Module name	**Geometric Modeling and Animation**
Module number	CMS-TRK-GMA
Senior Lecturer	Prof. Dr. Stefan Gumhold stefan.gumhold@tu-dresden.de
Qualification objectives	Students have an overview of the hardware and algorithms needed to create an animable digital image of a human character. They have an overview of surface representations and know the basic algorithms to evaluate and present these surface representations. You can assess which 3D scan technology is most suitable for which use. You know the algorithms needed to generate surface models from 3D scans. They know the mathematical representations for rigid body transformations and can use them to articulate 3D models. They have an overview of character animation techniques and know how to convert a simulated surface into character animation.
Contents	The module includes the surface representations with point-based, implicit and split-based representations, 3D scans discussing scanning procedures and scanning processing algorithms, skeletal-based object representations with mathematical representations for rigid body transformations, representations for articulated objects, basics of inverse kinetics, and algorithms to extract skeletal representations. Other content includes character animation of different techniques for the representation and animation of virtual people.
Forms of teaching and learning	The module includes lectures of 2 SWS, exercises of 2 SWS and self-study. The language of the lectures and exercises will be English.
Eligibility for participation	The skills to be acquired in the CMS-TRK-FCG Foundations of Computer Graphics module are required.

Usability	In the Masters Course Computational Modeling and Simulation, the module is a compulsory optional module in Track Visual Computing and in Track Computational Life Science, to be selected in accordance with Annex 2 to the Specific Examination Regulations. The module cannot be chosen in the Master's Course Computational Modeling and Simulation if this or a module with substantially the same content from a Course with which the entry conditions under § 3 of the Studienordnung have been met has already been completed. The module provides the pre-requisites for the modules it designates under the pre-requisites for participation.
Conditions for the award of credits	Credits are awarded when the module test is passed. The module test consists of a 90-minute away day. Bonus performance for away time is the release of 15 hours of exercise tasks. The language of the test will be English.
Credits and marks	The module allows 5 credit points to be obtained. The module score corresponds to the test performance score.
Frequency of the module	The module is offered every summer semester.
Workload	The total workload is 150 hours.
Duration of the module	The module covers 1 semester.