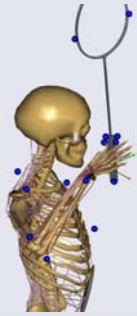


Easy use of Motion Capture Data

To fit your screen:
Sharing (upper right corner)->
View->Autofit



The web cast will
start in a few
minutes....

1. Making things move
2. Over-determinate kinematics in AnyBody
3. Parameter identification (individualization of the model)

Q&A session (~10 min)

Please follow the instructions to set up the audio:
www.anybodytech.com/fileadmin/downloads/AudioInstructionsWebEx.pdf

People



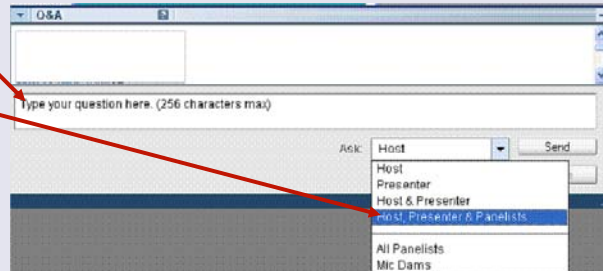
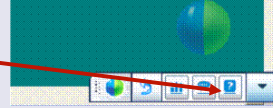
John Rasmussen
(Presenter)



Casper Gerner
Mikkelsen
(Host)

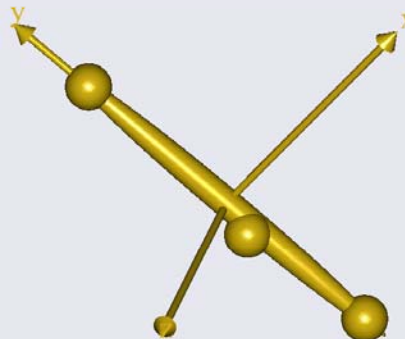
Q&A Panel

- Launch the Q&A panel here.
- Type your questions in the Q&A panel.
- Send the question to "Host, Presenter & Panelists"
- Notice the answer displays next to the question in the Q&A box. You may have to scroll up to see it.



1/3: Making things move (by mocap data)

- A rigid body segment has 6 dofs.
- A marker provides 3 constraints.
- But 2 markers are not enough for one segment.
- We need 3 markers per segment if no other constraints are present.
- 3 markers provide 9 constraints.
- So just a single segment model is already over-constrained when driven by mocap data.



Multiple segments

- If joint constraints are present, we need less markers.
- We need at least DoF/3 markers.
- Exactly how many we need is depends on the configuration.
- Wouldn't it be nice if we could just make sure we had enough?



2/3: New over-determinate kinematics in AnyBody version 4.1

- No limitation to any particular model.
- No limitation to any particular marker protocol.
 - The more, the merrier.
 - Markers on joint centers not required.
- Ability to use excess constraints for model scaling.

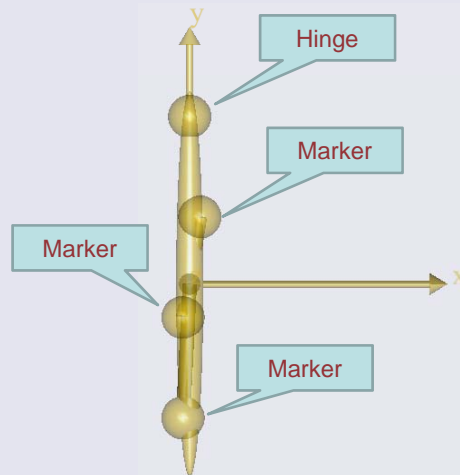
Two webcasts:

1. Today: How it works in version 4.1.
 - Simple example
 - Bottom-up definition
2. December 15th: How to use it in the lab.
 - Complex model
 - Top-down modeling

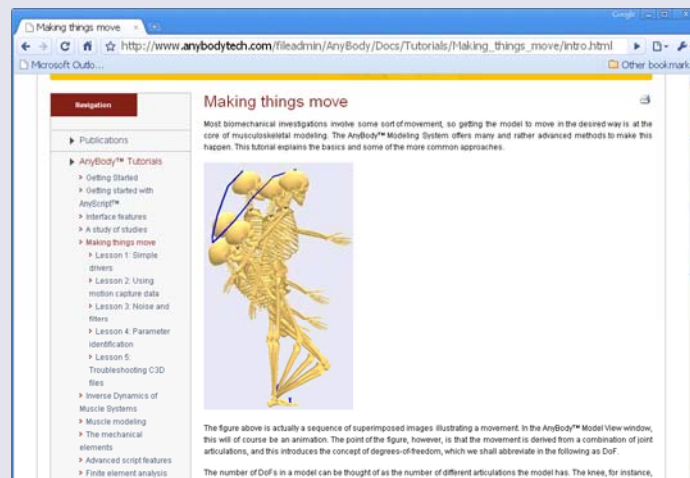
Appetizer:

<http://www.youtube.com/watch?v=JBGySqSAgo>

Pendulum Example

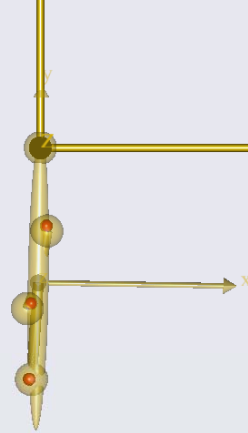


We roughly follow the tutorial



3/3: Parameter optimization

- Markers do not fit the segment points exactly:
 - Measurement errors
 - Skin artifacts
 - Alignment of markers
 - Segment lengths
 - Presumed joint positions
- Variations between
 - Test subjects
 - Trials with the same subject
- Idea: Use the redundancy of the constraints to identify parameters.



Andersen, MS, Damsgaard, M, Mac-Williams, B & Rasmussen, J 2009, 'A computationally efficient optimisation-based method for parameter identification of kinematically determinate and over-determinate biomechanical systems', Computer Methods in Biomechanics and Biomedical Engineering.

Things to observe

- | | |
|------------------------------------|---|
| 1. This was a very simple example. | 1. Exactly the same technology works on any model and any marker set. |
| 2. We did everything manually. | 2. We don't want to have to do a lot of manual setup. |

Automatic setup in AnyGait

- Two predefined models
 - Lower extremities only
 - Full body
- Predefined marker set(s)
- GCD output facility
- Predefined no. of optimization
- Easy modification to other setups.
- Processing of a new data set takes only a few minutes.



Peter Worsley University of Southampton



"When I have collected data for a new patient in the lab I am now half an hour away from a completed individualized musculoskeletal analysis. - And most of that time consists of moving data from my mocap system to my computer. The entire process is very user-friendly and there is little you have to set up manually."

Online resources

- www.anybodytech.com
 - The AnyBody Modeling System - free demo licenses
 - Webcast signup
 - New newsletter – user stories
- www.anybody.aau.dk The research project
- www.anyscript.org
 - User community
 - Open source library of body models and applications
 - List of publications.
 - Collaborative modeling project space.
 - Support.
 - Wiki section.

Thank you!
Q & A