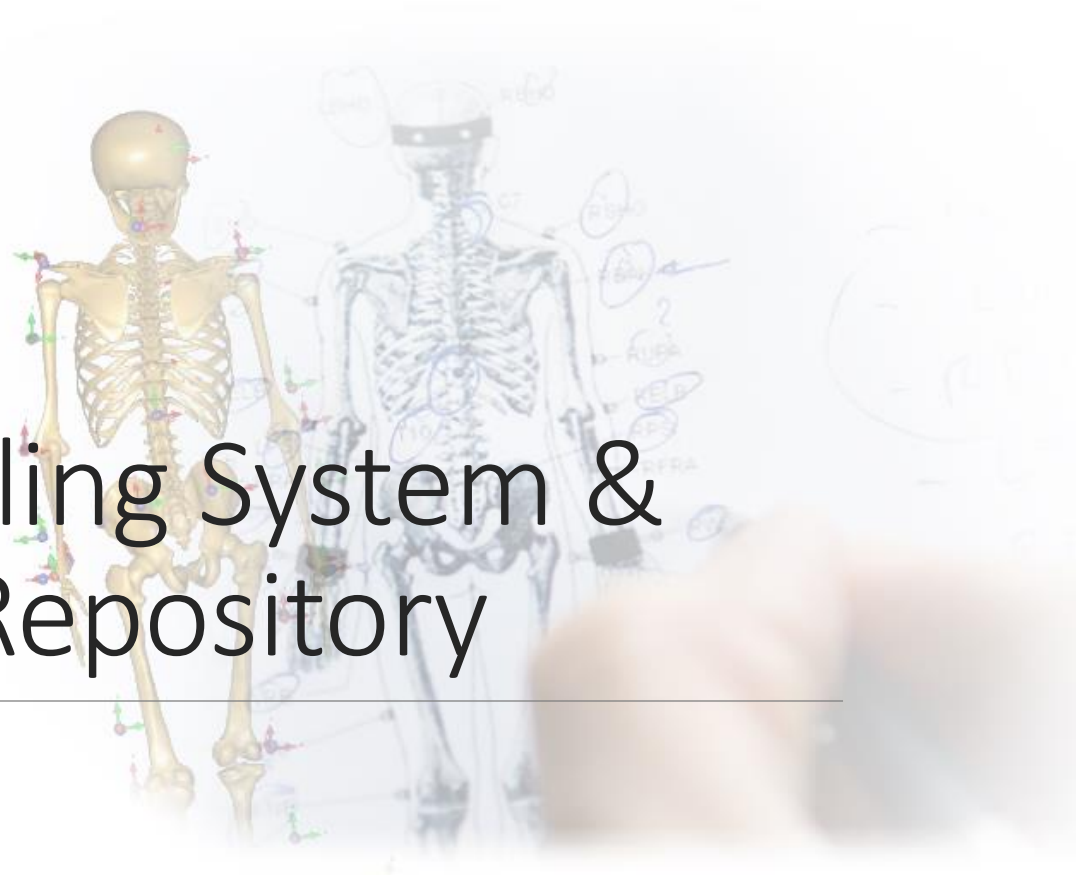
ANYBODY TECHNOLOGY

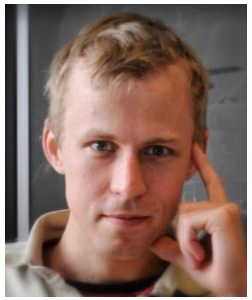


The new AnyBody Modeling System & Musculoskeletal Model Repository

TOUR AND OVERVIEW OF THE NEW 7.1 VERSION

Outline

- General introduction to the modeling system
- New features in the Modeling System
- New help resources and documentation
- New Model Repository (AMMR 2.0)
- Questions and answers



Morten Enemark Lund
R&D Engineer

Ananth Gopalakrishnan
Sr. Consultant, Ph.D

Musculoskeletal Simulation

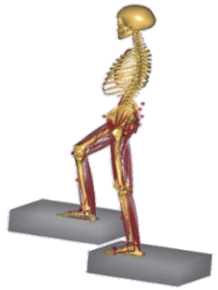
Motion data

Kinematics + Forces

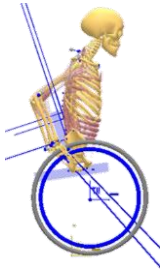
ANYBODY Modeling System

Body Loads

- Joint moments
- Muscle forces
- Joint reaction forces



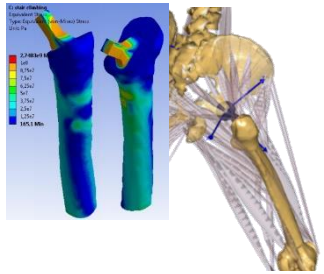
Movement Analysis



Product Design Optimization

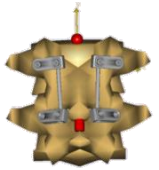
ANYBODY Modeling System

Ergonomic Analysis

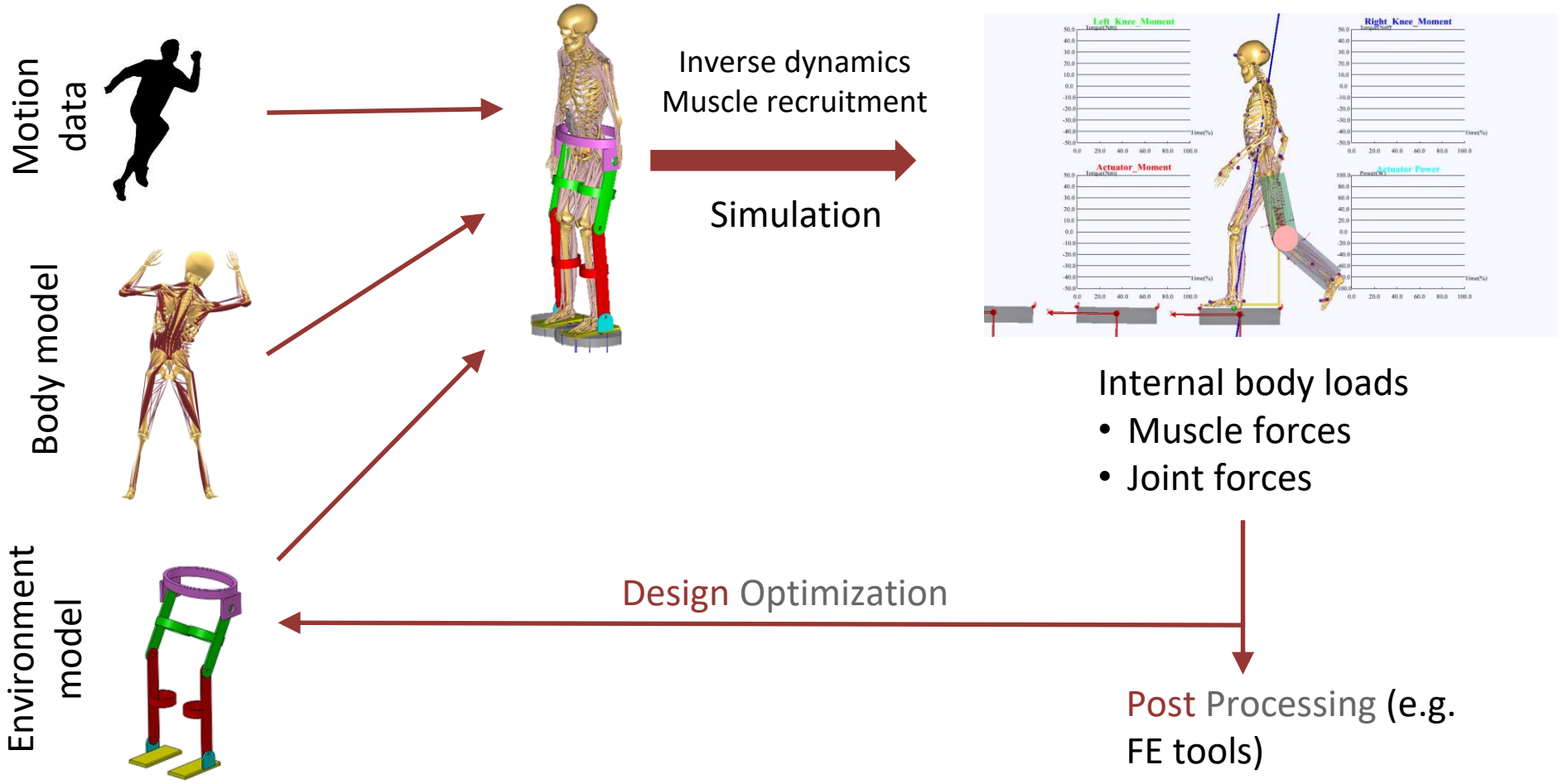


Load Cases for Finite Element Analysis

Surgical Planning and Outcome Evaluation

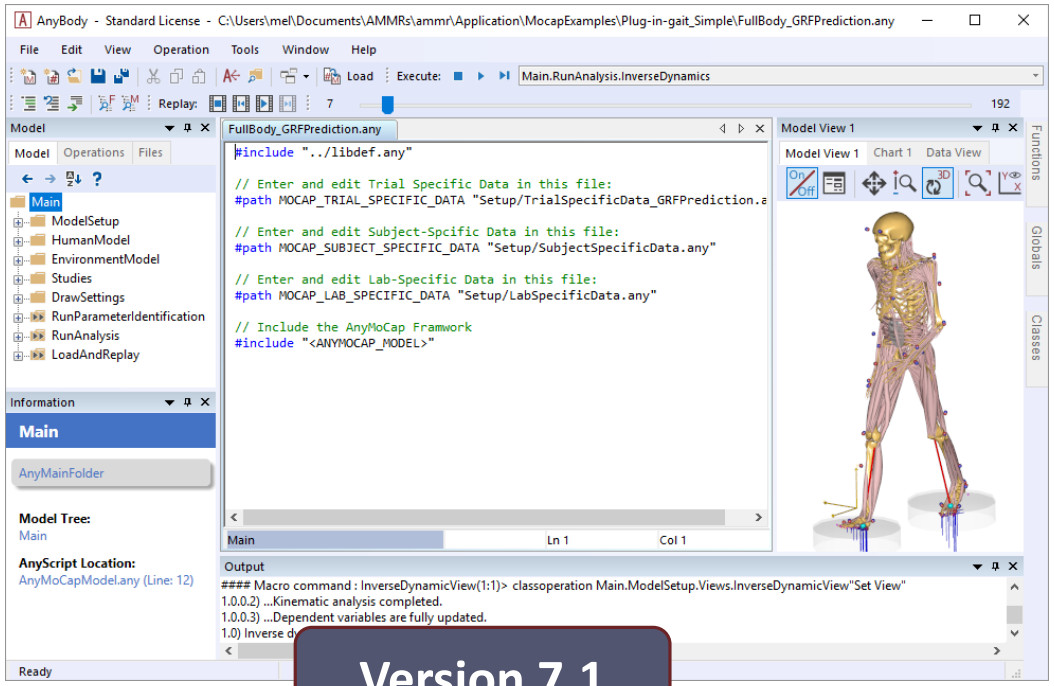


AnyBody Modeling System

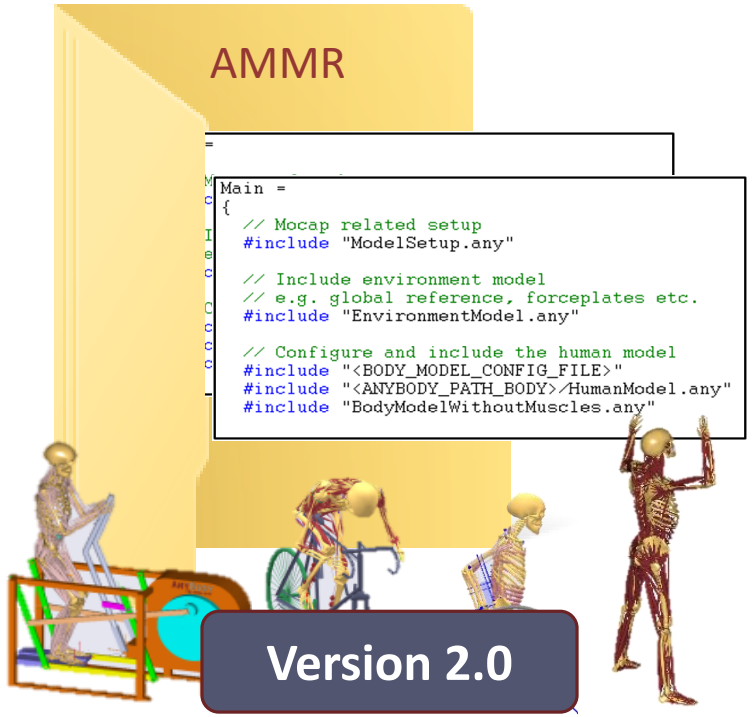


AnyBody Modeling System

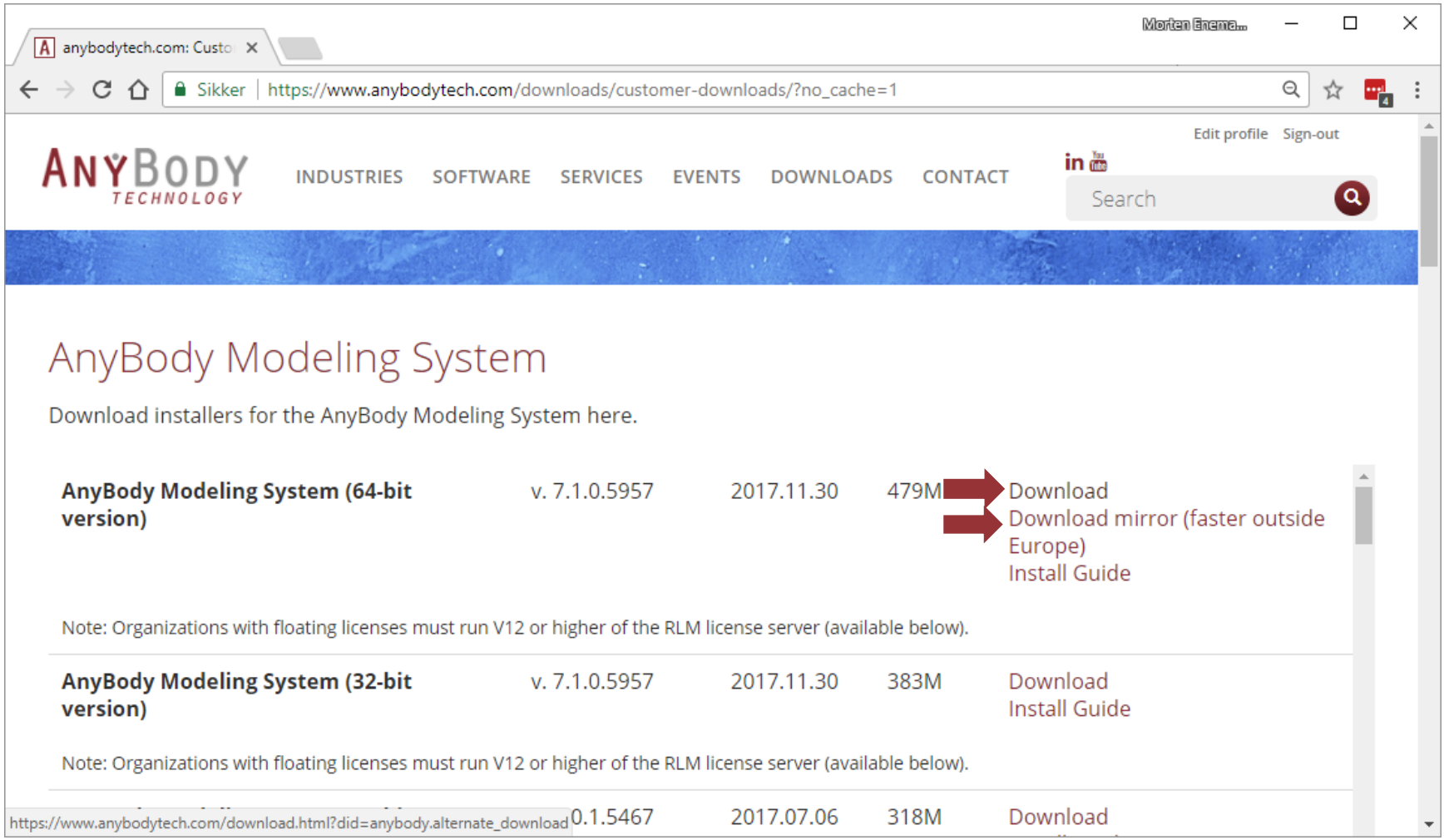
AnyBody Modeling System



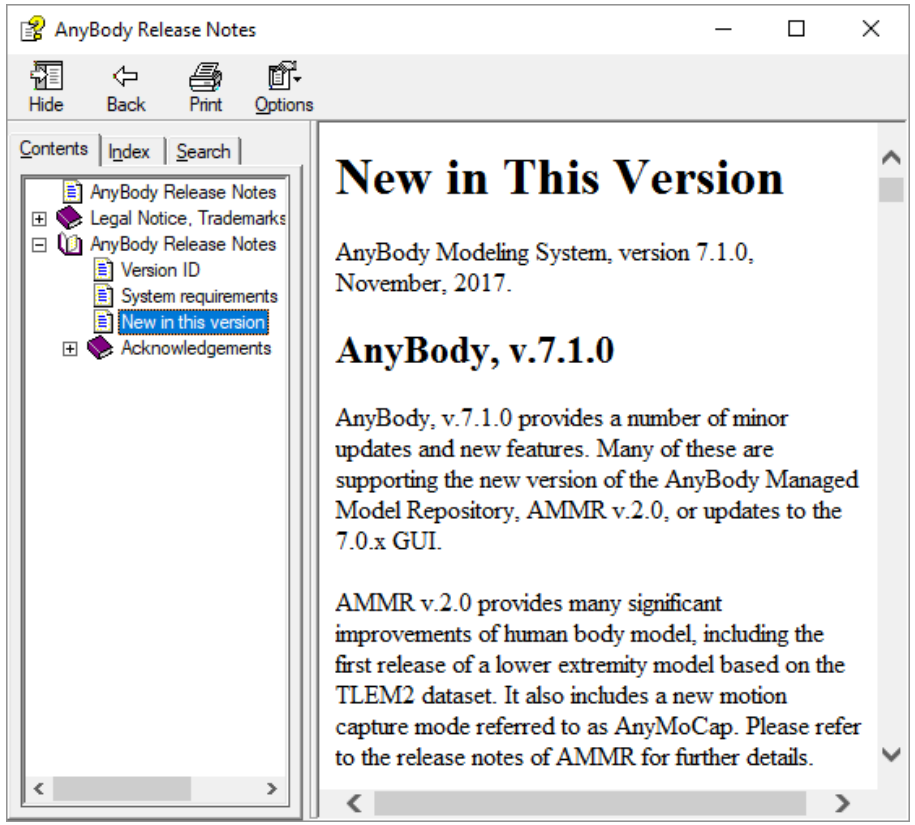
Model Repository

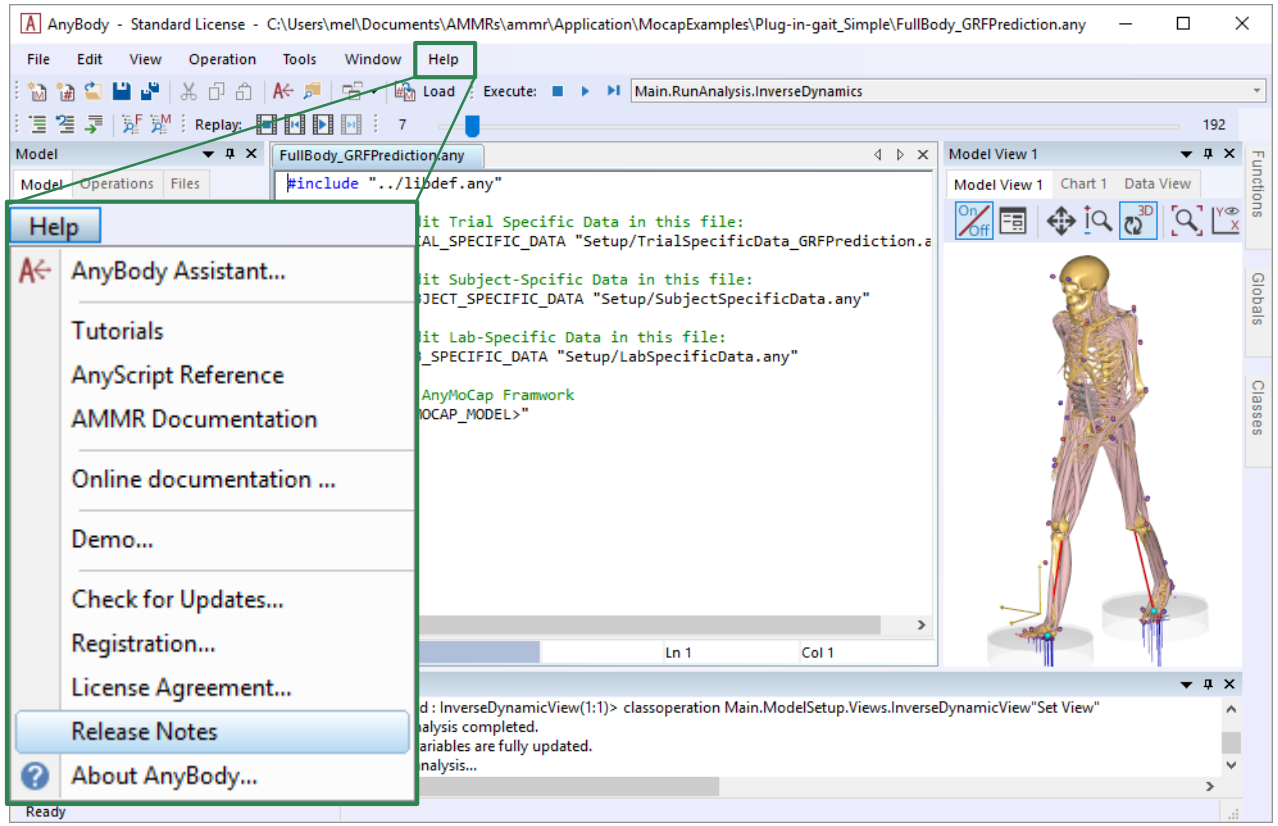


How to get the new version?



What is new?


AnyBody Release Notes
Hide
Back
Print
Options
Contents
Index
Search
AnyBody Release Notes
Legal Notice, Trademarks
AnyBody Release Notes
Version ID
System requirements
New in this version
Acknowledgements
New in This Version
AnyBody Modeling System, version 7.1.0, November, 2017.
AnyBody, v.7.1.0
AnyBody, v.7.1.0 provides a number of minor updates and new features. Many of these are supporting the new version of the AnyBody Managed Model Repository, AMMR v.2.0, or updates to the 7.0.x GUI.
AMMR v.2.0 provides many significant improvements of human body model, including the first release of a lower extremity model based on the TLEM2 dataset. It also includes a new motion capture mode referred to as AnyMoCap. Please refer to the release notes of AMMR for further details.


AnyBody - Standard License - C:\Users\mel\Documents\AMMRs\ammr\Application\MocapExamples\Plug-in-gait_Simple\FullBody_GRFPrediction.any
File
Edit
View
Operation
Tools
Window
Help
Load
Execute:
Main.RunAnalysis.InverseDynamics
Replay:
Model
Operations
Files
FullBody_GRFPrediction.any
#include "../libdef.any"
Model View 1
Chart 1
Data View
Help
AnyBody Assistant...
Tutorials
AnyScript Reference
AMMR Documentation
Online documentation ...
Demo...
Check for Updates...
Registration...
License Agreement...
Release Notes
About AnyBody...
Ln 1
Col 1
Ready
Functions
Globals
Classes

New in the Modeling System…

- 7.1 -> No major changes
- Many smaller bug fixes and improvements..
- Many tweaks to the user interface.
- Updates to muscle models
  - New/renamed members in `AnyMuscleModel`
    - Volume (Vol0) is now always present.
    - Some variables renamed (e.g. `Lfbar` to `Lf0`)
- New system for collecting mechanical objects in studies.

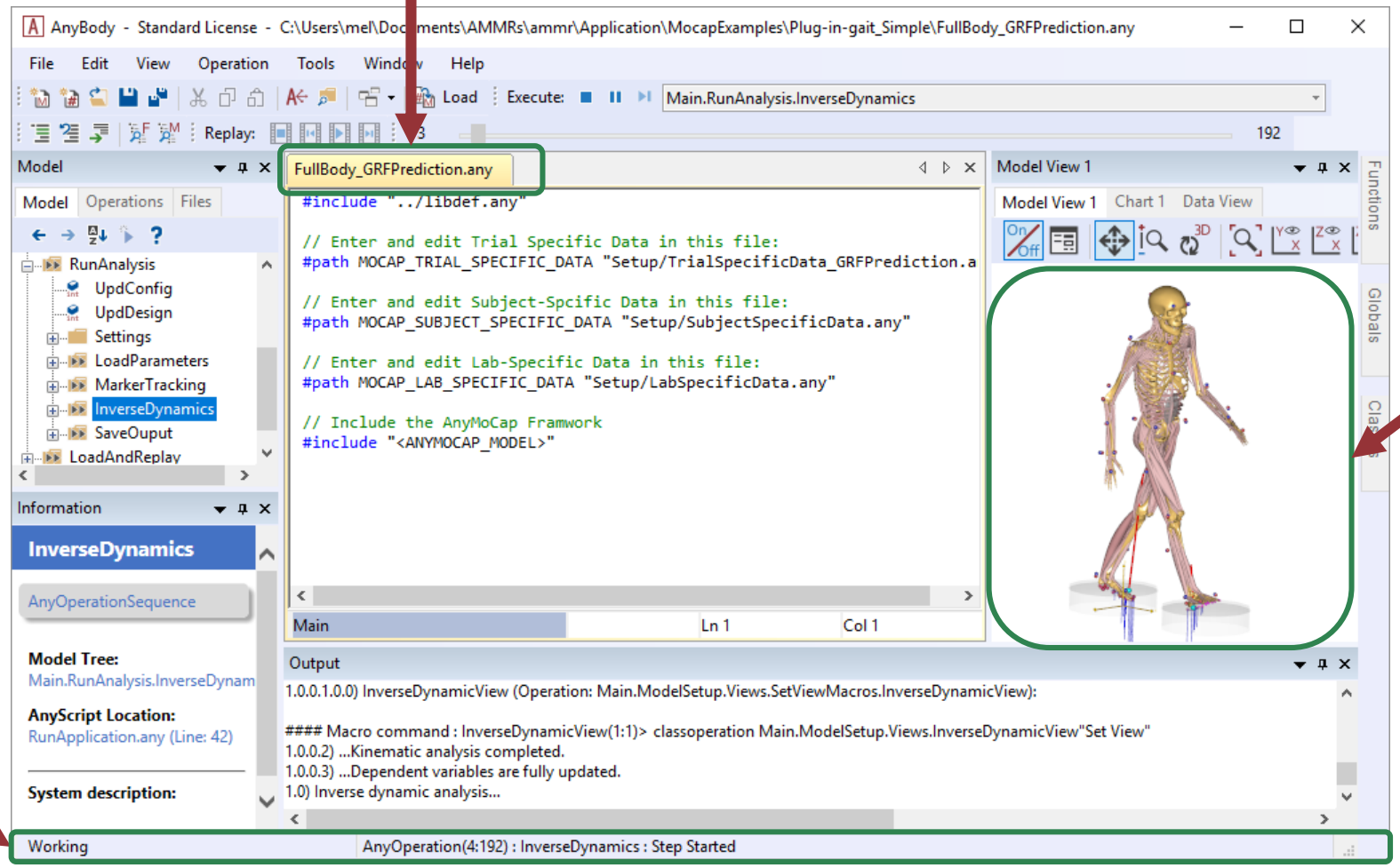
Preparation for future releases

- No influence on backwards compatibility
- May give warnings/notice when loading old models

WARNING(SYS4) : C:/U..s/mel/D..s/A..s/a..d/Body/A..n/L..M/MusPar.any(4058) : SoleusMedialis1Par.Lfbar : Deprecated Object/Member
Lfbar, Gammabar, and Espilonbar are deprecated objects. It is recommended to use Lf0, Gamma0, and Epsilon0, respectively.

UI updates and tweaks

Improved logic for editor tabs



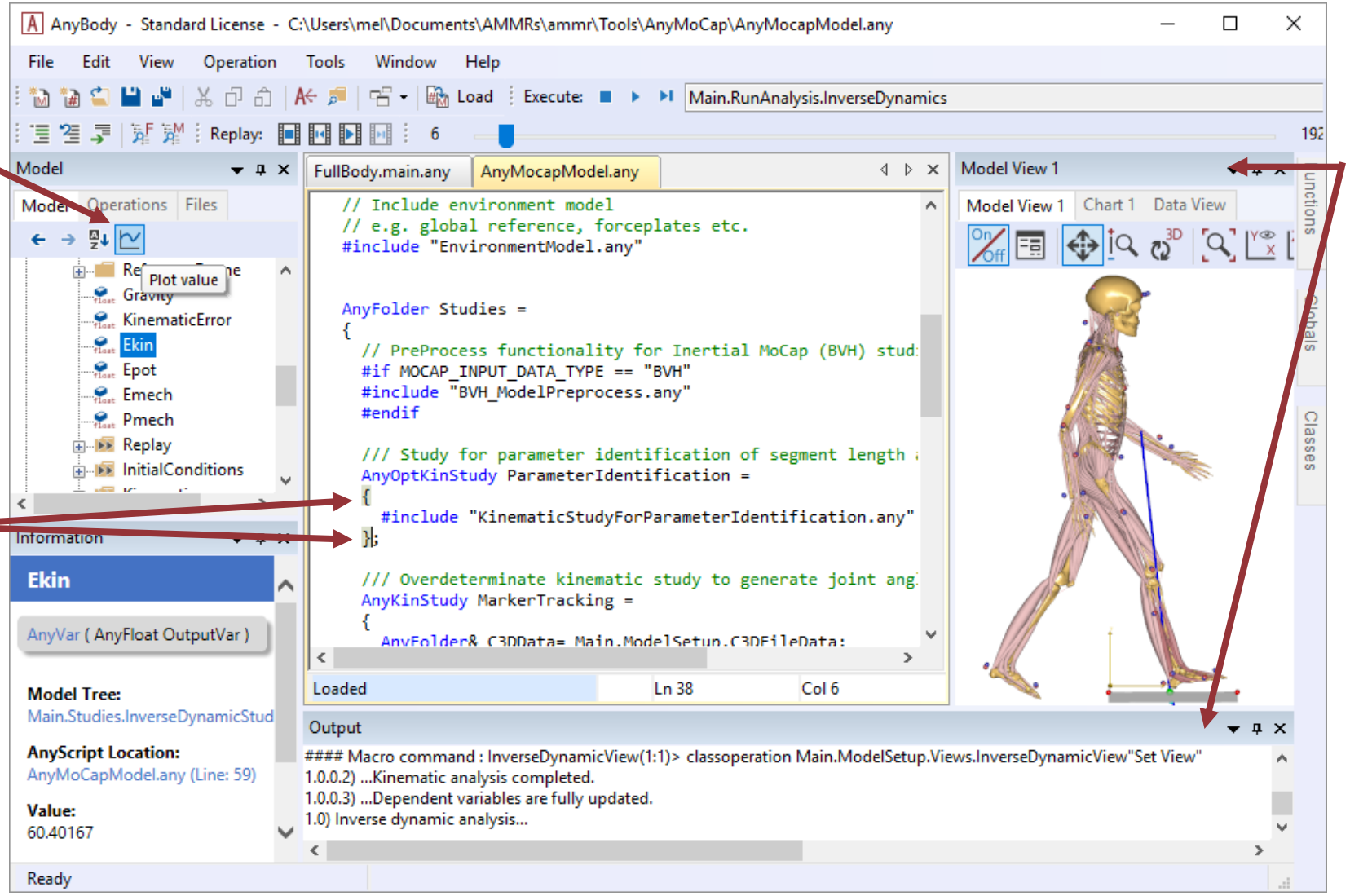
Faster graphics in model view.

New status bar

UI updates and tweaks

New button for plotting variables directly from the model tree

Highlight matching braces



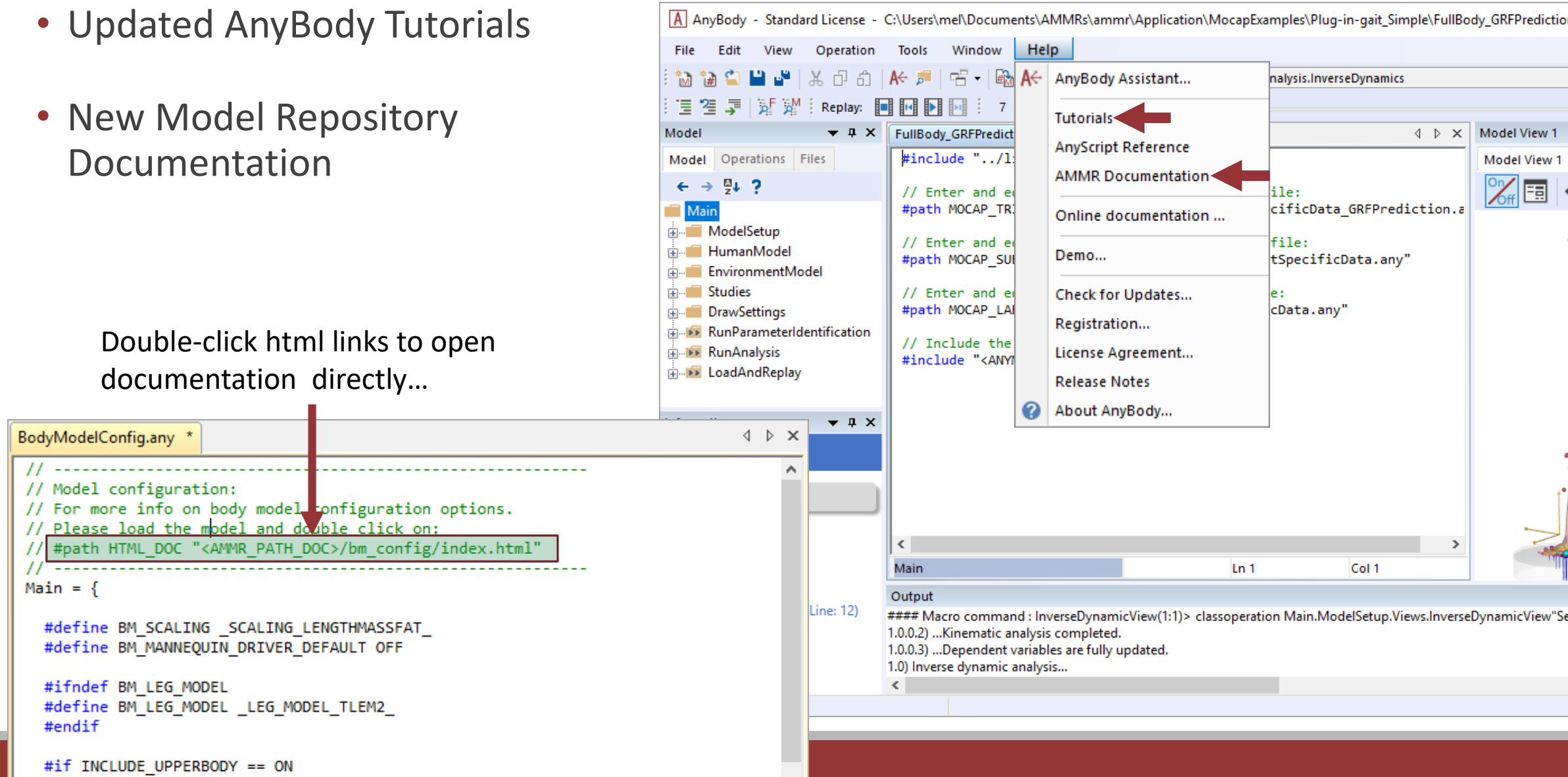
Windows can no longer undock by dragging

Instead: Double-click or right-click and choose undock

New help resources

- Updated AnyBody Tutorials
- New Model Repository Documentation

Double-click html links to open documentation directly…



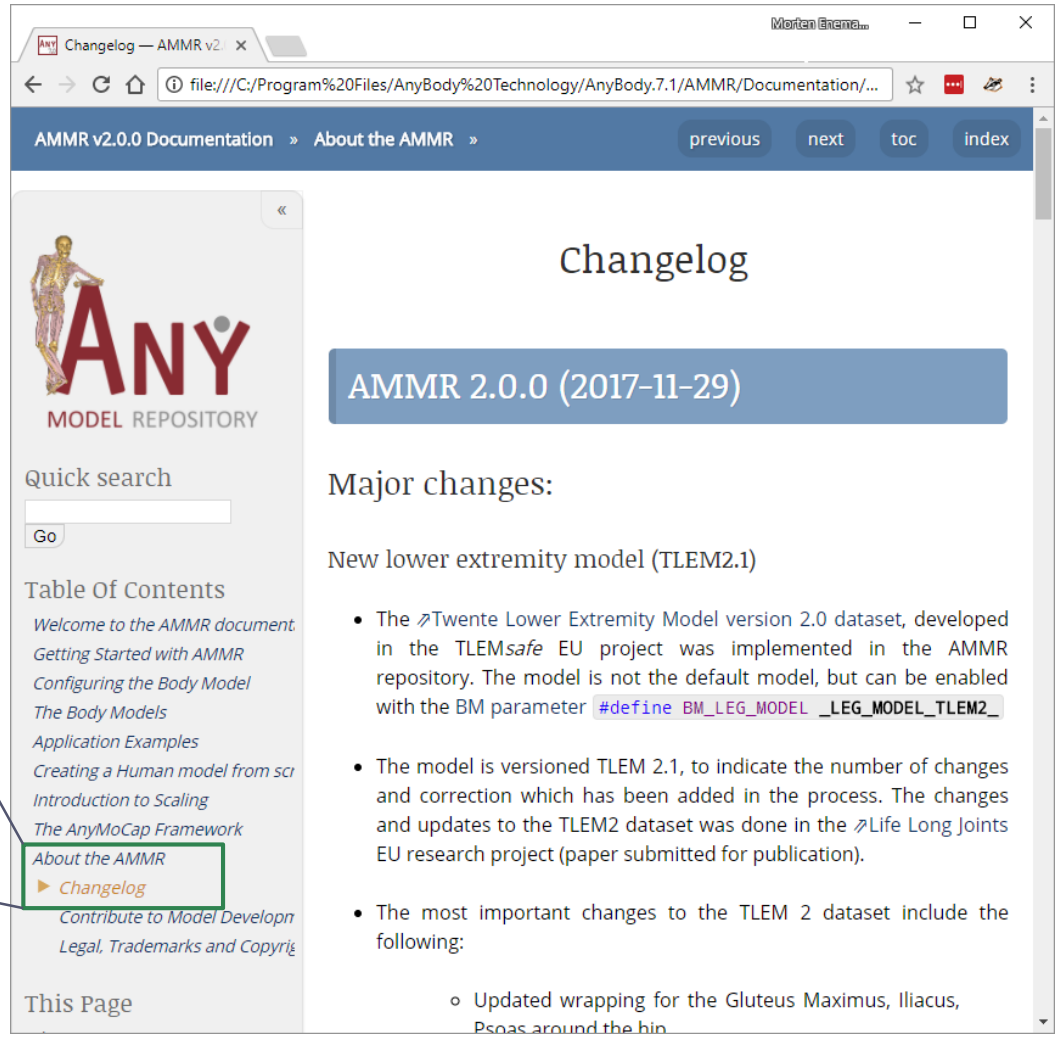
New Model Repository

Major release: version 1.6 -> **2.0**

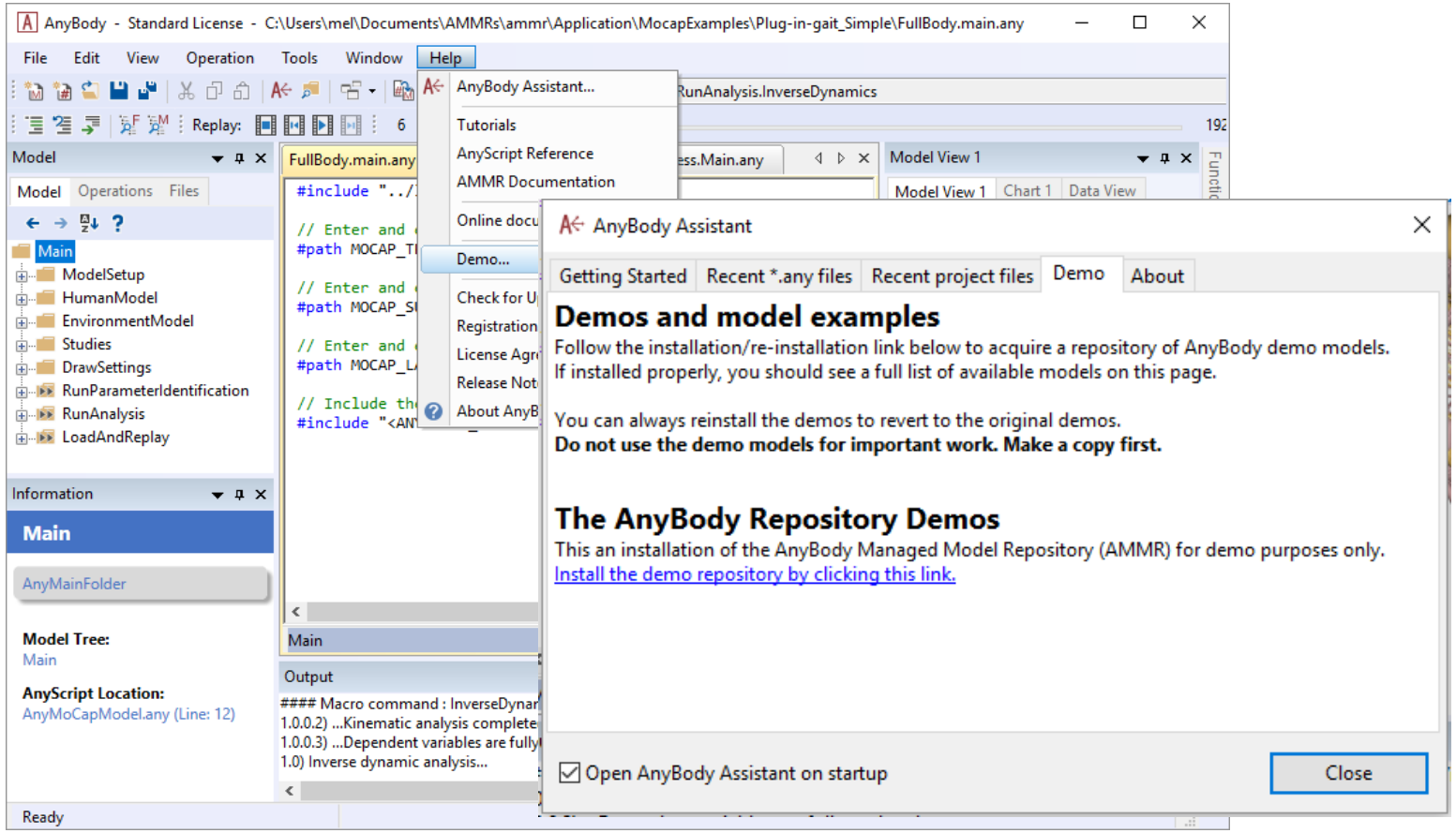
- Many improvements and changes.
- New Lower Extremity Model
- New Mandible Model
- New framework for MoCap based models
- New and updated examples

Model Repository

Repository Changelog



How do I get the new Model Repository?

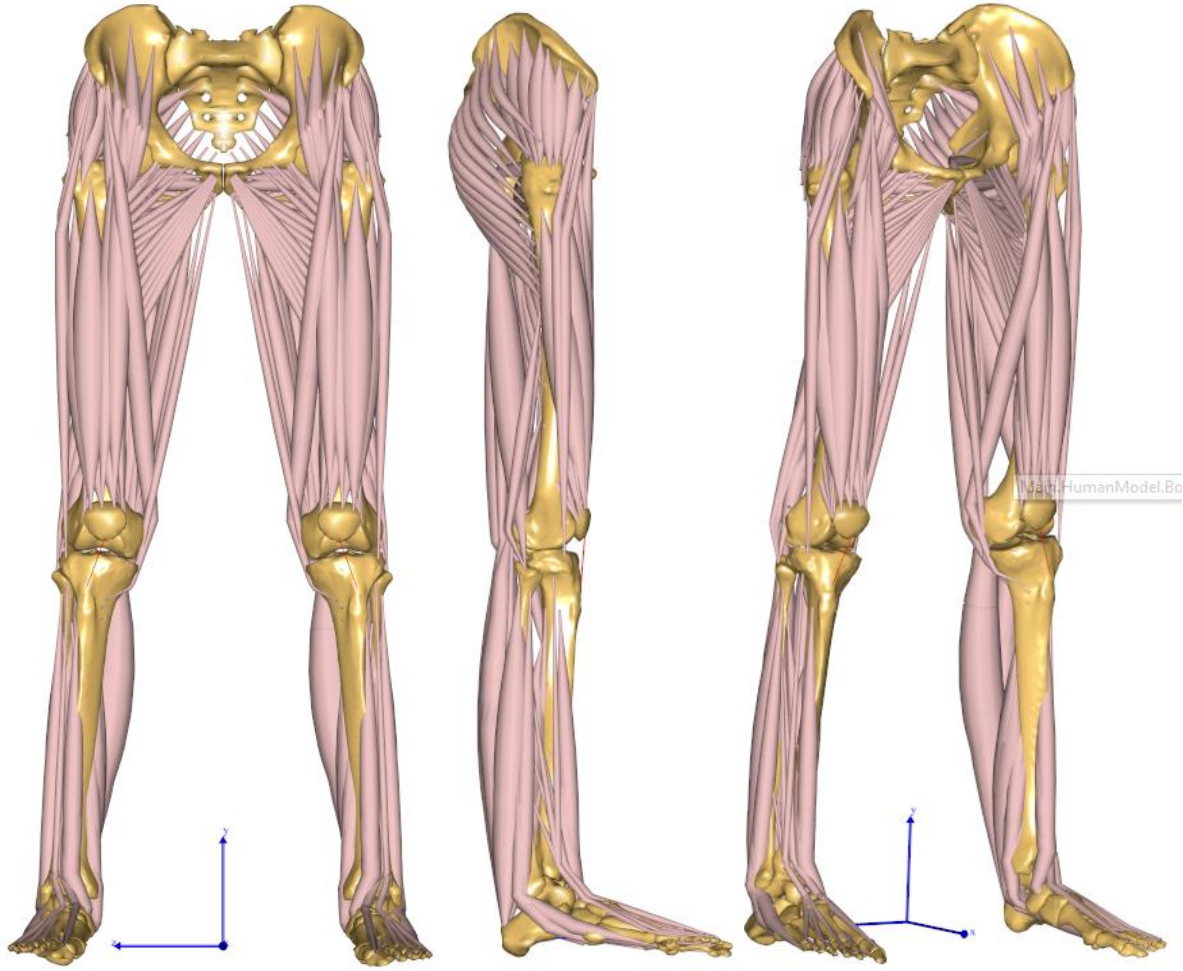


New lower extremity model

- Twente Lower Extremity Model 2.0
  - Dataset from TLEM*safe* EU project

TLEMsafe https://www.tlemsafe.eu/

- First implementation (TLEM 2) by:
  - Vincenzo Carbone and René Fluit from the University of Twente



Journal of Biomechanics 48 (2015) 734–741

Contents lists available at ScienceDirect

Journal of Biomechanics

journal homepage: www.elsevier.com/locate/jbiomech
www.JBiomech.com

TLEM 2.0 – A comprehensive musculoskeletal geometry dataset for subject-specific modeling of lower extremity

V. Carbone[a,n,1], R. Fluit[a,1], P. Pellikaan[a], M.M. van der Krogt[a,b], D. Janssen[c], M. Damsgaard[d], L. Vigneron[e], T. Feilkas[f], H.F.J.M. Koopman[a], N. Verdonschot[a,c]

[a] Laboratory of Biomechanical Engineering, Faculty of Engineering Technology, MIRA Institute, University of Twente, Enschede, The Netherlands
[b] Department of Rehabilitation Medicine, Research Institute MOVE, VU University Medical Center, Amsterdam, The Netherlands
[c] Orthopaedic Research Laboratory, Radboud University Medical Centre, Nijmegen, The Netherlands
[d] AnyBody Technology A/S, Aalborg, Denmark
[e] Materialise N.V., Leuven, Belgium
[f] Brainlab AG, Munich, Germany

New lower extremity model

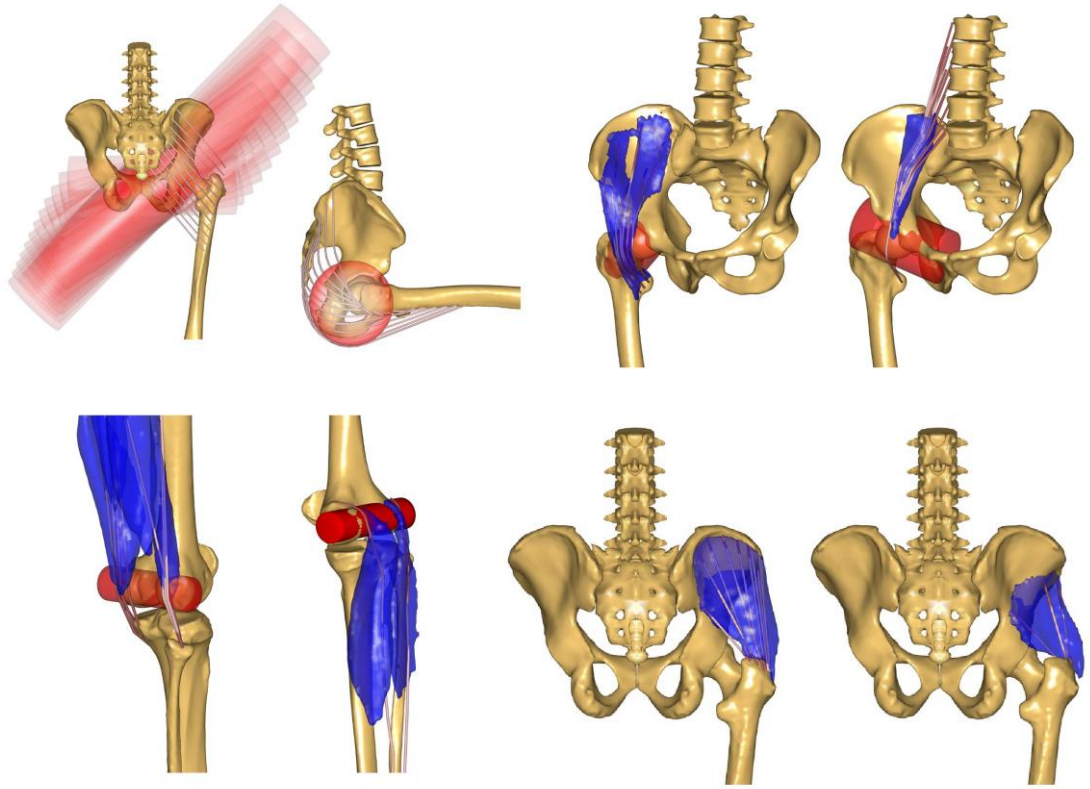
- Released version TLEM 2.1
  - Updated implementation
  - Re-engineered wrapping surfaces from MRI scans
  - Joint axis fitted from bone geometry
  - Many small bugfixes and improvements

- Work was done in the *Life Long Joint* EU project by: Enrico De Pieri, ETH Zurich. *

- Not the default model. Activate by setting:

```
#define BM_LEG_MODEL _LEG_MODEL_TLEM2_
```

See more in the AMMR documentation

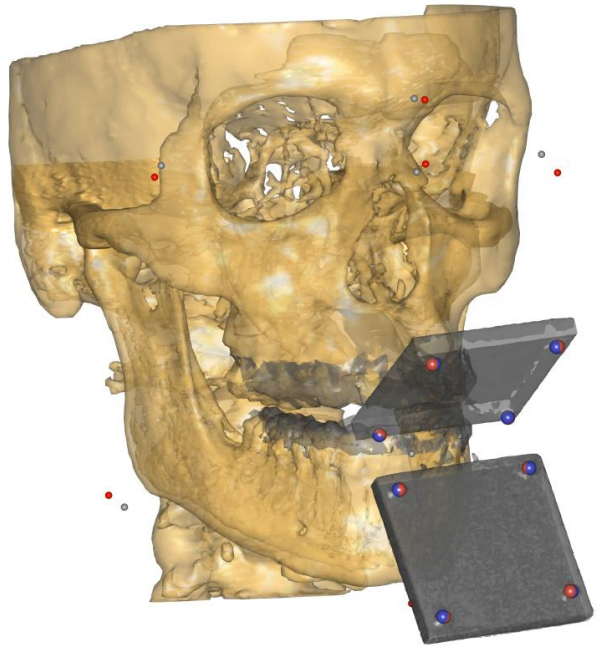


* De Pieri, E., Lund, M. E., Gopalakrishnan, A., Rasmussen, K. P., Lunn, D. E., and Ferguson, S. J., 2017, "*Biofidelic Muscle Wrapping in a Musculoskeletal Model Improves Hip Contact Force Prediction Accuracy,*" PlosOne. (Submitted)

New Mandible Model

Mandible model based on a CT scan of a 40 year old male.

Created by:
Michael Skipper Andersen and **Mark de Zee**.
Aalborg University, Denmark.



Validation example:

`Application/Validation/AalborgMandibleValidation/`

Published in:

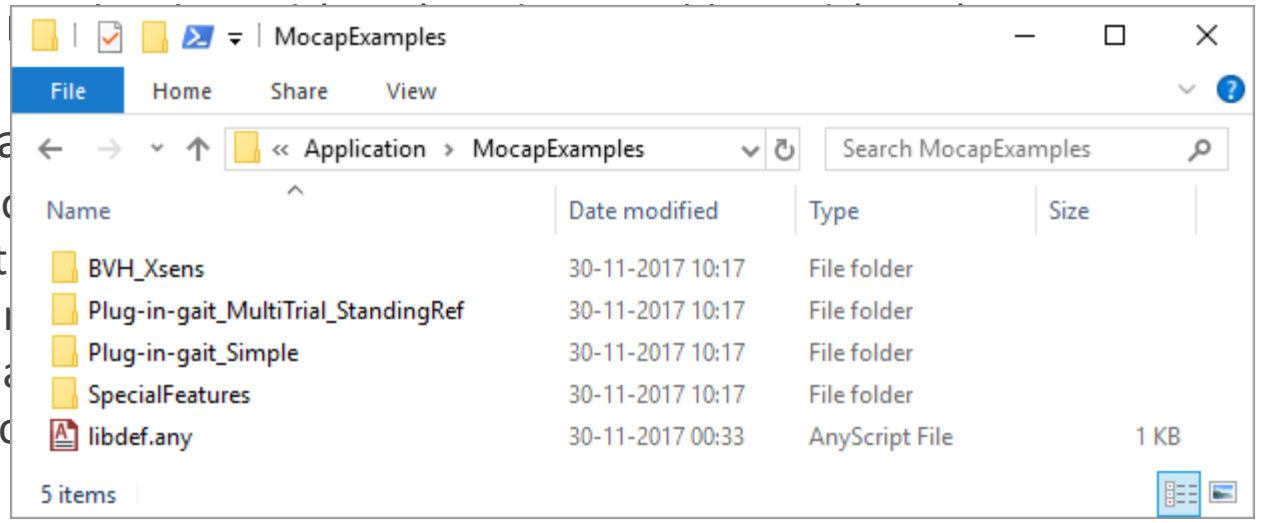
Andersen MS, de Zee M, Damsgaard M, Nolte D, Rasmussen J. 2017. *Introduction to Force-dependent Kinematics: Theory and Application to Mandible Modeling*. Journal of Biomechanical Engineering, 139(9), 091001. DOI: 10.1115/1.4037100.

The work was supported by the Sapere Aude program of the Danish Council for Independent Research under grant number: DFF-4184-00018.

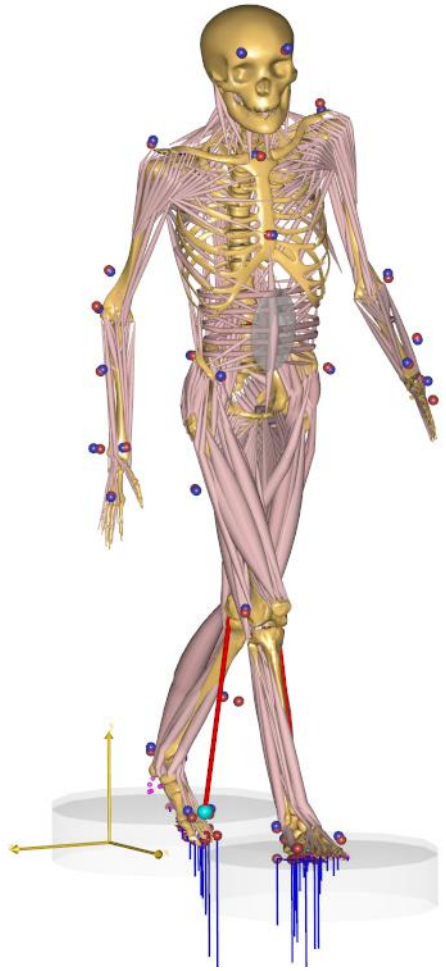
New Framework for MoCap models

Replaces the old MoCap examples

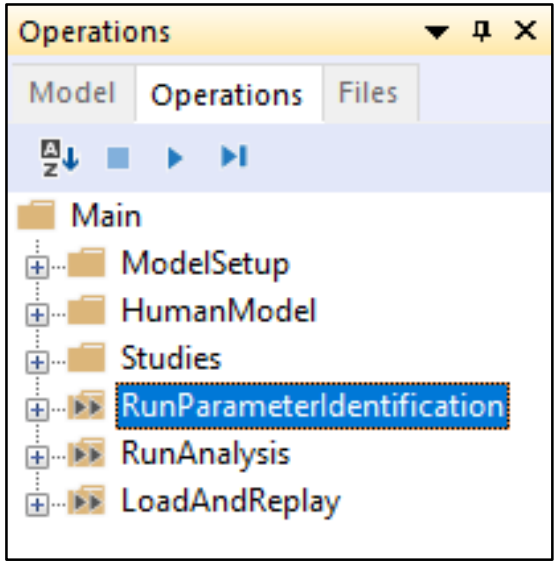
- Easy MoCap setup
- Support
- Many fea
  - Predictic
  - Easy set
  - Handle
  - Filter ma
  - Offset to

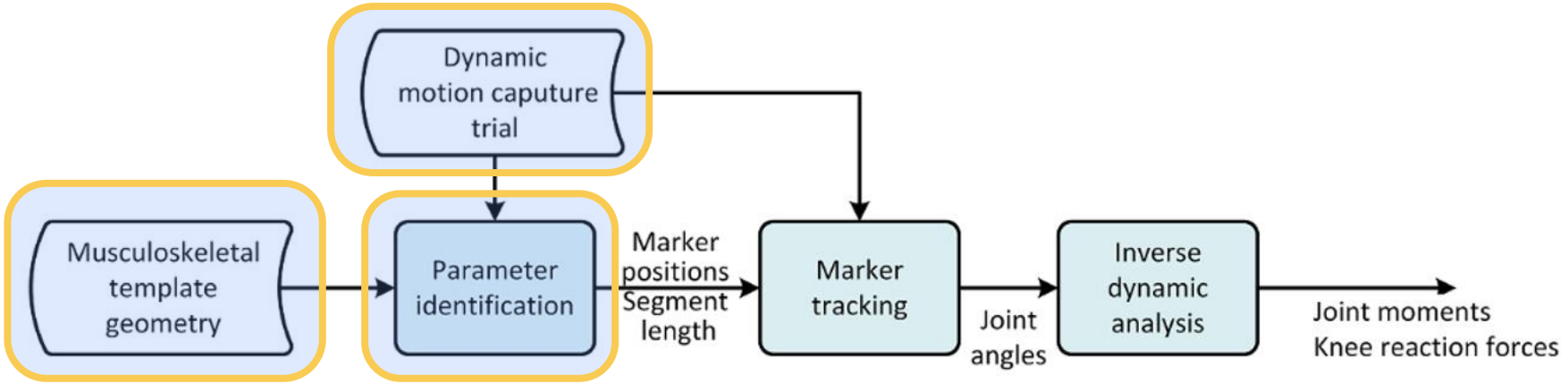


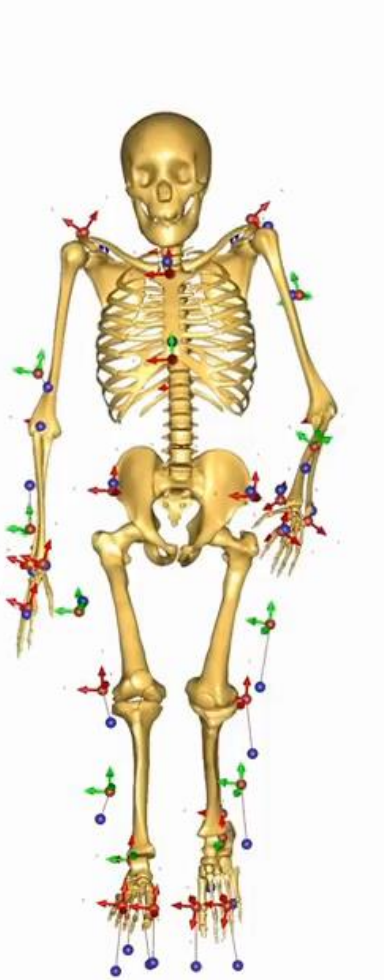
- Plus much more. See the documentation.



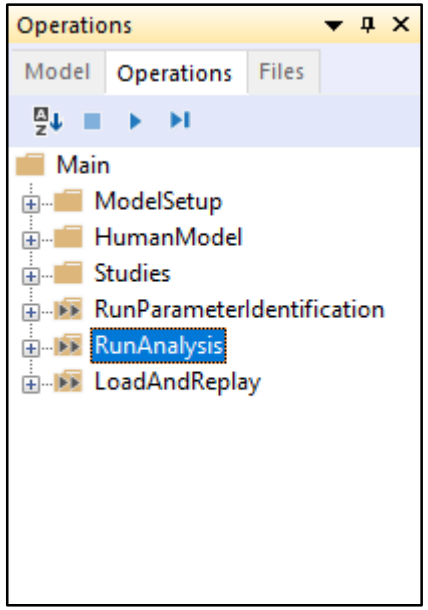
New Framework for MoCap models

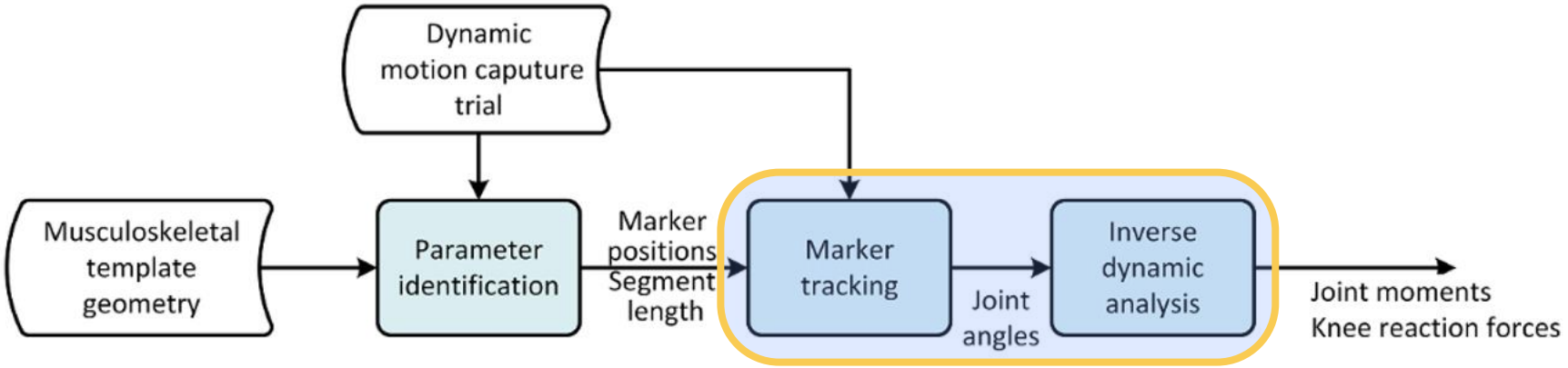


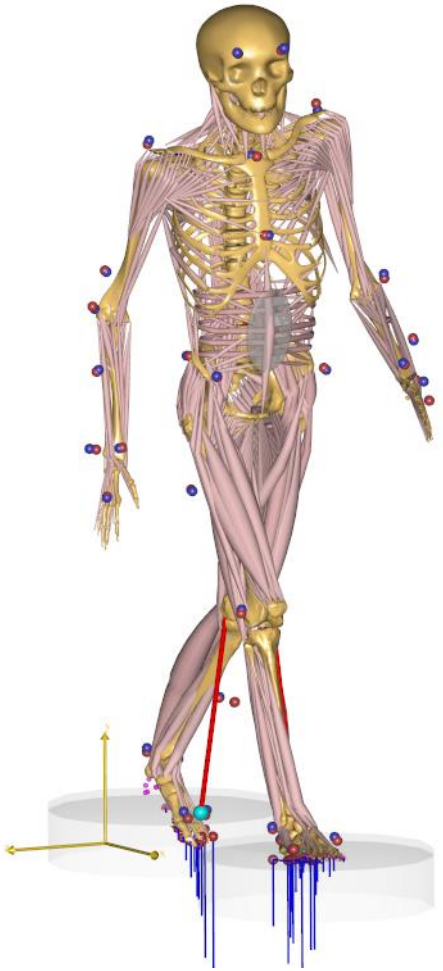




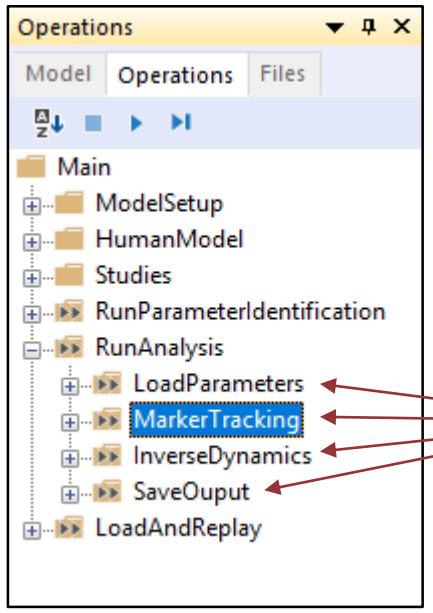
New Framework for MoCap models



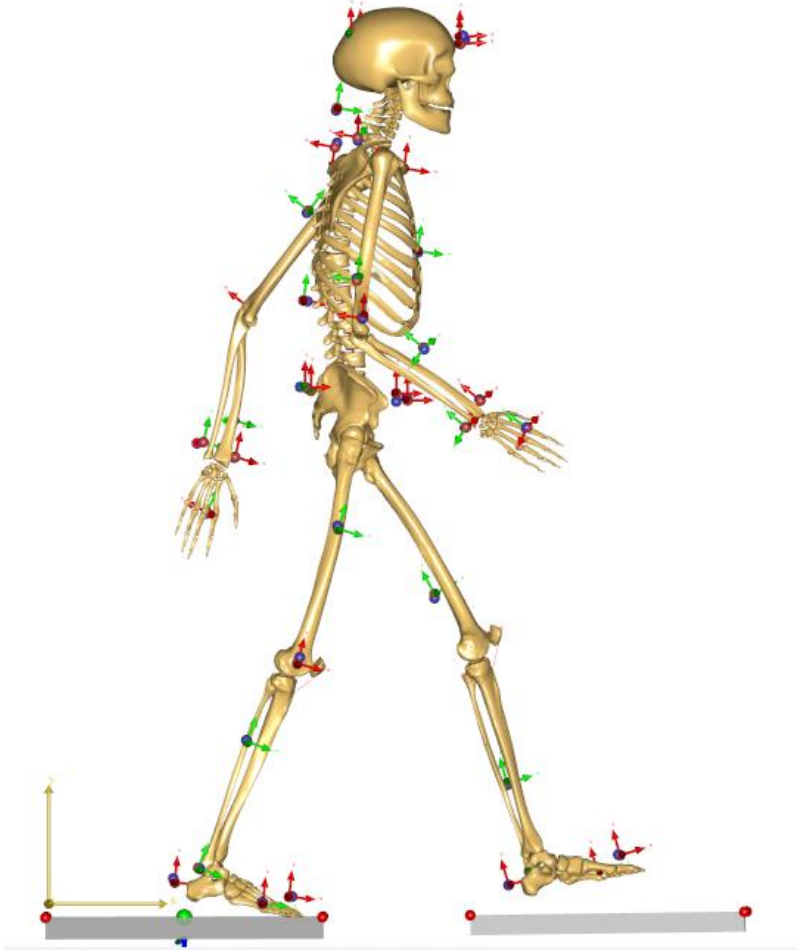


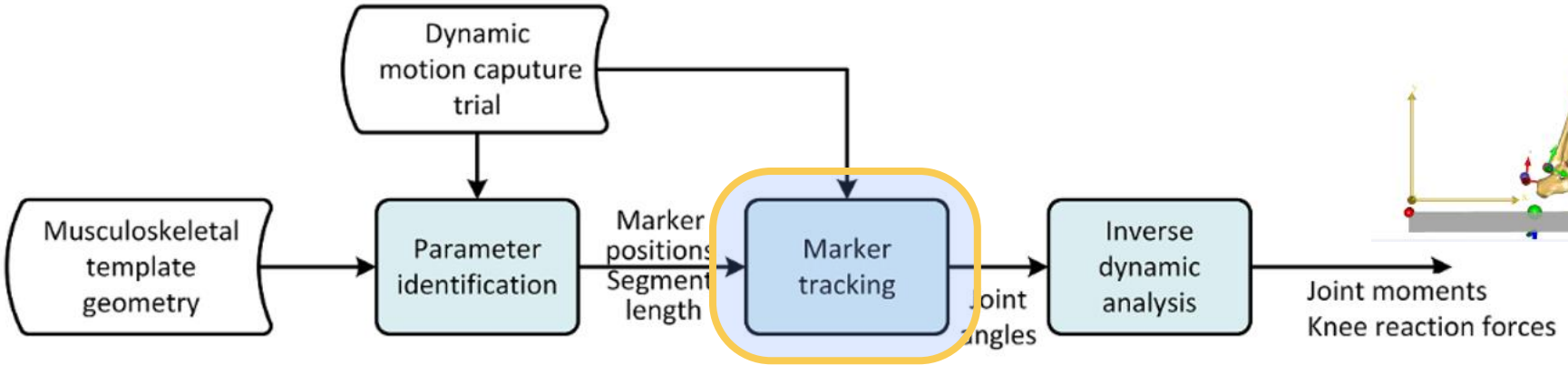


New Framework for MoCap models

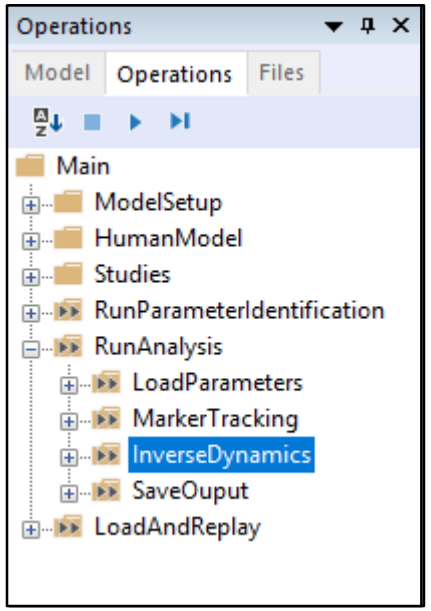


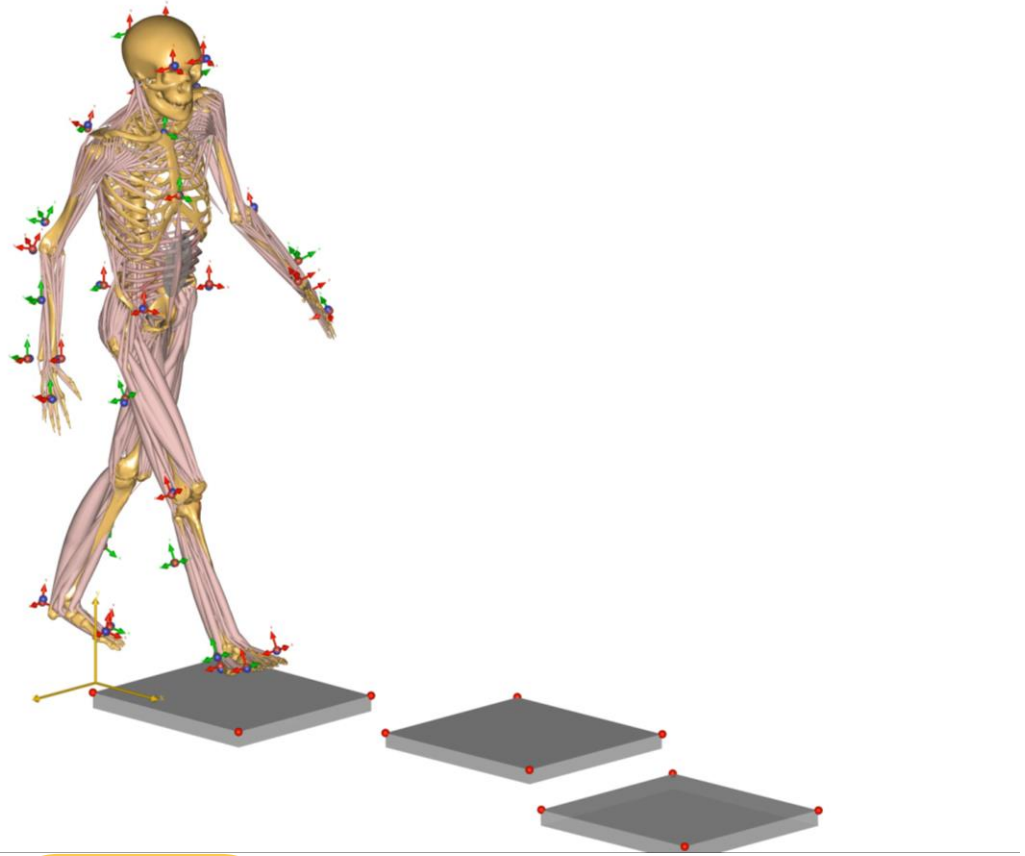
`RunAnalysis` is split into several steps

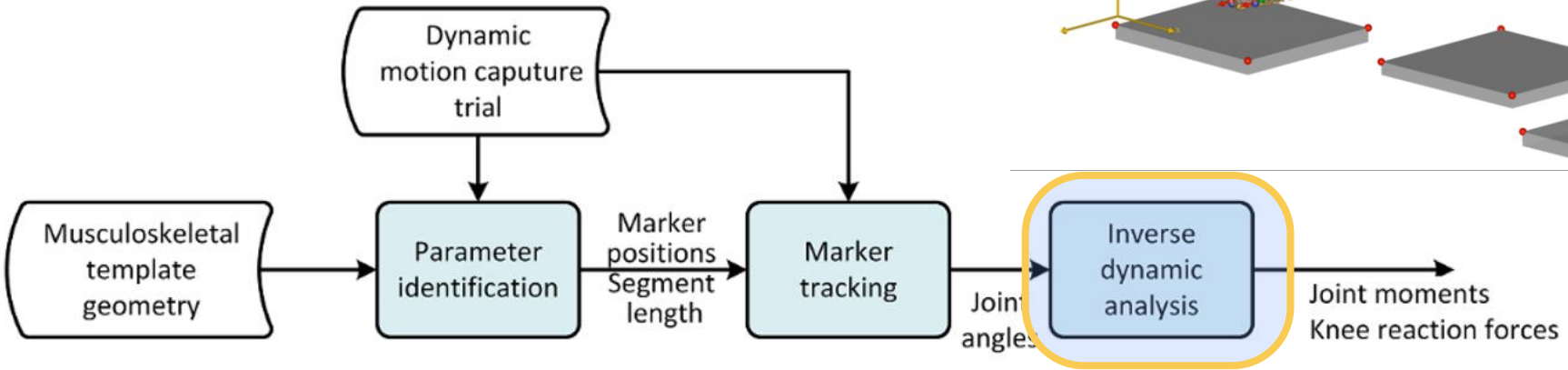




New Framework for MoCap models



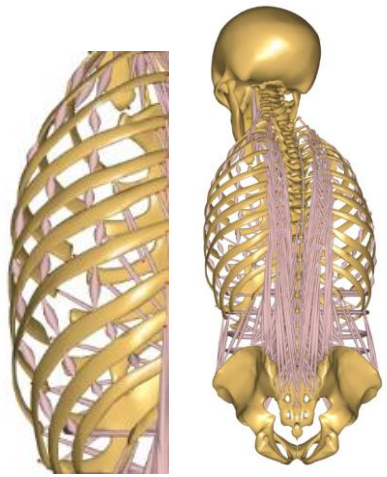




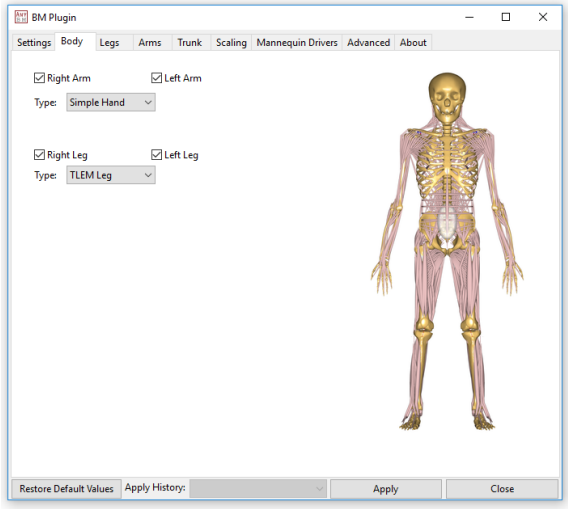
Future repository development…

Spring 2018 release:

- **Graphical model editing**
  - Plugin for system (Using Python)
- **New Thoracic model**
- **Volume based muscle recruitment**



New thoracic model



BM configurator plugin

Previous webcasts

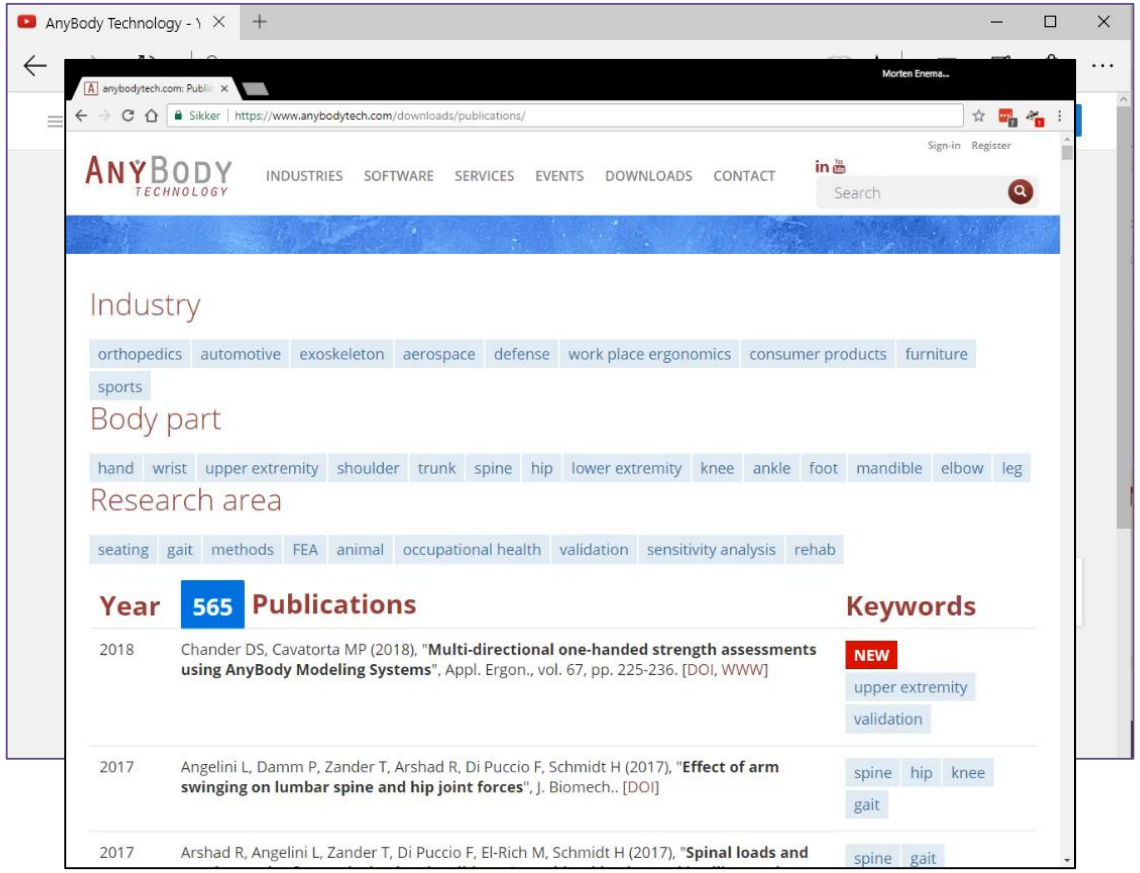
- Check our YouTube channel

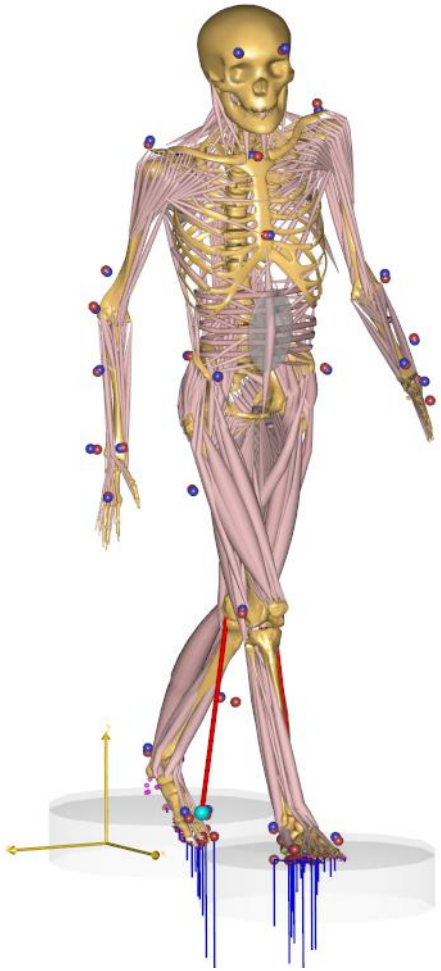
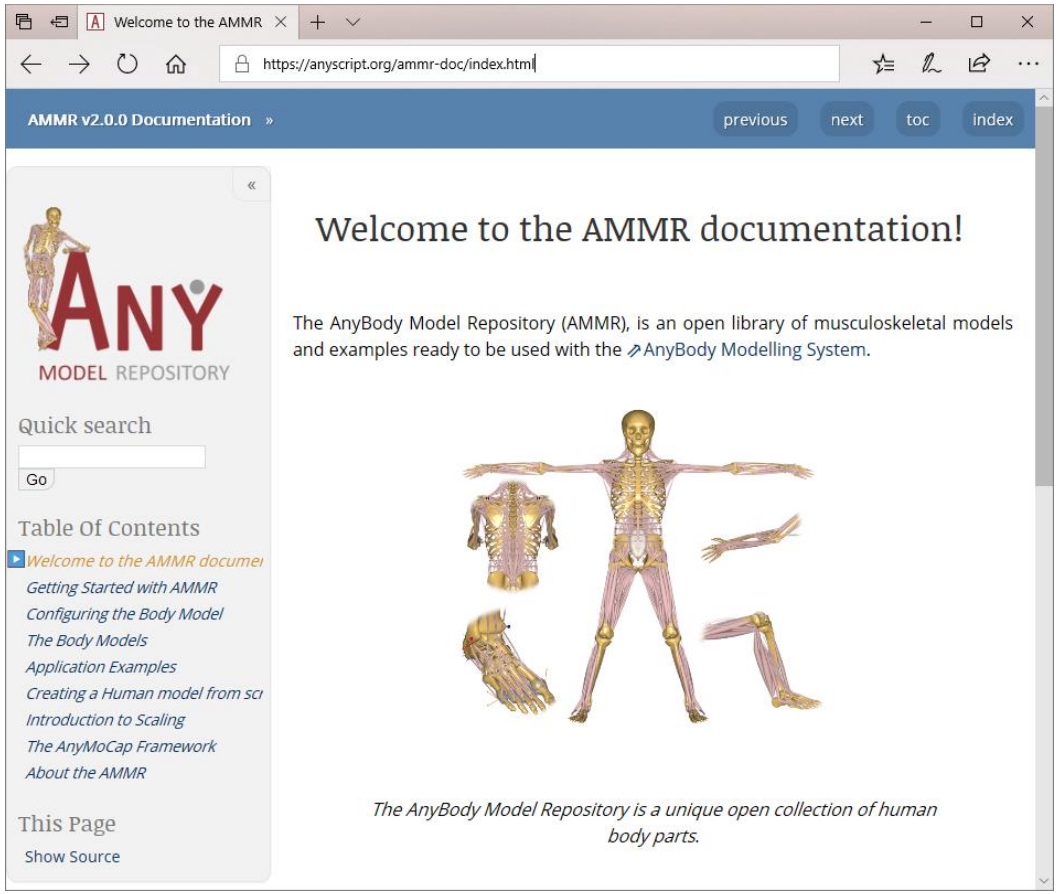
www.anybodytech.com

- Events, dates, publication list, ...

www.anyscript.org

- Wiki, Forum, Repositories



Meet us? Send email to sales@anybodytech.com

Time for questions: