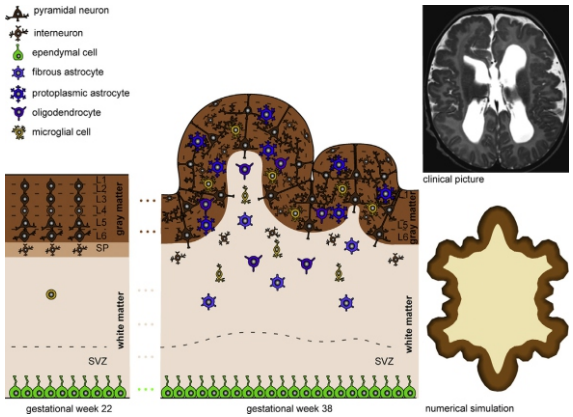

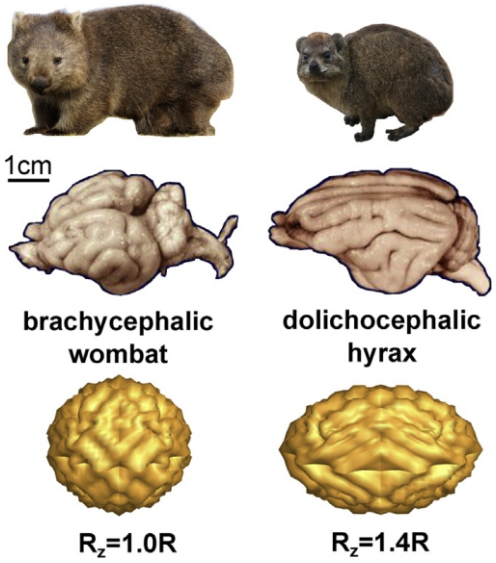

Prof. Dr.-Ing. habil. Ellen Kuhl
Department of Mechanical Engineering and Bioengineering
Stanford University, Stanford, United States
E-Mail: ekuhl.at.stanford.edu
http://biomechanics.stanford.edu/Main_Page

Dr.-Ing. Silvia Budday
Lehrstuhl für Technische Mechanik
FAU Erlangen-Nürnberg
E-Mail: silvia.budday@fau.de
https://www.ltm.tf.fau.de/

Kontakt:
Lehrstuhl für Technische Mechanik
Dr.-Ing. Silvia Budday
Egerlandstraße 5, 91058 Erlangen
Tel.: 09131/85 67611
silvia.budday@fau.de

FRIEDRICH-ALEXANDER UNIVERSITÄT ERLANGEN-NÜRNBERG
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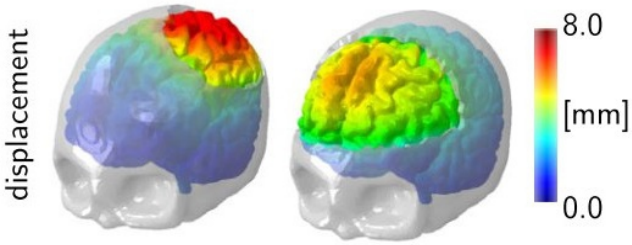
Lehrstuhl für Technische Mechanik



Einladung zur Vorlesung

„Introduction to Neuromechanics“

Prof. Dr.-Ing. habil. Ellen Kuhl
Dr.-Ing. Silvia Budday

im Sommersemester 2019

Lehrstuhl für Technische Mechanik

Der Lehrstuhl für Technische Mechanik der Friedrich-Alexander-Universität Erlangen-Nürnberg lädt ein zur Vorlesung

„Introduction to Neuromechanics“

Prof. Dr.-Ing. habil. Ellen Kuhl
Dr.-Ing. Silvia Budday

Termine:

Montag,	**17.06.19**	**14:00 - 15:30** **16:00 - 17:30**
Dienstag,	**18.06.19**	**8:30-10:00** **10:30-12:00**
Mittwoch,	**19.06.19**	**14:00 - 15:30** **16:00 - 17:30**
Montag,	**24.06.19**	**14:00 - 15:30** **16:00 - 17:30**
Dienstag,	**25.06.19**	**8:30-10:00** **10:30-12:00**
Mittwoch,	**26.06.19**	**14:00 - 15:30** **16:00 - 17:30**

Seminarraum 00.044
Lehrstuhl für Technische Mechanik
Egerlandstraße 5
91058 Erlangen

Informationen: silvia.budday@fau.de

Objectives:

Our brain is not only our softest, but also our least well-understood organ. Floating in the cerebrospinal fluid, embedded in the skull, it is almost perfectly isolated from its mechanical environment. Not surprisingly, most brain research focuses on the electrical rather than the mechanical characteristics of brain tissue. Recent studies suggest though, that the mechanical environment plays an important role in modulating brain function. Neuromechanics has traditionally focused on the extremely fast time scales associated with dynamic phenomena on the order of milliseconds. The prototype example is traumatic brain injury where extreme loading rates cause intracranial damage associated with a temporary or permanent loss of function. Neurodevelopment, on the contrary, falls into the slow time scales associated with quasi-static phenomena on the order of months. A typical example is cortical folding, where compressive forces between gray and white matter induce surface buckling. To understand the role of mechanics in neuroanatomy and neuromorphology, we begin this course by discussing the brains's anatomy and correlate our observations to neurophysiology. We discuss morphological abnormalities including lissencephaly and polymicrogyria and illustrate their morphological similarities with neurological disorders including schizophrenia and autism. Then, we address the role of mechanics during brachycephaly, plagiocephaly, tumor growth, and hydrocephalus. Last, we explore the mechanics of traumatic brain injury with special applications to shaken baby syndrome.

Suggested Reading:

Goriely A, Budday S, Kuhl E. Neuromechanics: from neurons to brain. Adv Appl Mech. 2015;48:79-139.
http://biomechanics.stanford.edu/paper/AAM15.pdf [1]