

## MASTERS THESIS

# Paired Load and Velocity Influence on Friction and Wear of Metal Surfaces

## Background

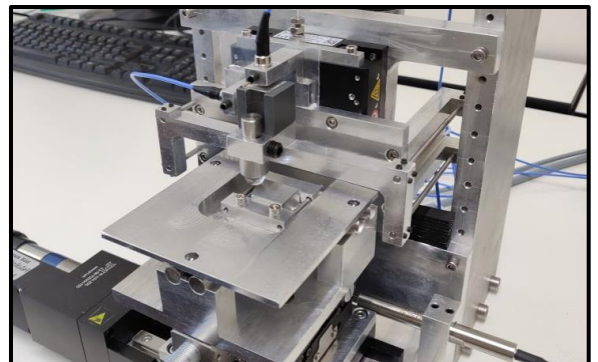
Friction and wear govern the reliability, energy consumption and operating limitations of virtually every mechanical device. Thus, these two phenomena have profound implications for our economic prosperity, environmental sustainability and healthcare. In metals, surface and sub-surface microstructural alterations have been deemed the major path for frictional energy dissipation, and therefore, these buried transformations hold the key to making metals more wear-resistant and friction-tunable. To unravel the joined effects load and velocity on friction and wear, we have designed experimental methodologies, whose duration fits well with the duration of a master's thesis.

## Tasks

In this experimental work, the influence of load and velocity on friction, wear, and microstructure development of high-purity copper will be analyzed. New test equipment, which was constructed to carry out the necessary experiments, will be improved and used for the experiments. The microstructure is to be thoroughly characterized on a scanning electron microscope and analyzed in conjunction with the measured friction.

### Proposed Timeline (6 months total):

- Literature Review (2 weeks)
- Instrument design, calibration (4 weeks)
- Experiment Preparation (2 weeks)
- Experimental Data Collection (6 weeks)
- Data Analysis (4 weeks)
- Thesis Writing and Revision (5 weeks)
- *Buffer week* (1 week)



*Load-adjustable Friction and Wear Tester*

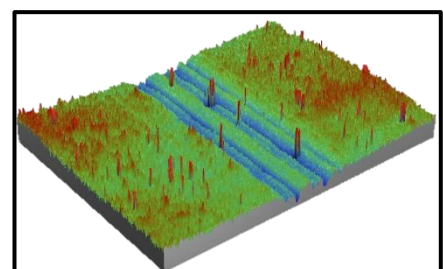
## Requirements

Students in the fields of mechanical engineering, materials science or similar. Previous knowledge in the field of tribology is not necessary. A conscientious and independent way of working, as well as interest in hands-on work are of central importance.

**Possible start: as soon as possible**

## Contact

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*Surface Wear Scar (~50 nm deep)*