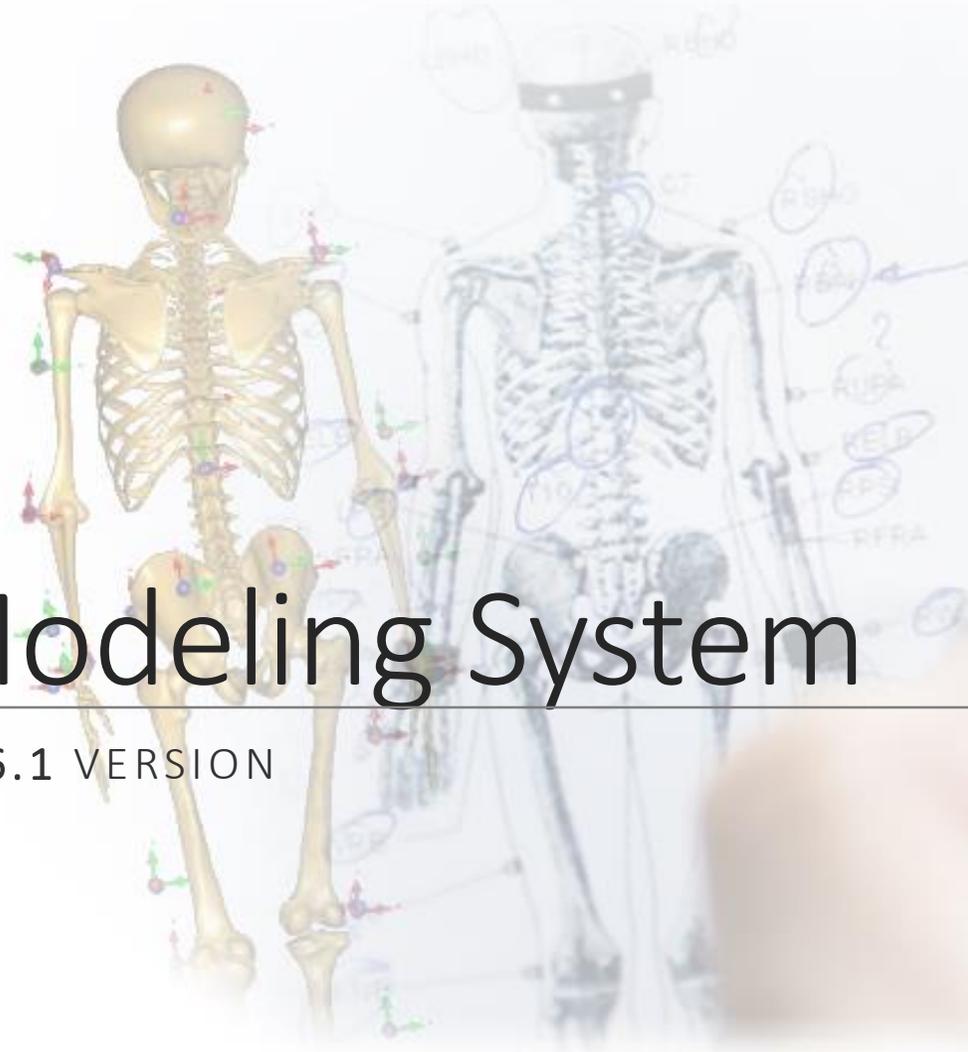


The webcast will start in a few minutes....



The AnyBody Modeling System

TOUR AND OVERVIEW OF THE NEW 6.1 VERSION

Outline

- General introduction to the modeling system
 - Software vs. models
 - What can it be used for?
- New features
 - Advanced kinematics
 - Working with BVH models
 - MoCap related improvements
 - Better graphics
- New community site and wiki
- Future plans
 - Sneak peak of AMS 7.0 and AMMR2.0
- Questions and answers



Morten Enemark Lund
AnyScript Wiking
R&D Engineer



Kasper Pihl Rasmussen
Simulations Engineer

Control Panel

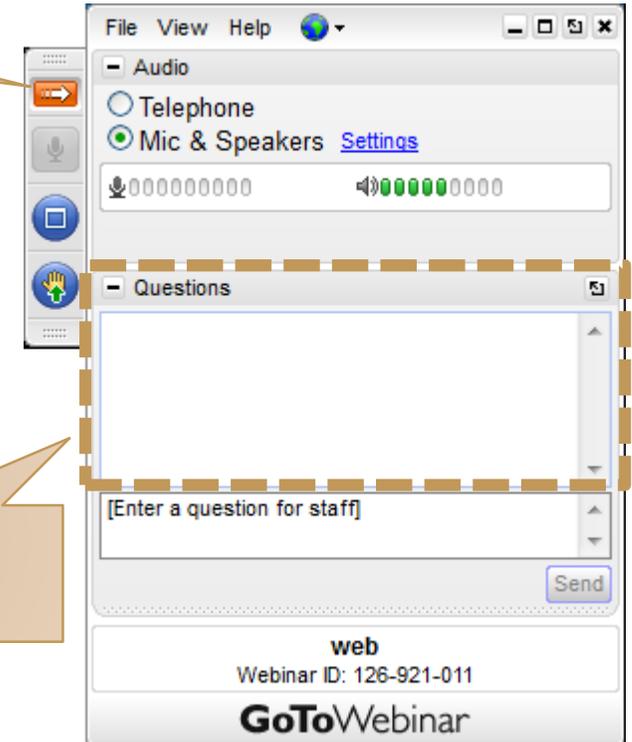
The Control Panel appears on the right side of your screen.

Submit questions and comments via the Questions panel.

Questions will be addressed at the end of the presentation. If your question is not addressed we will do so by email.

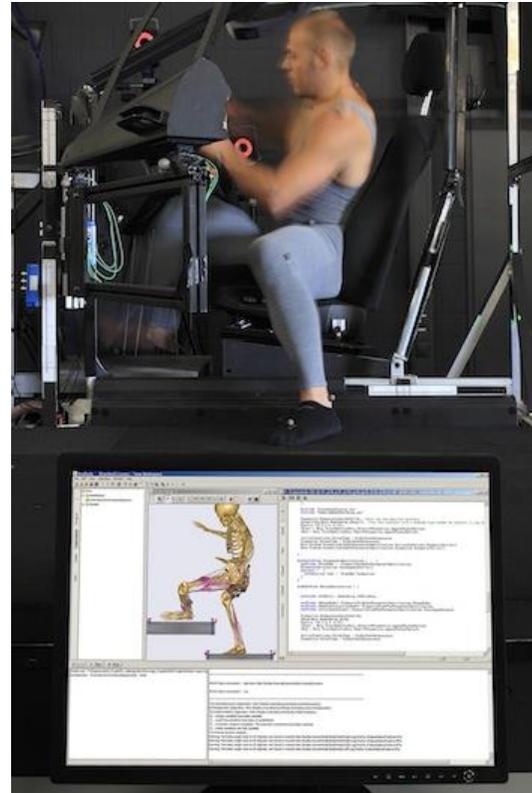
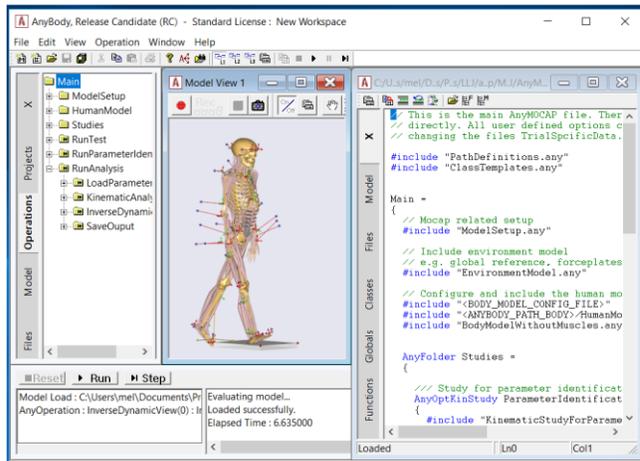
Expand/Collapse the Control Panel

Ask a question during the presentation



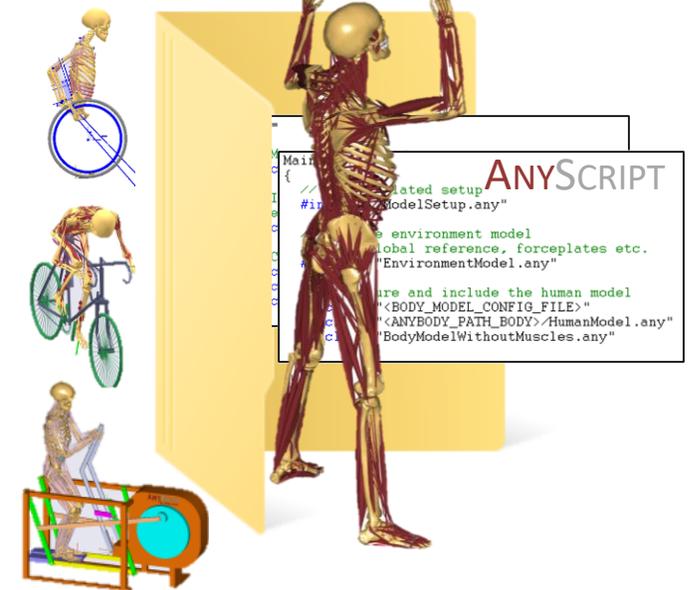
AnyBody Modeling System

ANYBODY Modeling System



Rasmussen et. al. (2011), ORS Annual Meeting

ANYBODY Managed Model Repository





Movement
Analysis

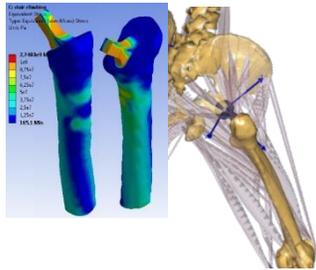


Product Design
Optimization



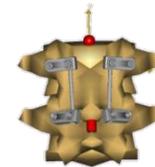
Ergonomic
Analysis

ANYBODY
Modeling System

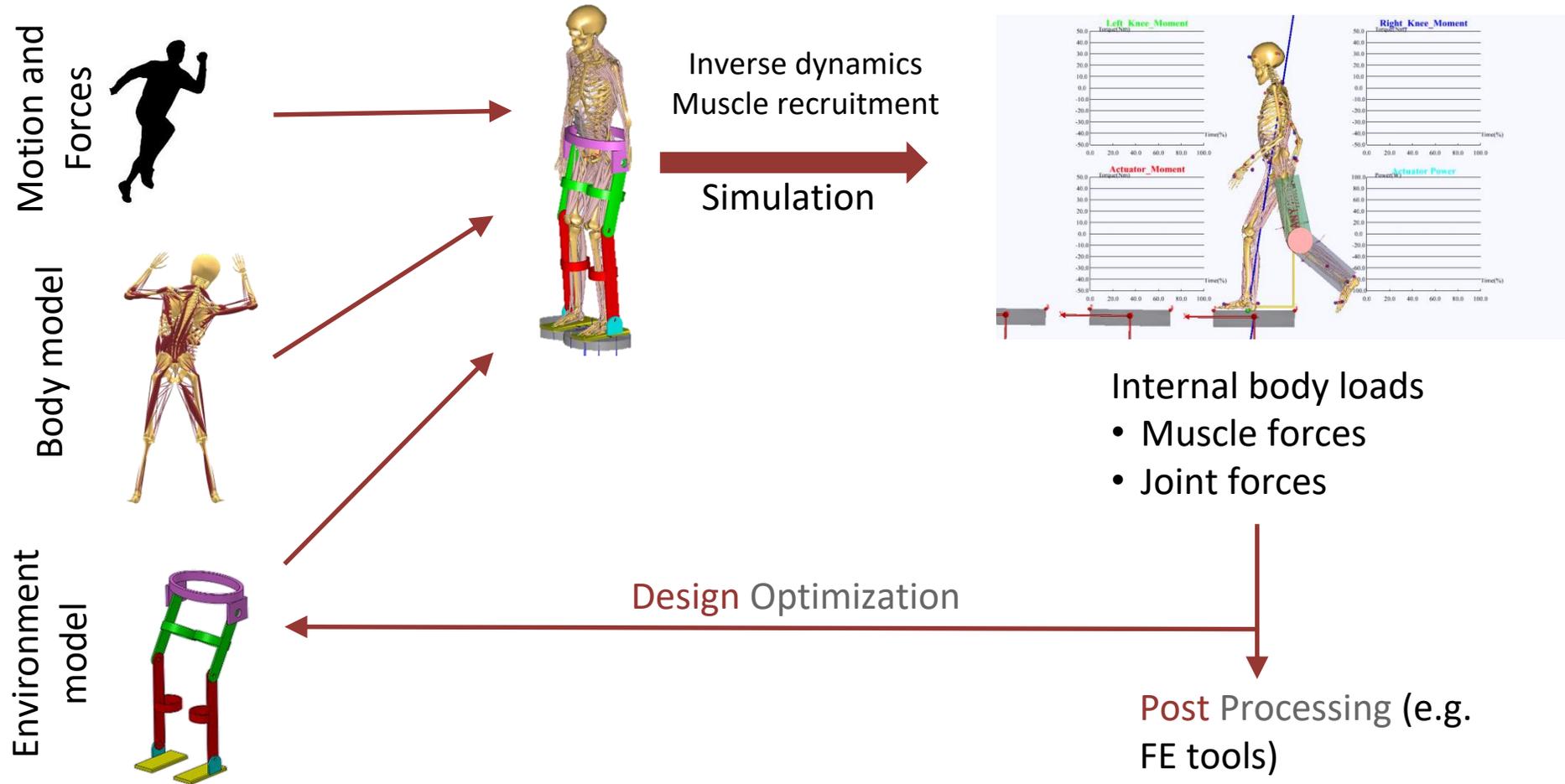


Load Cases for
Finite Element
Analysis

Surgical Planning and
Outcome Evaluation

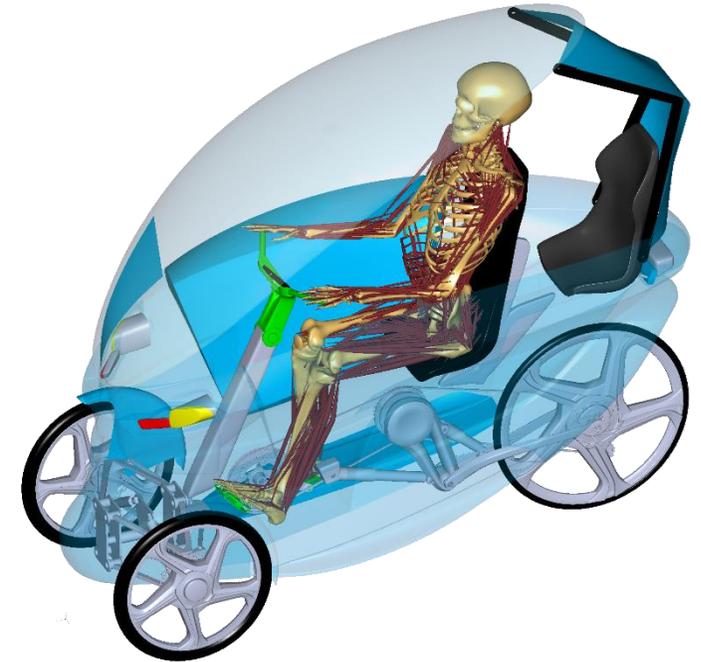
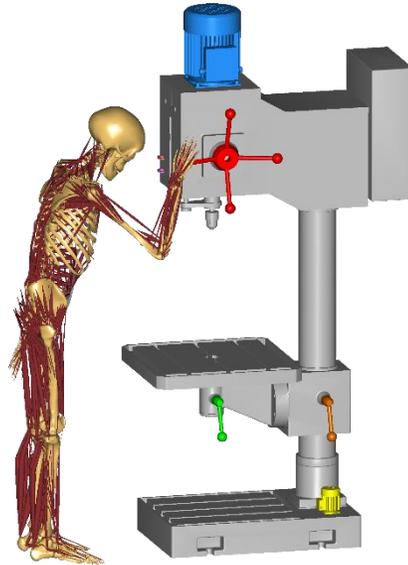


AnyBody Modeling System



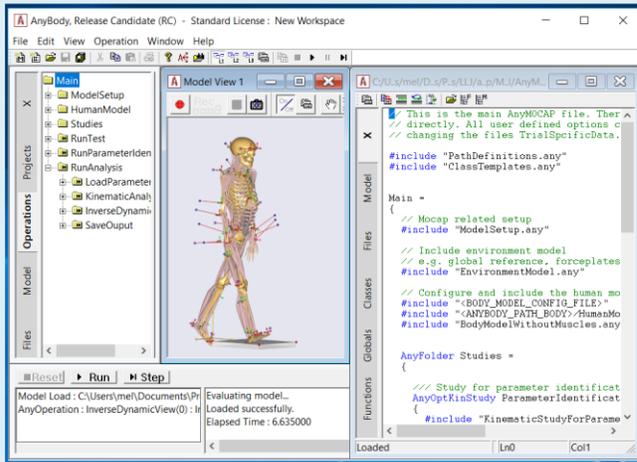
Machine Design and Optimization

- AnyBody Exporter for SOLIDWORKS®
 - Plugin for SolidWorks
 - Import your machine's design from SolidWorks
 - Run Man-Machine simulations



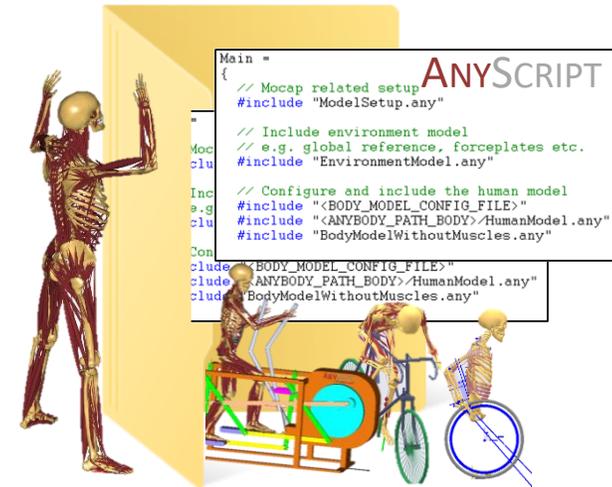
What is new in the release?

ANYBODY Modeling System



Version 6.1

ANYBODY Managed Model Repository



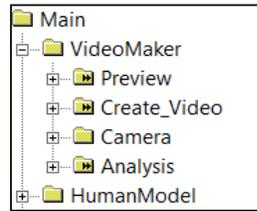
! Note: Still version 1.6



New MoCap framework



Example of an Inertial MoCap Model



AnyScript plugin Making videos



Plus more examples

Release of v.6.1

AnyBody Release Notes

Contents | Index | Search

New in This Version

AnyBody Modeling System, version 6.1.0, March, 2017.

AnyBody, v.6.1.0

User interface

- **Added official support for Windows 10.**
- **Model View:**
 - **Anti-aliasing improving image quality significantly:**
 - Enabled anti-aliasing of the Model View and added value in settings for specifying the level.
 - Added anti-aliasing option for image export.
 - Added anti-aliasing value to

Most changes are 'under the hood'

AnyBody, Release Candidate (RC) - Standard License : New Workspace

File Edit View Operation Window Help

Model View 1

Model Load : C:\Users\me1\Documents\Pr...
AnyOperation : InverseDynamicView(0) : In...
Evaluating model...
Loaded successfully.
Elapsed Time : 6.635000

```

// This is the main AnyMOCAP file. Ther
// directly. All user defined options c
// changing the files TrialSpecificData.

#include "PathDefinitions.any"
#include "ClassTemplates.any"

Main =
{
  // Mocap related setup
  #include "ModelSetup.any"

  // Include environment model
  // e.g. global reference, forceplates
  #include "EnvironmentModel.any"

  // Configure and include the human mo
  #include "<BODY_MODEL_CONFIG_FILE>"
  #include "<ANYBODY_PATH_BODY>/HumanMo
  #include "BodyModelWithoutMuscles.any"

  AnyFolder Studies =
  {
    // Study for parameter identificat
    AnyOptKinStudy ParameterIdentificat
    {
      #include "KinematicStudyForParame
  }
}

```

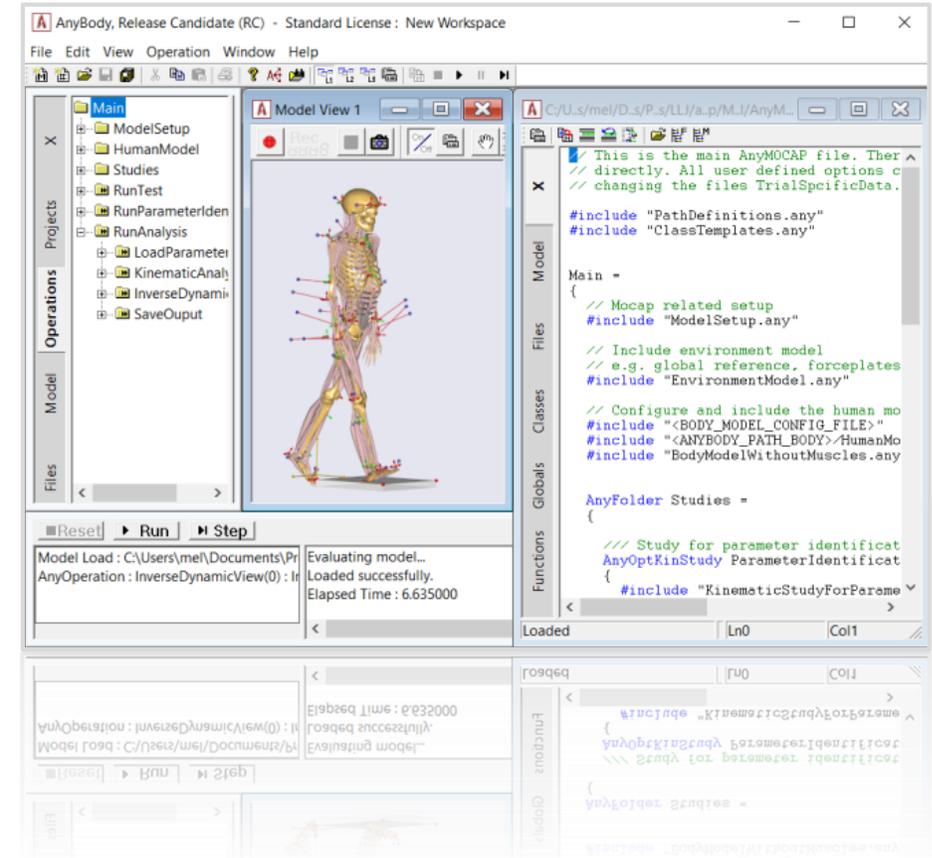
Release of v.6.1

Read the release notes to get a complete overview

- New **ANYSCRIPT** classes and functions
 - AnyKinMeasureFunComb1
 - AnyInputBVH

- **ANYSCRIPT** language improvements
 - New MoCap framework

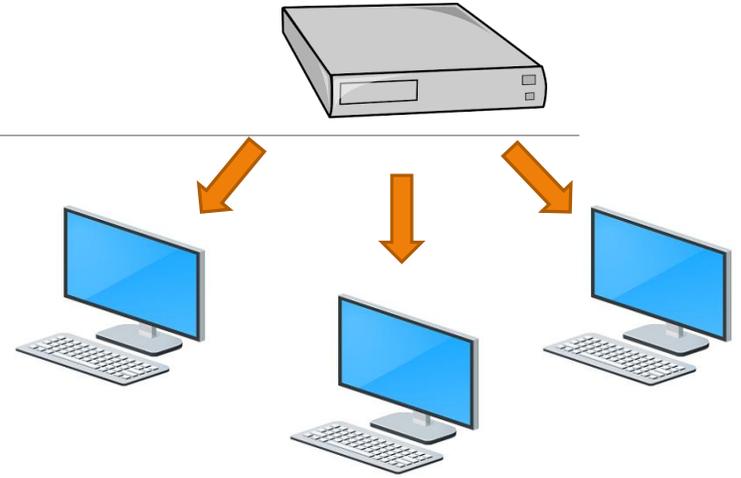
- Improved graphics in model view
 - Video creator tool



New license options

4 instances with a single floating license

 **Note:** A new license file is needed. Send email to: sales@anybodytech.com

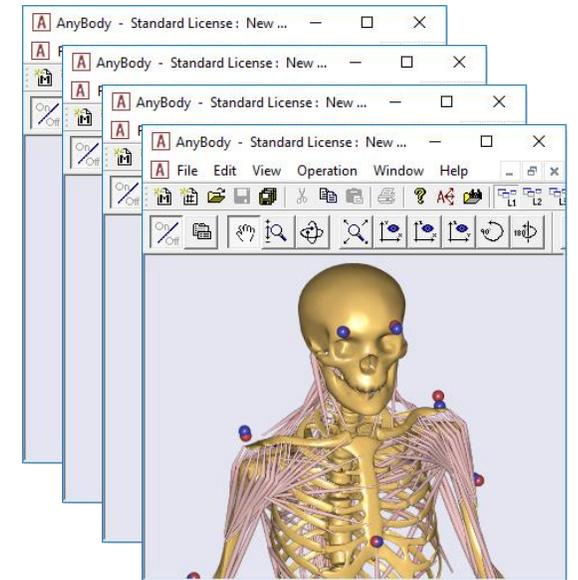


- New License type for batch processing
 - Run without the GUI.
 - Batch processing, sensitivity studies, Design optimization.



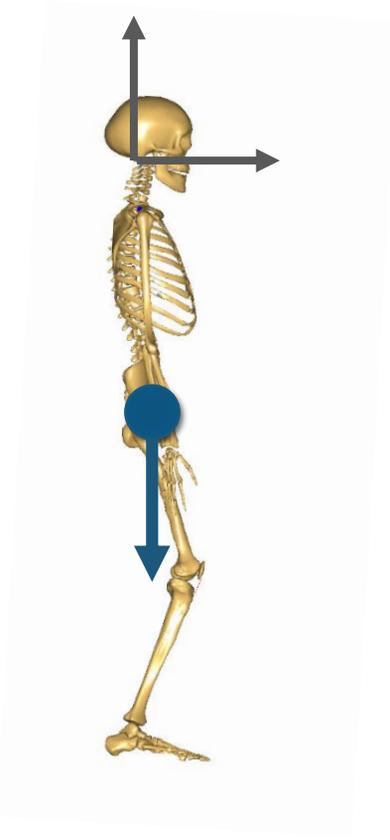
```
In [*]: T2SS = app3.start_macro(TLEM2_simple_sts, **models_sts);
        #app.save_results('TLEM2SimpleSTS.db')
```

× 410 of 417 



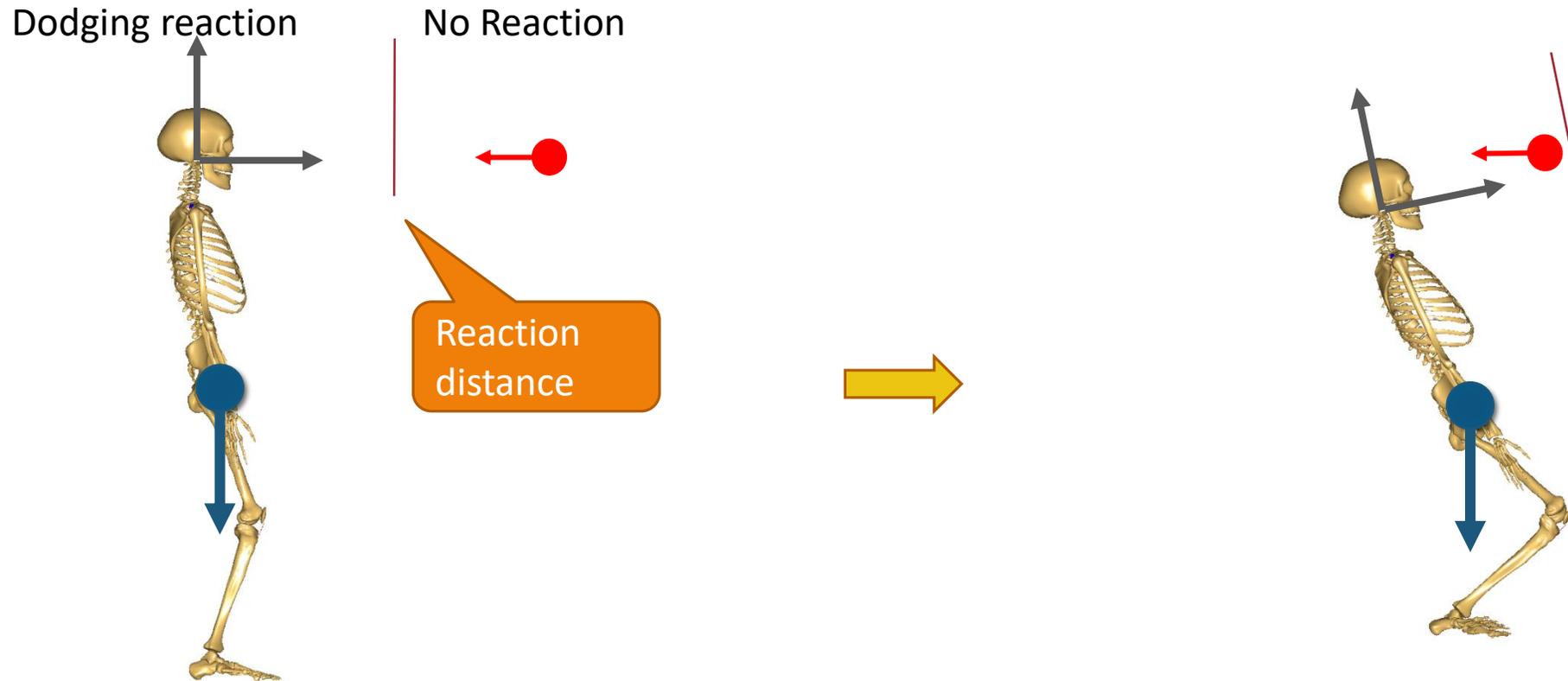
AnyKinMeasureFunComb1

- New class: AnyKinMeasureFunComb1
 - Combines a *kinematic measure* with a *function*



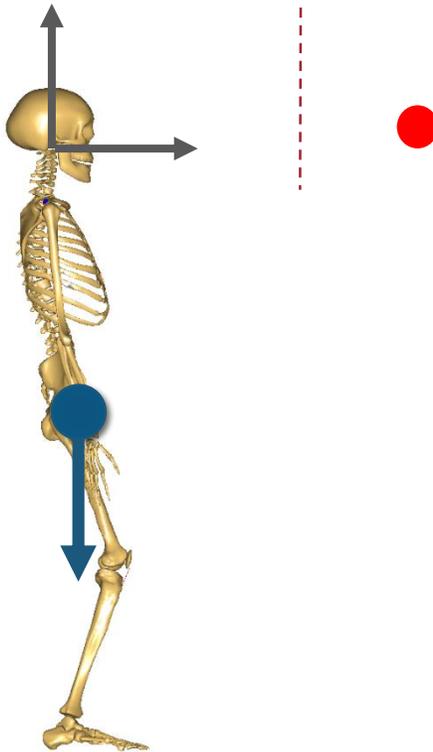
AnyKinMeasureFunComb1

- So what can it be used for?



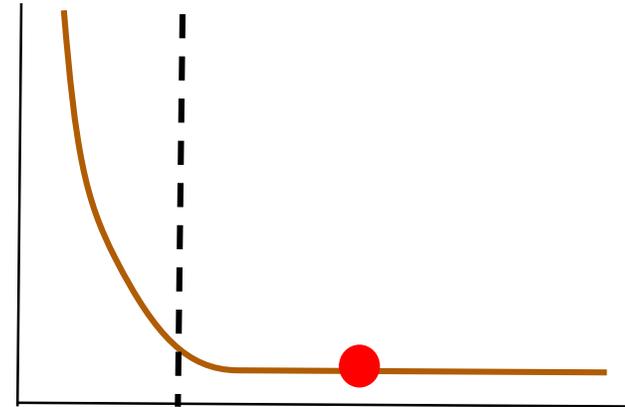
AnyKinMeasureFunComb1

Distance (input measure)



Function

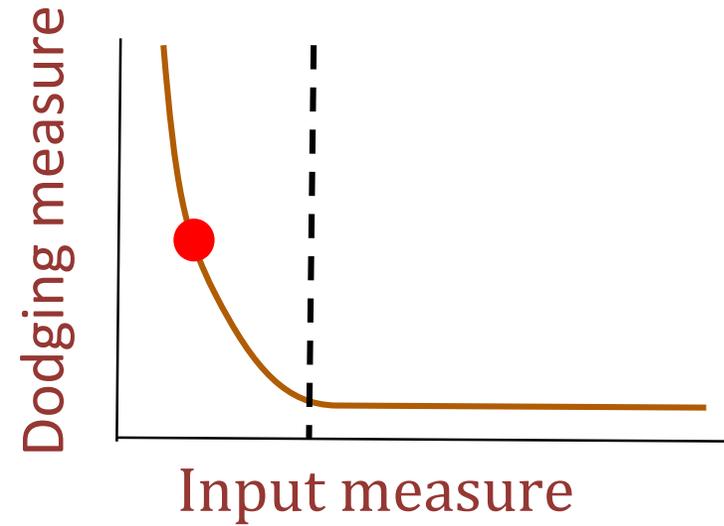
Dodging measure



Input measure

AnyKinMeasureFunComb1

The dodging measure is driven to zero.



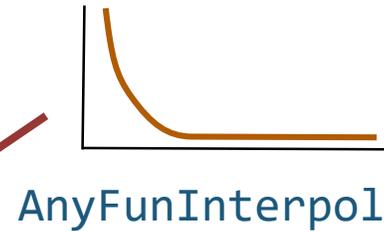
AnyKinMeasureFunComb1



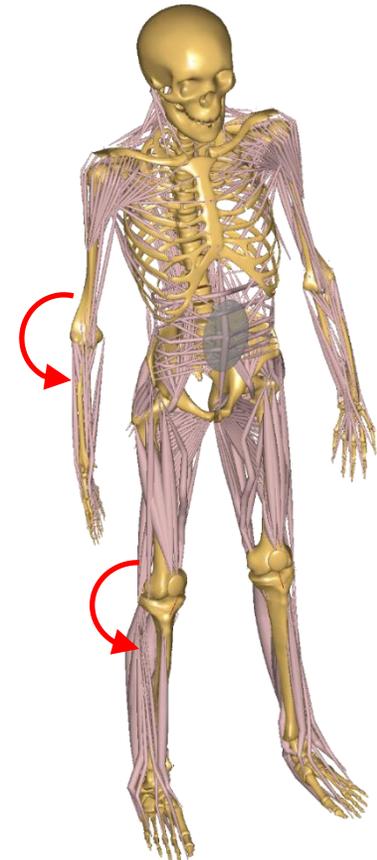
Advanced Kinematics

- New class: **AnyKinMeasureFunComb1**
 - Transformation of existing kinematic measures
 - Create new non-linear measures

```
AnyKinMeasureFunComb1 <ObjectName> =
{
  AnyKinMeasure& ref = .SomeMeasure;
  Functions = {&.Some.Any.Function};
};
```



AnyKinRotational
AnyKinLinear



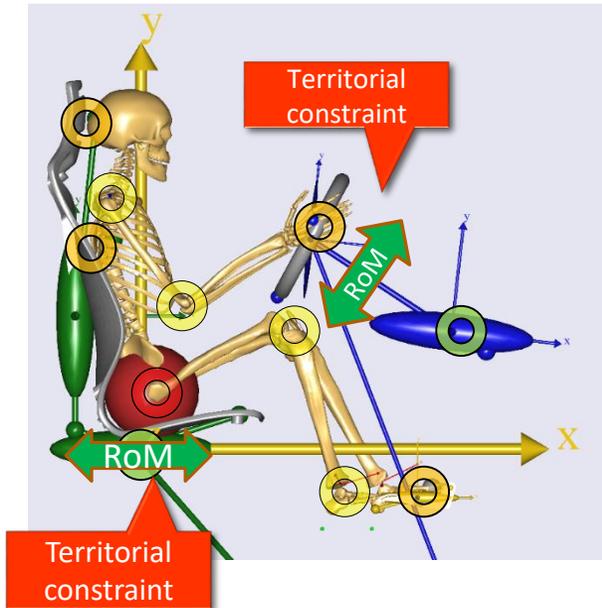
E.g. Implement constraint on joint limits.

Kinematic limits (Territorial constraints)

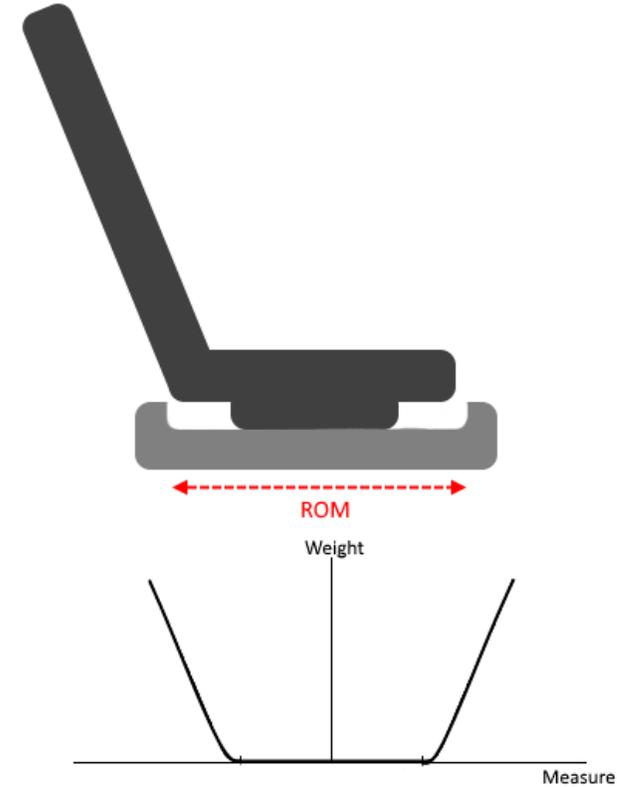
Hard
constraint



Soft
constraint



The model will find the position within the Territorial constraints that matches all other constraints the best.



The weight of the constraint will rise when the measure approaches the limits of the measures range of motion

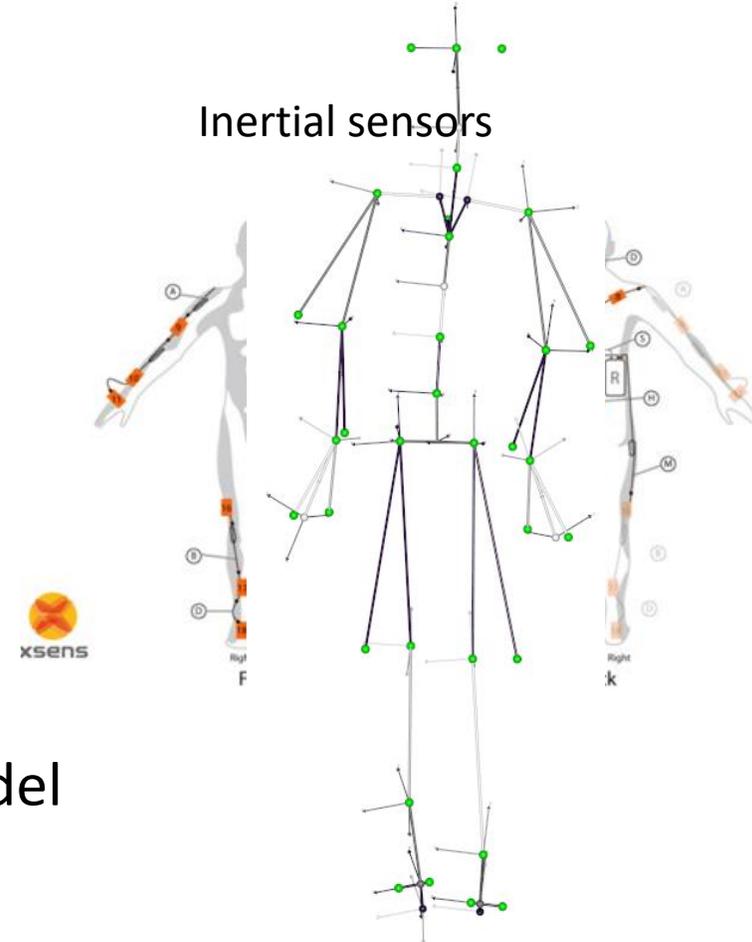
Example: Inertial driven models

3D motion capture without the lab

- Updated AnyScript class: **AnyInputBVH**
 - Robust initial position of the stick-figure
 - Fixed bug with Euler angle discontinuities

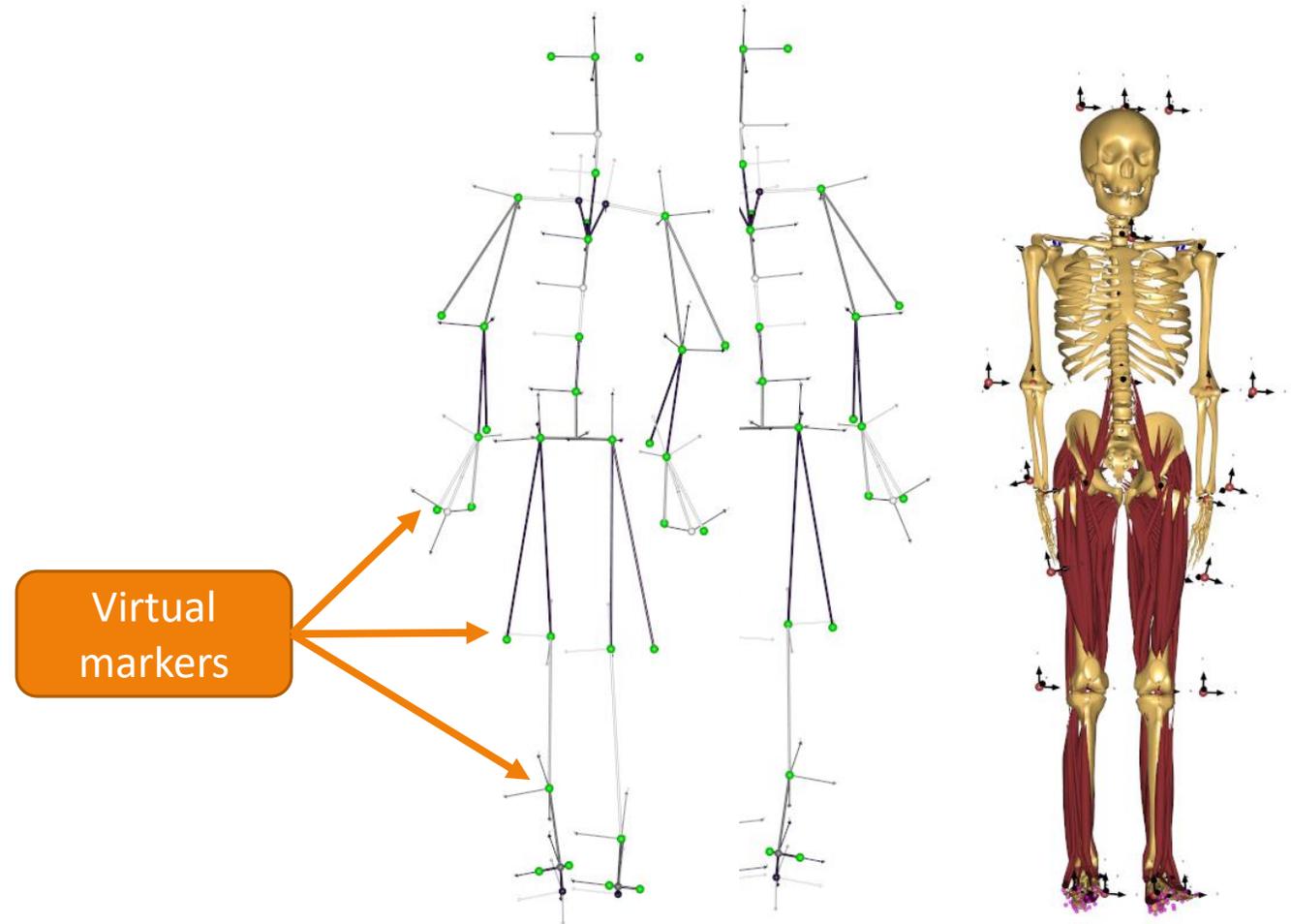
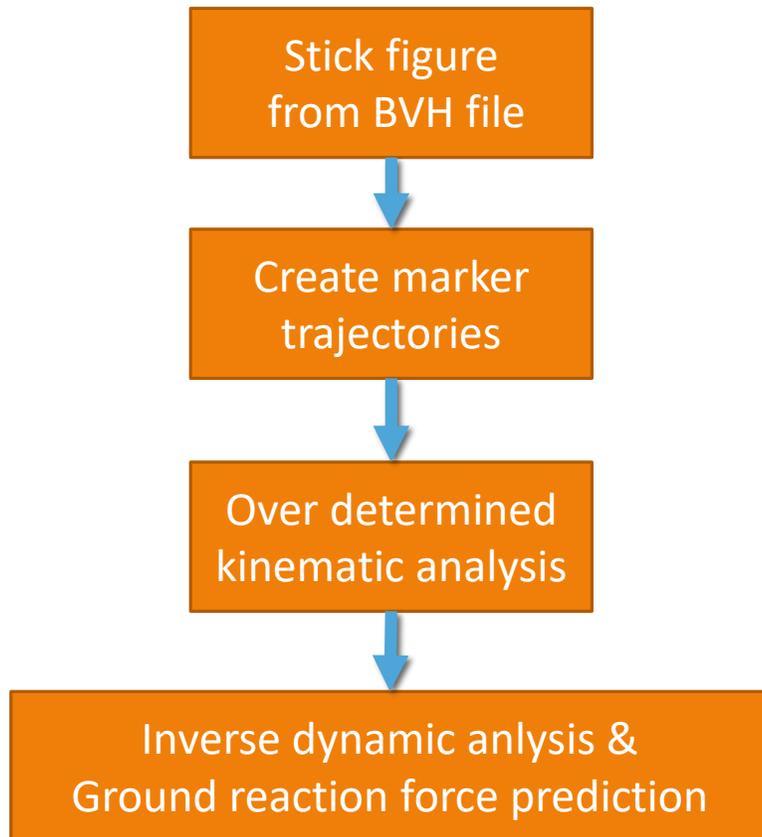
```
AnyInputBVH BVH_Input =
{
  FileName = "my_bvh_file.bvh";
};
```

↳ Creates a driven kinematic stick-figure model



Only part of the story

- New application example...



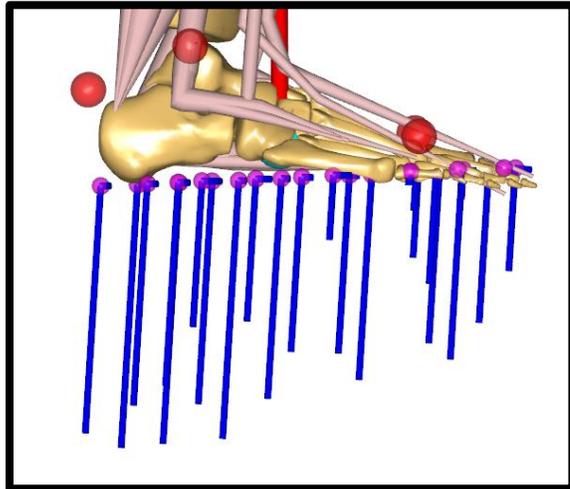
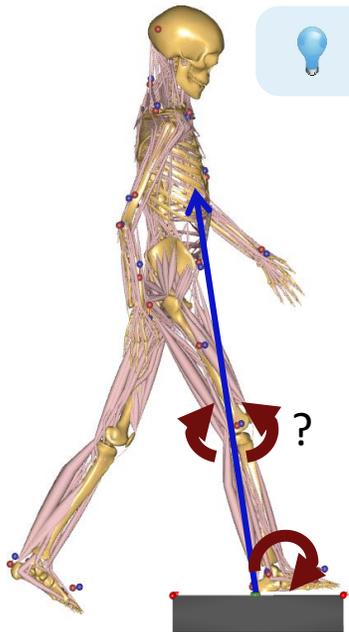
Prediction of ground reaction forces

- Boundary conditions are necessary for inverse dynamic analysis.
 - Usually from force-plates.

Solution: Ground reaction force prediction



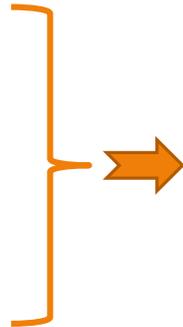
Note: See the webcast on GRF prediction.



New Framework for MoCap models

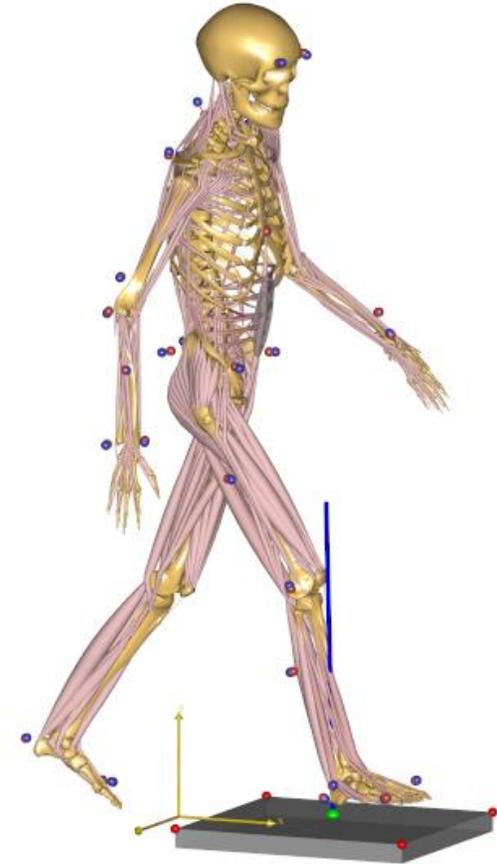
ANYSCRIPT language improvements

- Class template system
- AnyScript parser
- AnyInputFile
- AnyMechObjectExclude
- New model view features



New improved
MoCap framework

Existing MoCap examples are difficult...



New Framework for MoCap models

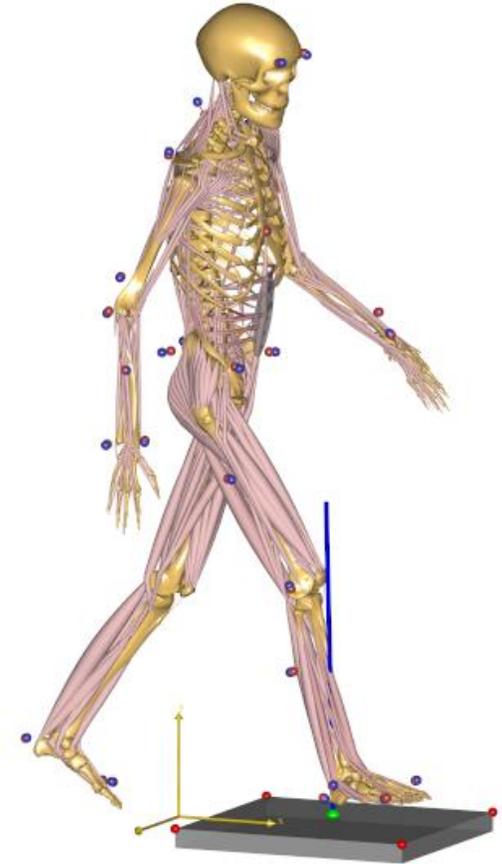
Makes MoCap models much simpler

Released early as beta application

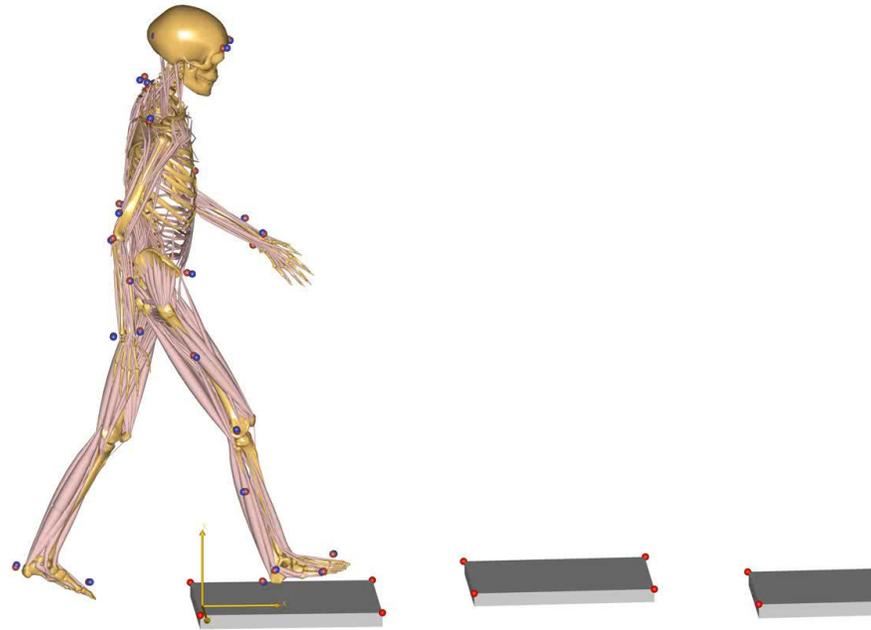
- Involve early adopters in the development
- Will eventually get into next AMMR release



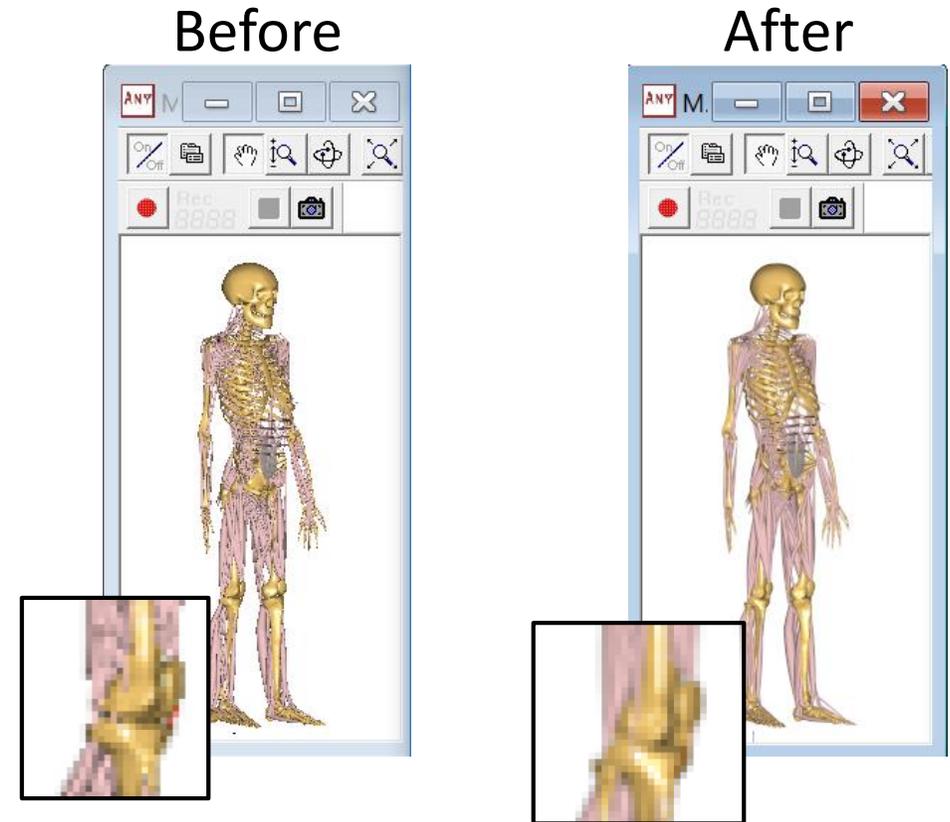
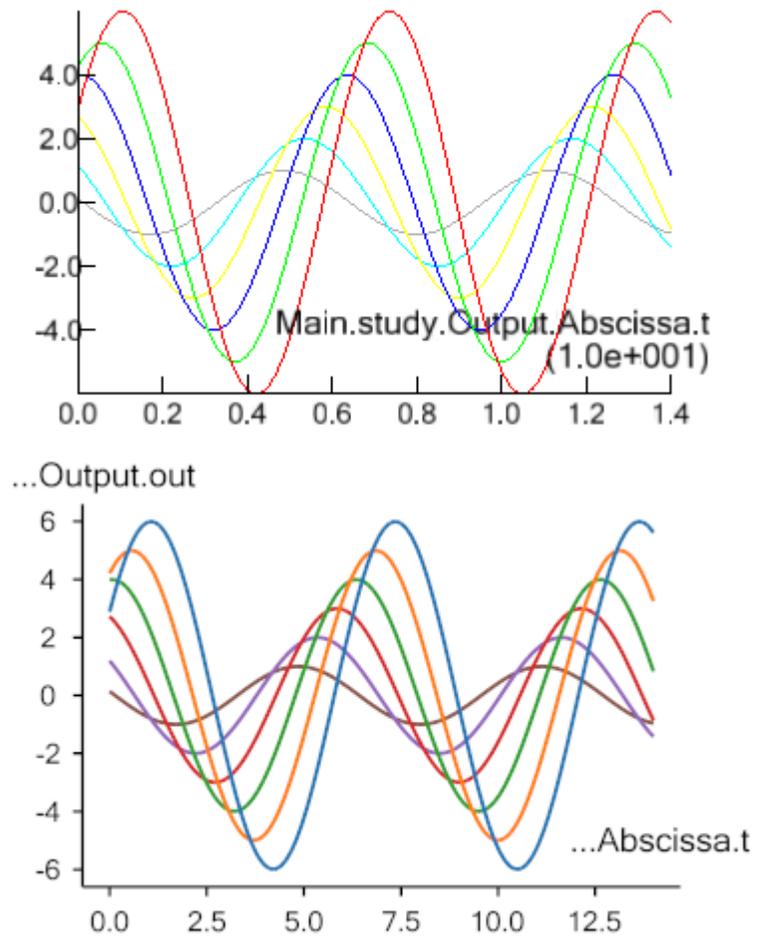
Get it here: <http://github.com/anybody/anymocap>



AnyMocap



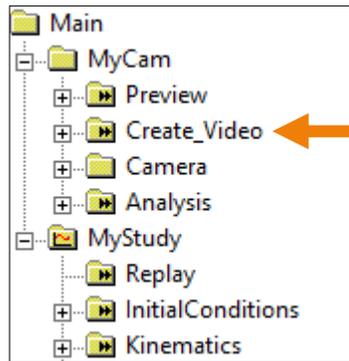
Graphical improvements



Example: Camera plug-in

Have you tried to make video of your simulations?

- A new model plug-in to create videos



Single Click to:

1. Run the analysis
2. Save all frames as images
3. Convert them to a video
4. Cleans up images
5. Play the video.

```
#include "CameraClassTemplate.any"

...

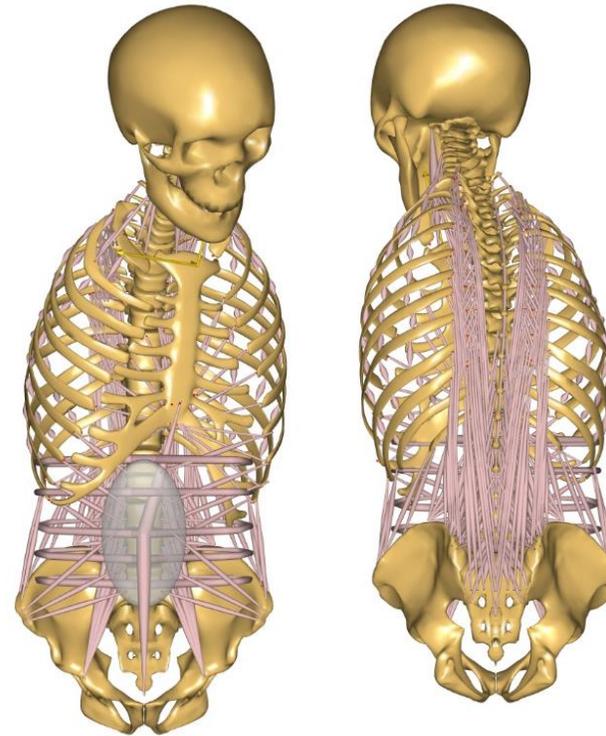
VideoLookAtCamera VideoMaker(UP_DIRECTION=y) =
{
    LookPoint2Camera_direction = {1, 1, -1};

    LookAtPoint = {0, 0, 1.3};

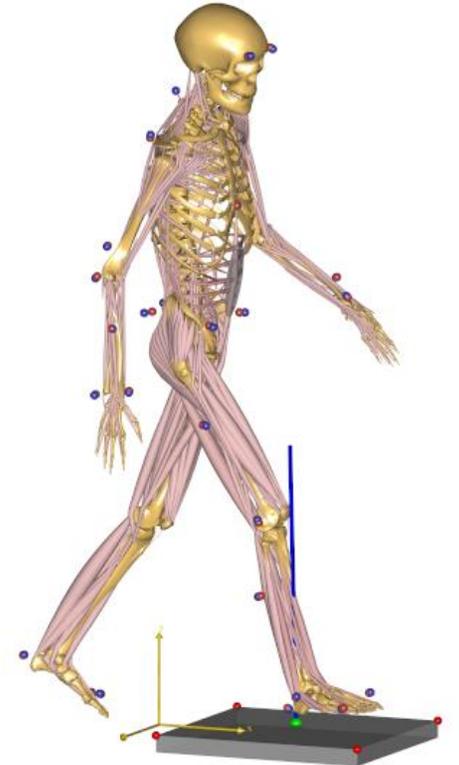
    Analysis = {
        AnyOperation &ref = Main.MyStudy.Kinematics;
    };
};
```

What can you expect in 2017?

- **New model repository**
 - New Lower limb model TLEM2.0
 - New thoracic model
 - Updated lumbar spine and pelvis
 - Many new application examples



New thoracic model

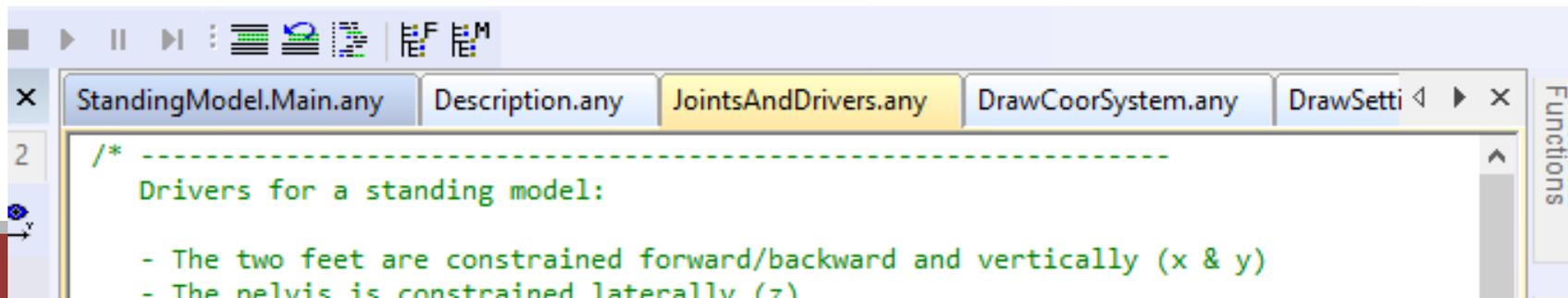
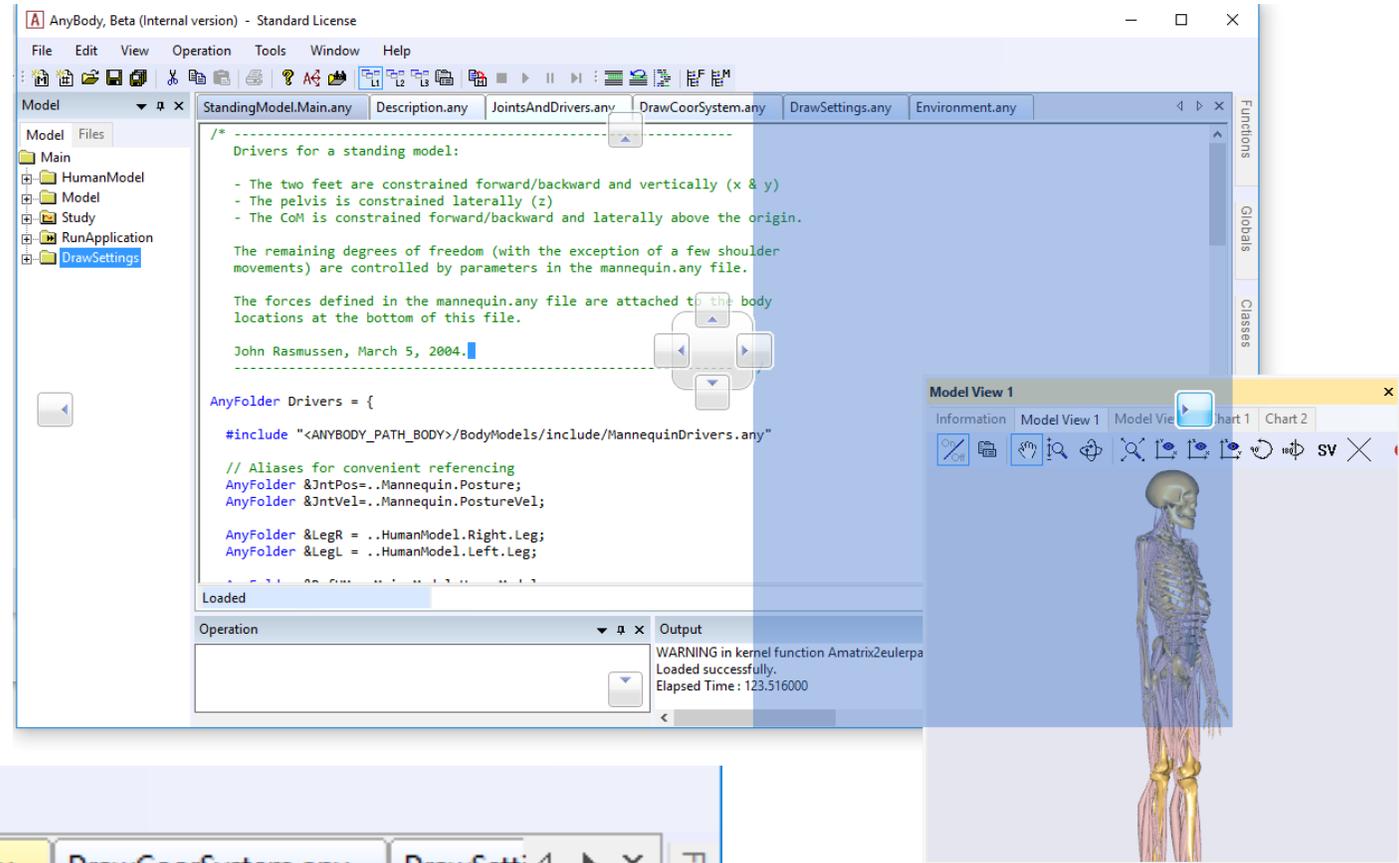


Twente Lower Extremity Model 2.0

What can you expect in 2017?

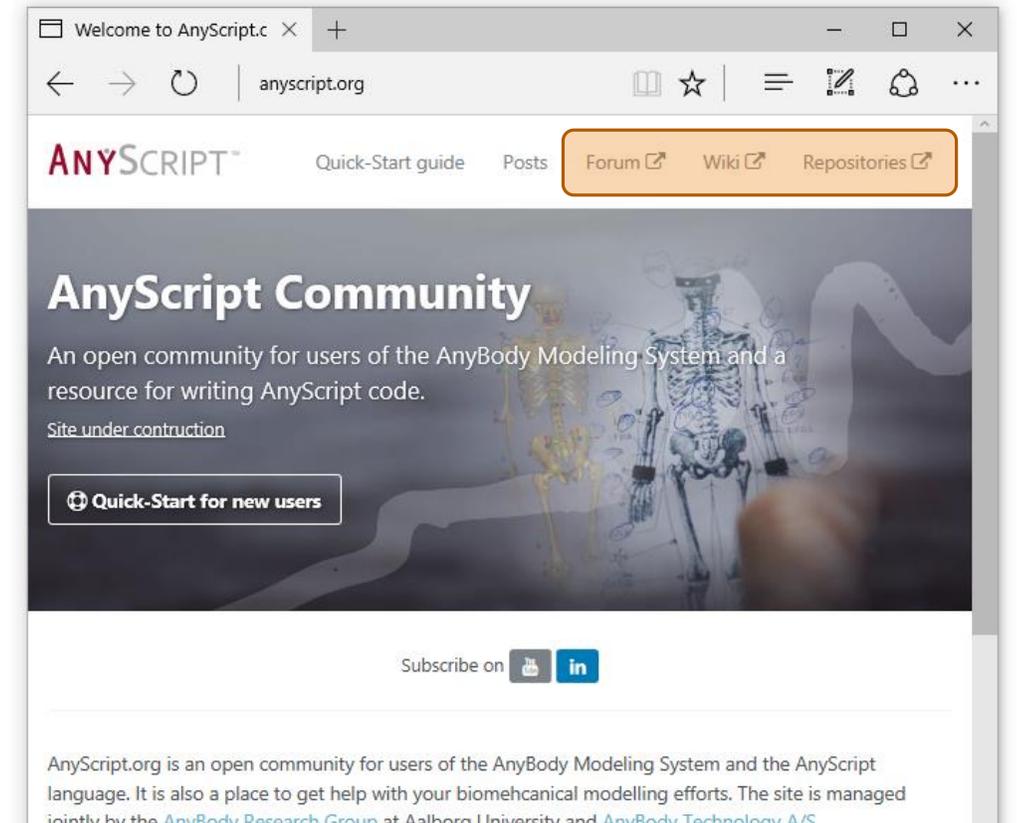
- **AnyBody Modeling System 7.0**

- New GUI system
- Tabbed editor
- More chart improvements
- New kinematic solvers
- Plugin system (Using Python)
- Software development kit



AnyScript.org

- Community site for Users and developers.
- Will have posts on:
 - Tips&Tricks for AnyScript
 - New models available
- Links to:
 - Forum
 - Wiki site (new)
 - Repositories (new)



Repository sharing

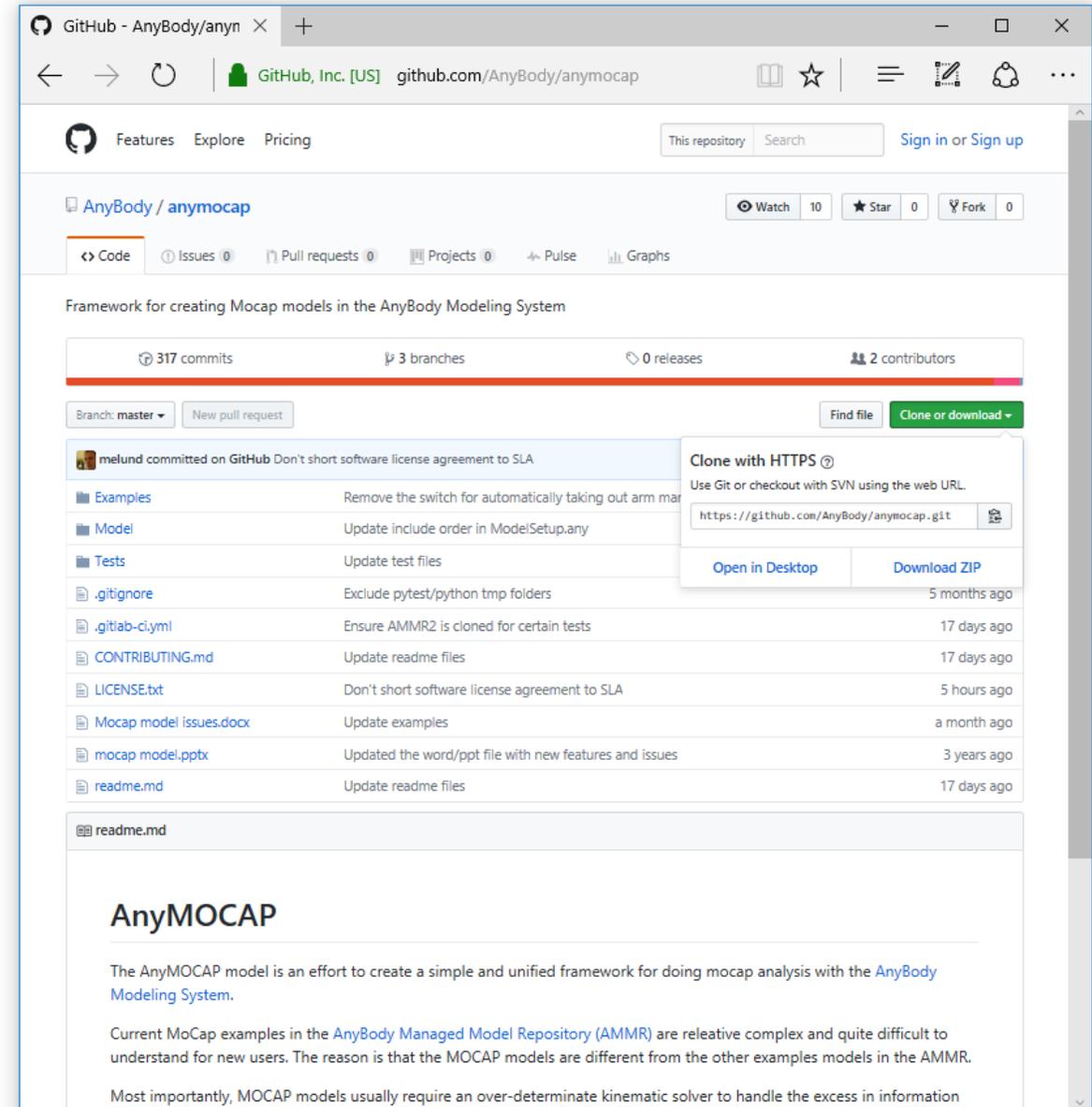
Online project hosting:

- GitHub. The biggest software development platform
- Version controlled repositories, issue tracking etc.

 <http://github.com/AnyBody>

- Download:
 - The examples models
 - New AnyMocap framework

-> and join the development



The screenshot shows the GitHub repository page for 'AnyBody / anymocap'. The repository has 317 commits, 3 branches, 0 releases, and 2 contributors. A file list is displayed with the following entries:

File	Commit Message	Time Ago
Examples	Remove the switch for automatically taking out arm mar	
Model	Update include order in ModelSetup.any	
Tests	Update test files	
.gitignore	Exclude pytest/python tmp folders	5 months ago
.gitlab-ci.yml	Ensure AMMR2 is cloned for certain tests	17 days ago
CONTRIBUTING.md	Update readme files	17 days ago
LICENSE.txt	Don't short software license agreement to SLA	5 hours ago
Mocap model issues.docx	Update examples	a month ago
mocap model.pptx	Updated the word/ppt file with new features and issues	3 years ago
readme.md	Update readme files	17 days ago

A 'Clone with HTTPS' dialog box is open, showing the URL: `https://github.com/AnyBody/anymocap.git`. Below the dialog, the 'readme.md' file content is visible, starting with the title 'AnyMOCAP' and a description: 'The AnyMOCAP model is an effort to create a simple and unified framework for doing mocap analysis with the AnyBody Modeling System.'

Previous webcasts

- Check our YouTube channel

www.anybodytech.com

- Events, dates, publication list, ...

www.anyscript.org

- Wiki, Forum, Repositories

Events:

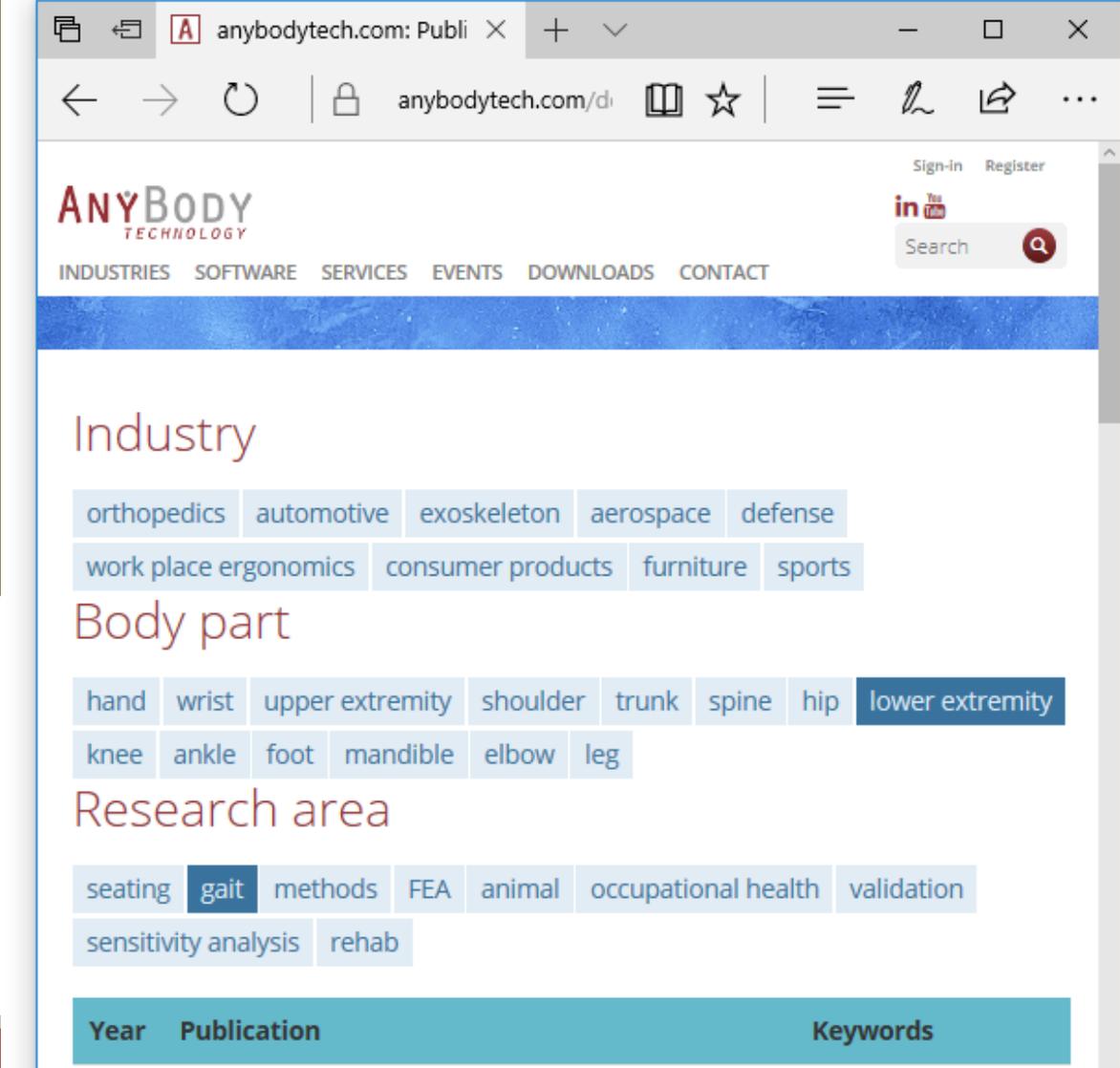
14-18 Mar: AAOS 2017 - San Diego, CA

19-22 Mar: ORS 2017 - San Diego, CA

19 Apr: Experience the AnyBody Spotlight Demo at WearRAcon 17 in Phoenix, AZ

 **Meet us?** Send email to sales@anybodytech.com

 **Note:** Close to 500 AnyBody related publications.

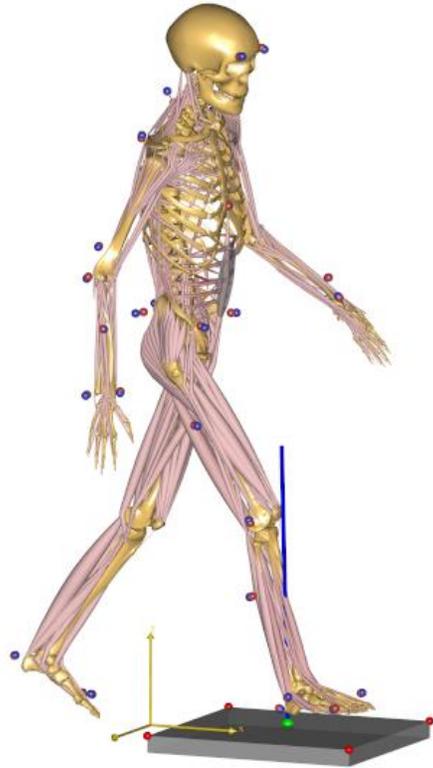


The screenshot shows the AnyBody Technology website with the following content:

- Browser tabs: anybodytech.com: Publi
- Address bar: anybodytech.com/di
- Navigation: Sign-in, Register, in YouTube, Search
- Menu: INDUSTRIES, SOFTWARE, SERVICES, EVENTS, DOWNLOADS, CONTACT
- Section: **Industry**
 - orthopedics, automotive, exoskeleton, aerospace, defense
 - work place ergonomics, consumer products, furniture, sports
- Section: **Body part**
 - hand, wrist, upper extremity, shoulder, trunk, spine, hip, lower extremity
 - knee, ankle, foot, mandible, elbow, leg
- Section: **Research area**
 - seating, gait, methods, FEA, animal, occupational health, validation
 - sensitivity analysis, rehab
- Table header:

Year	Publication	Keywords
2016	Carbone V, van der Krest M, Koozeman H, B	

Time for questions:



Welcome to AnyScript.c x +

← → ↻ | anysript.org

ANYSCRIPT™ Quick-Start guide Posts Forum Wiki Repositories

AnyScript Community

An open community for users of the AnyBody Modeling System and a resource for writing AnyScript code.

[Site under construction](#)

[Quick-Start for new users](#)

Subscribe on

AnyScript.org is an open community for users of the AnyBody Modeling System and the AnyScript language. It is also a place to get help with your biomechanical modelling efforts. The site is managed jointly by the [AnyBody Research Group](#) at Aalborg University and [AnyBody Technology A/S](#)