

Marker Set

1. Load a model

In this workshop we use gait2392 from the OpenSim model library (located in the OpenSim install folder): C:\OpenSim 3.3\Models\Gait2392_Simbody\gait2392_simbody.osim

You can also access the .osim model in the “2_MarkerSet” folder: **gait2392_simbody.osim**

2. Add markers

There are three ways to add markers to a model. You can 1) create markers in the .osim file using Notepad++ 2) create markers using the GUI directly or 3) append a marker set to the model importing the content of an XML file.

- **Option 1:** Edit the <MarkerSet> section of the .osim file in Notepad++

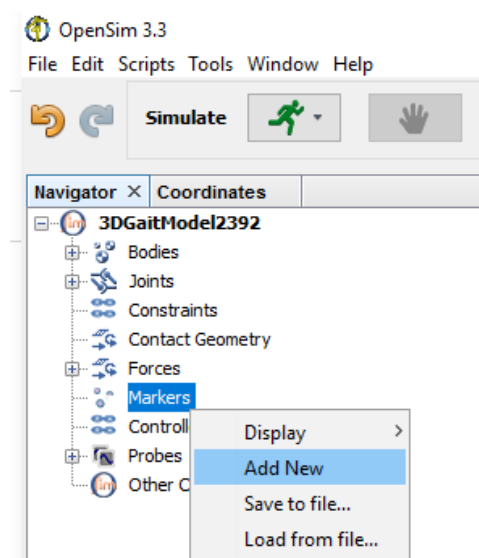
```
<MarkerSet>
  <objects>
    <Marker name="Sternum">
      <!--Body segment in the model on which the marker resides.-->
      <body>torso</body>
      <!--Location of a marker on the body segment.-->
      <location> 0.0400997 0.372474 0</location>
      <!--Flag (true or false) specifying whether or not a marker should be 1
      <fixed>false</fixed>
    </Marker>
    <Marker name="Neck">
      <!--Body segment in the model on which the marker resides.-->
      <body>torso</body>
      <!--Location of a marker on the body segment.-->
      <location> -0.07707 0.423049 0</location>
      <!--Flag (true or false) specifying whether or not a marker should be 1
      <fixed>false</fixed>
    </Marker>
    <Marker name="R.Shoulder">
    <Marker name="L.Shoulder">
    <Marker name="Xiphoid">
    <Marker name="Thoracic">
    <Marker name="Lumbar">
    <Marker name="Sacral">
    <Marker name="R.Asis">
    <Marker name="L.Asis">
```

- **Option 2:** Add markers manually using the GUI

Right click on “Markers” in the “Navigator” tab and select “Add New” to create a new marker.

Use “Ctrl + left click” to move the marker in the “View” window.

Marker properties can be modified in the “Properties” window.



- **Option 3:** Define a marker set in a distinct XML file (see below) and then use the ScaleTool to add these markers to a model.

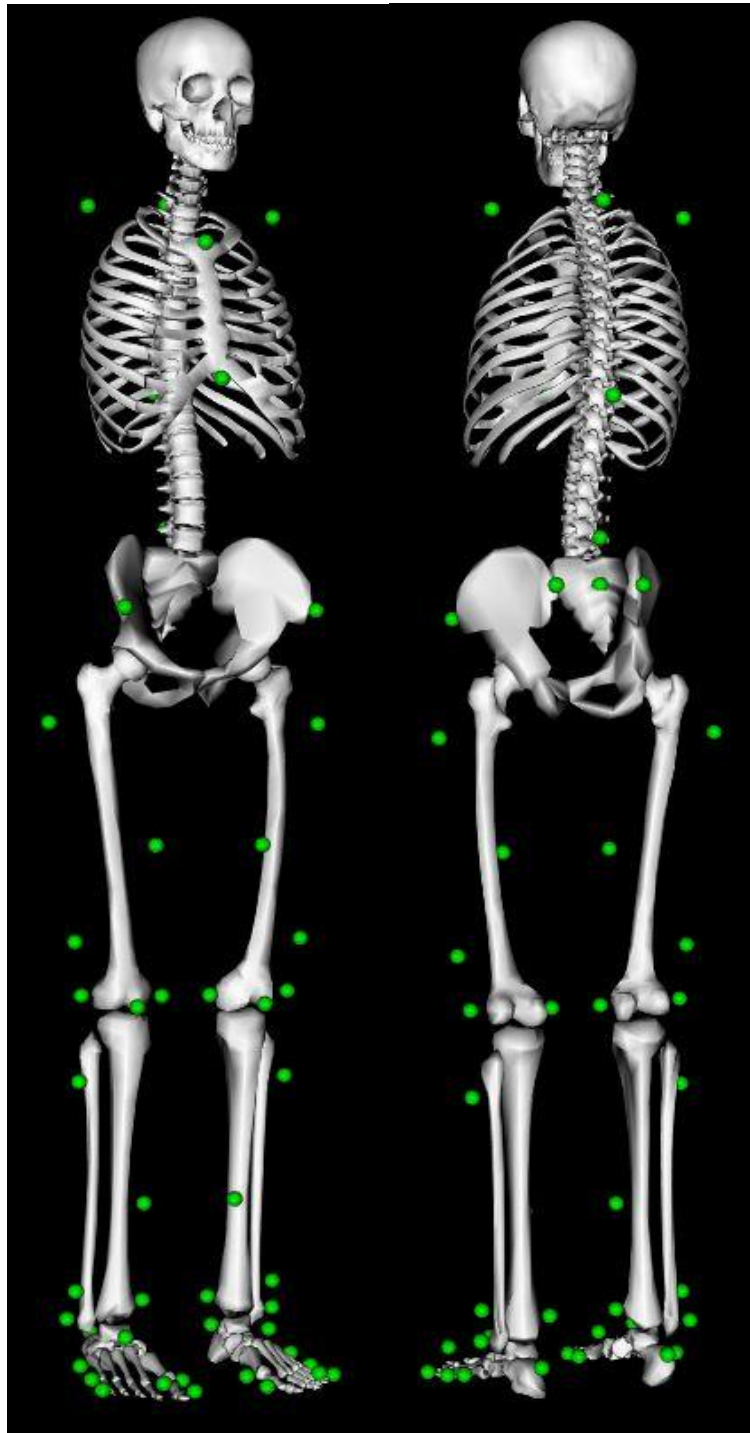
```
<?xml version="1.0" encoding="UTF-8"?>
<OpenSimDocument Version="20302">
  <MarkerSet name="gait2392_Scale">
    <objects>
      <Marker name="Sternum">
        <!--Body segment in the model on which the marker resides.-->
        <body> torso </body>
        <!--Location of a marker on the body segment.-->
        <location>0.7 0.3 0</location>
        <!--Flag (true or false) specifying whether or not a marker should be kept
        fixed in the marker placement step. i.e. If false, the marker is
        allowed to move.-->
        <fixed> false </fixed>
        <!--Used for displaying a marker in the visuals.-->
        <VisibleObject name="">
          <!--Set of geometry files and associated attributes, allow .vtp, .stl,
          .obj-->
          <GeometrySet name="">
            <objects/>
            <groups/>
          </GeometrySet>
          <!--Three scale factors for display purposes: scaleX scaleY scaleZ-->
          <scale_factors>1 1 1</scale_factors>
          <!--transform relative to owner specified as 3 rotations (rad) followed by
          3 translations rX rY rZ tx ty tz-->
          <transform>0 0 0 0 0 0</transform>
          <!--Whether to show a coordinate frame-->
          <show_axes> false </show_axes>
          <!--Display Pref. 0:Hide 1:Wire 3:Flat 4:Shaded Can be overridden for
          individual geometries-->
          <display_preference> 4 </display_preference>
        </VisibleObject>
      </Marker>
      <Marker name="R.Acromium">
      <Marker name="L.Acromium">
      <Marker name="Top.Head">
      <Marker name="R.ASIS">
      <Marker name="L.ASIS">
      <Marker name="V.Sacral">
      <Marker name="R.Thigh.Upper">
      <Marker name="R.Thigh.Front">
```

We will practice all options during the workshop. In the “2_MarkerSet” folder you will find a partially complete (**workshop_incompleteMarkerSet.xml**) and a full (**workshop_fullMarkerSet.xml**) XML marker set. You can use the first one to practice to add markers on a model (missing markers are specified below), and check your final marker set against the provided complete one.

This marker set is based on the description from the “Fifth Grand Challenge Competition to Predict In Vivo Knee Loads”, which can be found in the “2_MarkerSet” folder: **MarkerSetDescription.pdf**

Remember that virtual markers in the .xml or .osim file and experimental markers in the .trc file should have **the exact same names**.

This is a screenshot of the complete marker set used in the tutorial:



NOTE: For this workshop not all markers from the description file are needed. Missing markers from the partially complete marker set are:

- Right ASIS
- Left ASIS
- Right PSIS
- Left PSIS
- Sacral
- Right Knee Lateral
- Left Knee Lateral

3. Useful links

Please consult the webpage: <https://simtk-confluence.stanford.edu/display/OpenSim/Scale+Marker+File>.