

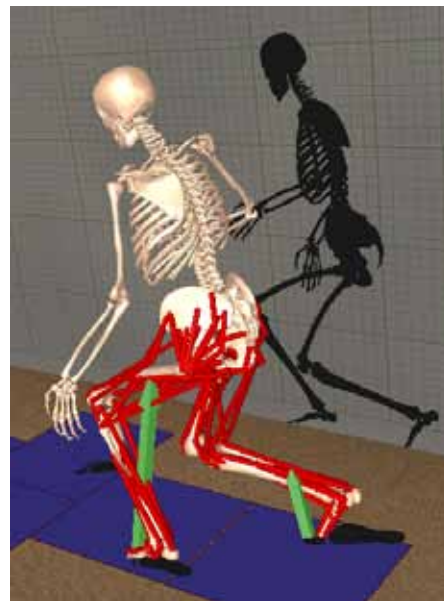
# SIMM Modules

## SIMM Base

SIMM Base is a complete model creation and kinematics analysis program. Between the graphical interface and editing of text files, users can create models of any musculoskeletal structure and perform kinematic analyses on them. Isometric forces in the muscles can be calculated, but to do any inverse or forward dynamics, the Dynamics Pipeline or FIT Module is needed. SIMM comes with a full-body model that has a comprehensive lower extremity, and a simplified upper extremity with no muscles. Includes the SIMM Viewer which allows colleagues and students who do not have a SIMM license to view SIMM data. View and animate models, as well as plot muscle properties and motion variables.

## Dynamics Pipeline

The Dynamics Pipeline is an optional module that allows forward and inverse dynamics analyses. It requires SD/FAST and Visual Studio. The Dynamics Pipeline generates C & C++ source code for a simulation, which is then compiled with Visual Studio. Visual Studio automatically calls SD/FAST to generate some



## FIT Module

The FIT Module is a subset of the Dynamics Pipeline, so users should never need both. The FIT Module does not require SD/FAST or Visual Studio and does not provide access to the source code. It comes with one dynamic DLL, customized to their musculoskeletal model. The model can be scaled to fit any subject, and any property of any muscle can be changed.

## Real-Time Motion Module

The Real-time Motion Module imports motion files created by Motion Analysis systems. Motions are mapped onto a pre-built, customizable, full-body model with 344 anatomically accurate muscles. The body segments, joint kinematics, and muscle attachment sites of the model are scaled to match the size of the subject whose motion is being recorded. This is the ideal tool for clinicians and researchers who want to visualize the relationships between muscle activity, external forces, and the resulting body motion.

## C3D Module

The C3D Module is the Motion Module without the real-time component. It imports TRB/TCR files as well as C3D files. It is meant for use with non-Motion Analysis Corporation motion capture systems.

## Generic Knee Model

The Generic Knee Model is a high-resolution model of the knee derived from plastic bone models and MRI data. It contains four bones (femur, tibia, fibula, and patella), five ligaments (anterior and posterior cruciate, medial and lateral collateral, and patellar ligaments), and the lateral and medial menisci. The model has two degrees of freedom that represent flexion-extension and varus-valgus. It does not plug into any of the full-body models, and cannot be scaled with a static trial to fit different subjects.

## Full-Body Model

The Full Body Model is a comprehensive model of an average adult that was made by assembling components that were developed and validated by various researchers. Unlike the full body model that comes with SIMM, this model contains a detailed kinematic model of the shoulder, as well as 100 upper extremity muscles.