

## 3 (Post-)doctoral positions in the field of Mechanics-augmented brain surgery

Department Maschinenbau (MB), Erlangen, TV-L E 13, Vollzeit, Befristete Anstellung,  
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### Ihre Aufgaben

Brain tissue's softness poses serious risks during surgery. Despite rapid advances in virtual al reality (VR) or augmented reality (AR) that enhance surgical outcomes, current solutions often overlook brain tissue mechanics, such as the complex region-dependent mechanical properties of brain tissue and mechanics-induced cell dysfunction or death.

In this ERC funded project, we aim to minimize unnecessary brain tissue damage by integrating continuum mechanics-based simulations into VR/AR solutions. To this end, we plan to combine simultaneous large-strain mechanical measurements and multiphoton microscopy (A1) with continuum mechanics modeling and simulations (A2 & A3) to identify thresholds for tissue and cell damage under complex three-dimensional loadings. By merging simulation results and VR/AR techniques (A4), this project strives towards real-time predictions of brain tissue deformation and corresponding damage.

To accomplish these goals, we are looking for three talented and motivated scientists:

- (1) One (post-)doctoral researcher (f/m/d) with a background in engineering or biology will establish the experimental setup, perform the experiments, and analyze the corresponding data (A1). We particularly welcome applications from postdoctoral researchers with a background in cell/molecular biology and 3 years of experience working with genetically modified cells/organisms. They will have the opportunity to expand their horizons towards the emerging field of brain mechanics and mechanobiology, combining state-of-the-art approaches in cell biology and mechanics.
- (2) One (post-)doctoral researcher (f/m/d) with a background in mechanical/computational/biomedical engineering will develop the continuum mechanics model (A2), implement the corresponding equations within a finite element framework using the C++ based FE library deal.ii, and perform the inverse parameter identification (A3) for model calibration.
- (3) One postdoctoral researcher (f/m/d) with a background in computational engineering or computer science will work on the challenging tasks of real-time deformation models and the integration into existing VR/AR frameworks (A4). The candidate will uniquely combine fundamental knowledge in nonlinear finite element modeling and advanced machine learning techniques with the exciting technology of VR/AR.

### Ihr Profil

### Notwendige Qualifikationen:

Master's degree in a related field of study (see individual positions 1-3)

**Wünschenswerte Qualifikationen:**

fluent in English and German

**Stellenzusatz**

Befristetes Forschungsvorhaben

You will become part of an extremely engaged, innovative team with international collaborators, state-of-the-art equipment, and an environment providing room for creativity and personal development.

The contract conditions and the salary will be according to the collective labour agreement for public service employees of the federal states of Germany (E13 TV-L).

Please send your application documents (application letter, CV, training and employment references) in electronic form (as ONE PDF-file) to [silvia.budday@fau.de](mailto:silvia.budday@fau.de).

We welcome applications from scientists of all genders.

**Interessiert?**

Die vollständige Stellenausschreibung sowie alle Infos zum Bewerbungsverfahren finden Sie hier:

