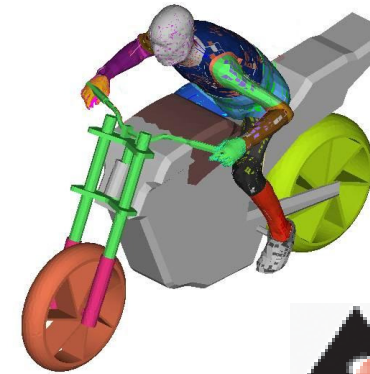
WP2a: Reaction time during braking with tactile warning.

WP2b: Reaction in visual-audio-tactile stimuli and combination of them.

# Interaction with other partners



/home/user/L/Desktop/20090706\_HUMOS\_positioned\_Yamaha-UNIFL\_ALTAIR\_results/YAMH2VID00  
Result: N/A  
N/A: Model Step  
N/A



# Closing work

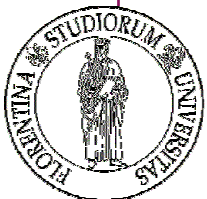
1. Results and the analysis method from the braking test with Nicolás
2. Analyze the results from the real world motorcycle test
3. Further study the results of the swerve manouevre UNIFI

February (1)

March (2&3)

April (2&3)

4. Write the thesis and publish results



# Conclusions

- Kinematics of motorcyclists' in pre-crash phase and during the accident.
- Mechanisms behind injuries.
- New knowledge specifically for motorcyclists based on the current knowledge of car occupants and pedestrians.

# Succes ermee!

