



OpenSim Workshop – Leuven
November 6-8, 2018

Welcome!

opensimworkshop.simcp.be

Agenda : November 6

8:30 – 9:00	Check OpenSim installation
9:00 – 9:30	Introducing faculty and participants <i>Friedl De Groote</i>
9:30 – 10:00	Musculoskeletal modeling in OpenSim - Use and application <i>Ilse Jonkers</i>
10:00 – 10:30	Data import, marker set definition, and scaling <i>Maarten Afschrift, Hans Kainz</i>
10:30 – 11:00	Coffee Break
11:00 – 13:00	<i>Work on your own project</i>
13:00 – 14:00	Lunch
14:00 – 14:30	Inverse Kinematics <i>Friedl De Groote</i>
14:30 – 16:00	<i>Work on your own project</i>
16:00-16:30	Coffee Break
16:30-17:00	Inverse Dynamics <i>Dario Cazzola</i>
17.00-18.00	<i>Work on your own project</i>
19.00- ...	<i>Course Dinner</i>

Agenda : November 7

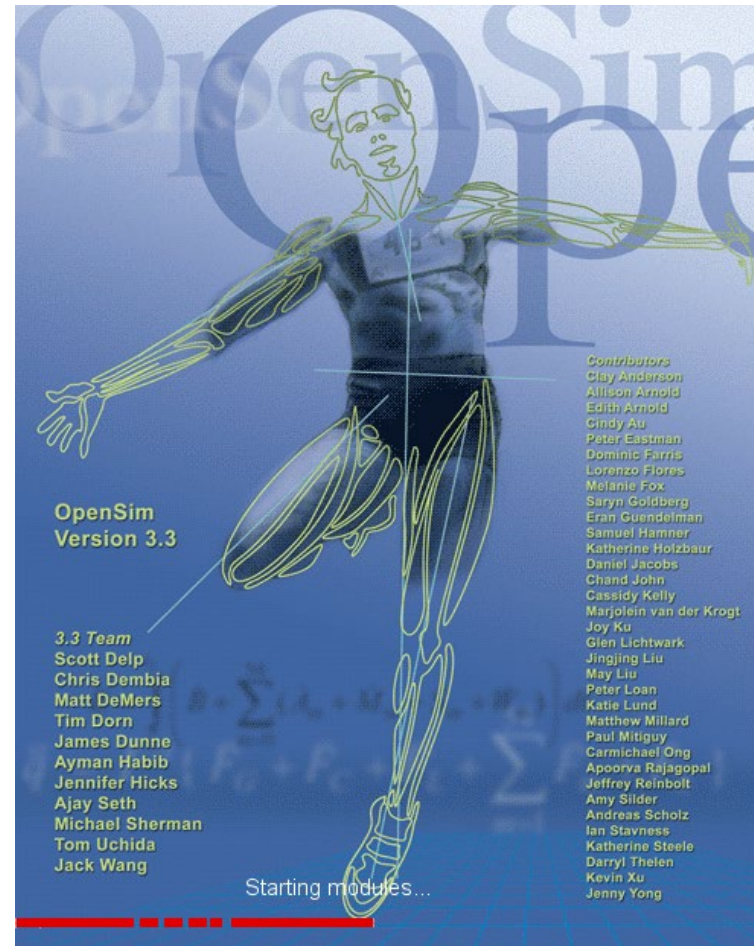
7:45 – 8:30	<i>Morning Run (meet in front of De Nayer)</i>
9:00 – 9:30	Residual Reduction Algorithm <i>Dario Cazzola</i>
9:30 – 11:00	<i>Work on your own project</i>
11.00 – 11:30	Coffee Break
11.30 – 12.00	Static Optimization <i>Luca Modenese</i>
12:00 – 13:00	<i>Work on your own project</i>
13:00 – 14.00	Lunch
14:00 – 14:30	Forward simulation <i>Colin Smith</i>
15:30– 16:00	<i>Work on your own project</i>
16:00-16:30	Coffee Break
16:30-17:00	Computed Muscle Control <i>Friedl De Groote</i>
17.00-18.00	<i>Work on your own project</i>
17.30-18.00	<i>Skype call with OpenSim team</i>

Agenda : November 8

7:15 – 8:00	<i>Morning Run (meet in front of De Nayer)</i>
8.30-9.00	Automating Opensim Processing <i>Luca Modenese</i>
9:00 – 9:30	Joint Reaction Analysis + Induced Acceleration Analysis <i>Luca Modenese, Mariska Wesseling</i>
9:30 – 11:00	<i>Work on your own project</i>
11:00 – 11:30	Coffee Break
11.30 – 11.45	About model/simulation validation <i>Colin Smith</i>
11:45 – 13:00	<i>Work on your own project</i>
13:00 – 14.00	Lunch
14:00 – 14:30	<i>Prepare your project presentation</i>
14:00– 15:30	<i>Participants' presentations (optional, but you can win prizes!)</i>
15:30-16:30	<i>SimCP Symposium</i>

The Workshop Software

OpenSim 3.3



Objectives for the Workshop

- Gain more insight in the Opensim workflow using your own motion capture data:
 - Learn the underlying theory, best practices, and troubleshooting tips for IK, ID, RRA and CMC through hands-on practice
 - Learn techniques for data management OpenSim in your own research
 - Become confident in your data workflow
- Achieve your project goals and share your results.
- Advance your research!

Getting the most out of the workshop:

- Set clear and manageable project goals
- Help each other
- Use your resources, workshop materials:
opensimworkshop.simcp.be
- Still need help? Find the right person to ask your questions
- Have fun and take breaks

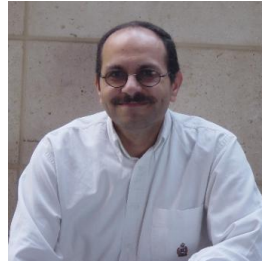
How we hope you will respond:

- Continue to use OpenSim in your research
- Develop musculoskeletal models and contribute them to the biomechanics community
- Use OpenSim in your teaching and contribute new teaching materials
- Add features to the software and share with others

OpenSim is a team of contributors:



Scott Delp



Ayman Habib



Jennifer Hicks



Jeff Reinbolt



Ajay Seth



Michael Sherman



Edith Arnold



Matt DeMers



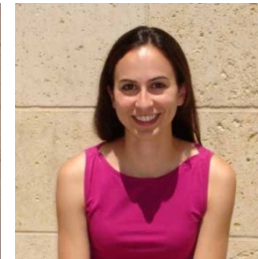
Sam Hamner



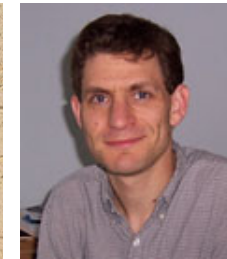
Chand John



Kat Steele



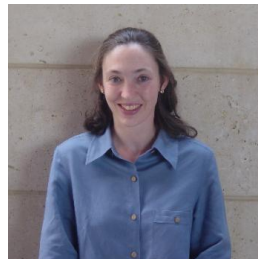
Melanie Fox



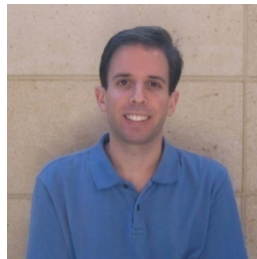
Peter Eastman



Clay Anderson



Allison Arnold



Eran Guendelman



May Liu



Peter Loan



Darryl Thelen



You!

Additional info

Internet

- eduroam
- guest account – ask for username at password at the registration desk

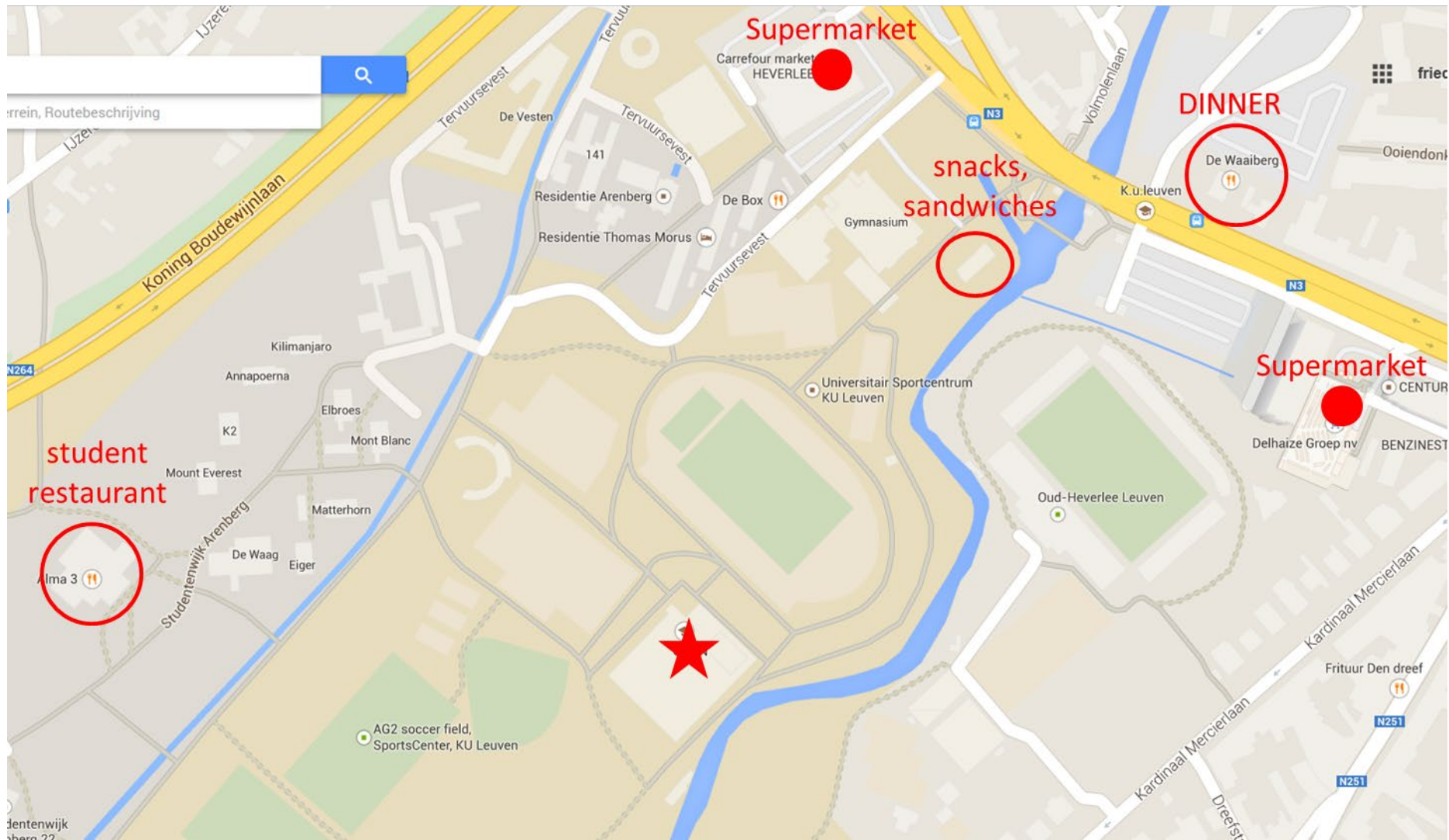
Lunch

Suggestion:

- Spuyse – sandwiches and snacks
- Alma – personnel/student restaurant
- Supermarkets (Carrefour and Delhaize walking distance)

Social Events

- 7pm Course dinner @ De Waaiberg
- Morning Runs



Faculty – Friedl De Groote

Assistant Professor
Human Movement Biomechanics Research Group
KU Leuven



2009: PhD in Mechanical Engineering (KU Leuven)
Visiting researcher at Stanford University (Scott Delp),
University of Florida (B.J. Fregly), Georgia Tech (Lena Ting)

Research Interest:

Development of computational models and methods to study human motion that are sufficiently accurate and numerically efficient to be used for outcome prediction of neuro-orthopedic treatments and rehabilitation/training programs.

Applications relate to:

- understanding interaction between biomechanics and neural control,
- investigating mechanisms of balance deficits in elderly,
- treatment of gait disorders (e.g. CP).

Goal is to:

Optimize clinical outcome and performance

Faculty – Ilse Jonkers

Professor
Human Movement Biomechanics Research Group
KU Leuven



2000: Phd in Rehabilitation Sciences (KU Leuven)
2000-2009: Postdoctoral Researcher (KU Leuven)
2004-2006: Visiting Scholar Stanford University

Research Interest:

I want to understand the neuromuscular constraints of gross motor function and relate gross motor function, joint and tissue loading to musculoskeletal adaptation.

Applications relate to:

- the understanding of joint and implant loading (UL&LL)
- the remediation of gait disorders in CP and stroke patients

Goal is to:

Optimize rehabilitation strategies and surgical interventions

Faculty – Maarten Afschrift

Postdoctoral researcher
Human Movement Biomechanics Research Group
KU Leuven



2018: PhD in Biomechanics (KU Leuven)

Research Interest:

Understanding the neuro-musculoskeletal mechanisms underlying human movement using a blended experimental and simulation approach

Applications relate to:

- Influence of aging on balance control
- Interaction between wearable robotic devices and muscle-tendon function

Goal is to:

Develop methods that can predict the effect of specific interventions on human movement

Faculty – Hans Kainz

Postdoctoral researcher
Human Movement Biomechanics Research Group
KU Leuven



2016: PhD in Biomechanics (Griffith University, Australia)

Research Interest:

Development and application of subject-specific neuro-musculoskeletal models and simulations with the aim to answer clinical questions.

Applications relate to:

Evaluate the impact of clinical interventions on the musculoskeletal system and identify causes for movement disorders.

Goal is to:

Improve clinical gait analysis and clinical decision-making in people with movement disorders

Faculty – Dario Cazzola

Lecturer in Biomechanics
Centre for the Analysis of Motion,
Entertainment Research & Applications
University of Bath



PhD in Human Physiology (Università degli Studi di Milano, Italy)

Research Interest:

Investigate the injury mechanisms in contact sports and understand the aetiology of spinal musculoskeletal diseases

Applications relate to:

- The analysis of cervical spine injury mechanisms in rugby
- Biomechanical assessment and prediction in Axial Spondyloarthritis
- Computer simulation of sprint running

Goal is to:

Inform real world interventions in sport settings and improve assessment of spinal musculoskeletal diseases

Faculty – Luca Modenese

Research Fellow

Department of Civil Engineering

Imperial College London



2013: PhD in Biomechanics (Imperial College London).

2013-2015 postdoc at Centre for Musculoskeletal Research, Griffith University.

2015-2017 postdoc at INSIGNEO Institute for in silico Medicine, University of Sheffield.

Research Interest:

Use of subject-specific musculoskeletal models from medical images in clinical and orthopaedics applications.

Applications relate to:

Identification of pathology and discrimination of clinical outcomes in musculoskeletal diseases.

Goal is to:

Improve clinical evaluation and surgical planning protocols.

Faculty – Mariska Wesseling

Postdoctoral researcher
Human Movement Biomechanics Research Group
KU Leuven



2015: PhD in Biomedical Science (KU Leuven)

Research Interest:

To study factors that affect joint loading and the subsequent effect on the tissue, to be able to determine the effect of interventions non-invasively.

Applications relate to:

Treatment of joint disorders (e.g. osteoarthritis)

Goal is to:

Determine the effect of interventions non-invasively

Faculty – Colin Smith

Postdoctoral researcher
Laboratory for Human Movement
ETH Zurich

2017: PhD in Mechanical Engineering
(University of Wisconsin-Madison, USA)



Research Interest:

Coupling dynamic imaging and musculoskeletal simulation to investigate knee joint mechanics during movement.

Applications relate to:

Osteoarthritis after soft knee tissue injury, total knee replacement, orthopedic treatments for crouch gait in cerebral palsy patients

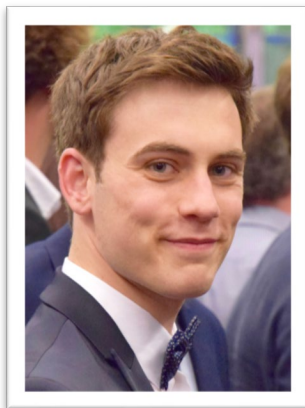
Goal is to:

Better understand the mechanisms governing joint mechanics during movement to inform surgical and rehabilitative treatments for joint pathologies

Additional Support (will have red name tags)



Wannes
Swinnen



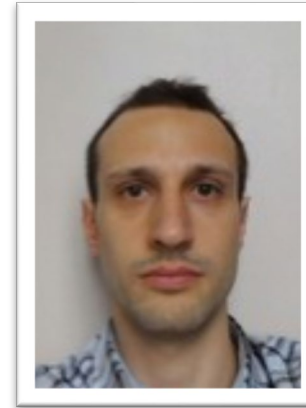
Thomas
Overbergh



Sanne
Vancleef



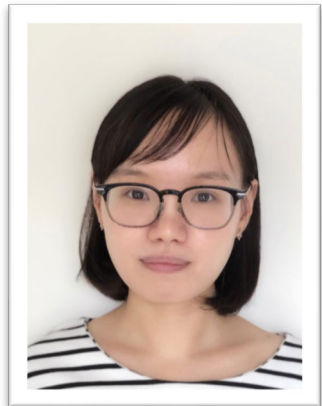
Dimitar
Stanev



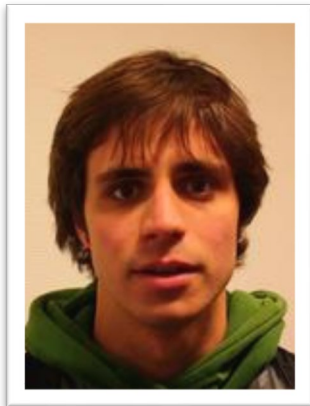
Lorenzo
Pitto



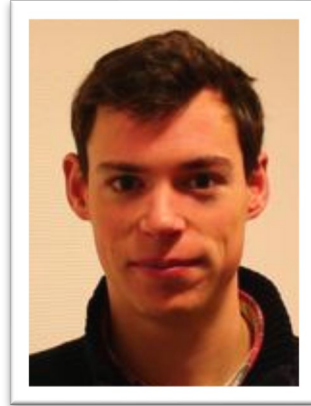
Azin
Zargham



Echo
Wang



Sam
Van Rossom



Antoine
Falisse



Tom
Van Wouwe



Hoa
Hoang