Einladung zum Vortrag

IMMERSED MOLECULAR ELECTROKINETIC FINITE ELEMENT METHOD FOR NANO-DEVICES IN BIOTECHNOLOGY AND DRUG DELIVERY

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The lecture opens with a discussion on modern uses of multiscale analysis, uncertainty quantification techniques, and validation experiments for the design of nanodevices in biotechnology and medicine. The 3D immersed molecular electrokinetic finite element method (IMEFEM) will be presented for the modeling of micro fluidic electrokinetic assembly of nano wires and filaments and bio-molecules. This transformative bio-nanotechnology is being developed to enable drug delivery systems to achieve desired therapeutic effects and for the design and optimization of an electric field enabled nanotip DNA sensor. For the Nanodiamond-based drug delivery device we will discuss the multiscale analysis, quantum and molecular mechanics, immersed finite element and meshfree methods, uncertainty quantification, validation experiments. In addition, we will describe the mathematical formulation of pH control interactions among chemically functionalized nanodiamond, doxorubicin hydrochloride drugs and biocompatible parylene polymer. For the nanotip, we will discuss the underlying mechanics and physical parameters influencing the bio-sensing efficiency of the nanotip, such as the threshold of applied electric field, nano/microfluidics, bio-molecule deformation, and nanoscale Brownian motion. Through multiscale analysis, we will provide guidelines for nanodevice design, including fundamental mechanisms driving the system performance and optimization of distinct parameters for the high-sensitivity device throughput.

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11:00 Uhr **MW 0250**

Für weitere Informationen: http://www.lnm.mw.tum.de/events
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