



INSTITUTE FOR APPLIED PHYSICS

MASTER THESIS OPPORTUNITY

Constructing and testing an apparatus for measuring the adhesive energy of natural cements and glues

We are searching for an experimentally skilled and highly motivated master student interested in biologic and biomimetic adhesion for a project in the area of tissue gluing. Together with a collaboration partner from MedUni Wien we aim to construct an apparatus for measuring the adhesive strength of natural, biomimetic, and synthetic glues that may be applied in tissue gluing.

General requirements: Enrolled in master program (FH or University) in chemistry, physics, material sciences, or similar; excellent command of English (oral and written).

Project Abstract: Wet adhesives intended for tissue gluing during surgery should ideally be biocompatible and non-toxic while maintaining specific mechanical and superior adhesive properties. In this context, for more than one decade the search for appropriate substances has been focused on biological sources and inspiration such as mussels, barnacles, geckos, and insects such as flies, ticks and many others that adhere well to diverse surfaces and/or tissues. However, a direct measurement and standardized benchmarking of natural glues and its biomimetic derivatives is still not possible to date.

For this purpose, we are currently designing a custom-made system of micro-tweezers that will be attached to a micromanipulator. This apparatus will allow us to pull off natural cements and glues in a precise and controlled way, while simultaneously adhesive forces and work of adhesion can be recorded and normalized. The newly designed system will be tested using natural cement excreted by ticks. This project potentially results in a generally applicable apparatus for measuring and evaluating the power of natural and synthetic glues for applications in medical and technical sciences.

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