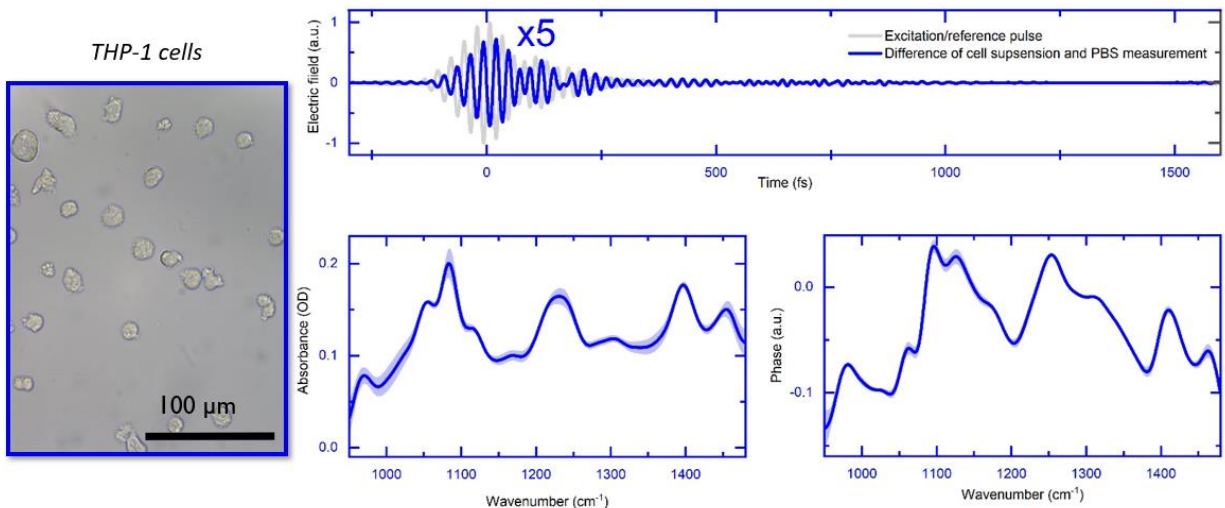


Master's project on field-resolved infrared spectroscopy of living cells

(for master students of Physics, Biophysics or related subjects)



The group of **Broadband Infrared Diagnostics** (BIRD group), at the Chair of Experimental Physics at Ludwig-Maximilians-Universität München, is a unique collaborative venture involving laser specialists, molecular life scientists, mathematicians and clinicians, devoted to the use of state-of-the-art laser-based field-resolved infrared spectroscopy (FRS) for applications in biology and medicine (www.attoworld.de/bird; www.lasers4life.de). Our group is based at the Research Center in Garching (Forschungszentrum Garching, Section Physics of LMU, Am Coulombwall 1, 85748 Garching), which is easily accessible by public transport.

In the proposed master project, we want to test the ability of our technique to distinguish different cell types on the basis of their infrared spectra. In general, mid-infrared spectroscopy is sensitive to the molecular composition of a sample, which eventually allows the identification of different sample types. Recently, we could show for the first time that the increased sensitivity of FRS allows us to detect the infrared spectrum of living cells in aqueous media with a high signal-to-noise ratio.¹ In a follow-up work we plan to perform measurements on different cell types and cellular conditions to investigate whether they can be identified by their measured infrared spectra. This is the first step towards label-free cell cytometry.

Please address your interest to join our team to our group leader Dr. Mihaela Zigman (mihaela.zigman@mpg.de), Dr. Frank Fleischmann (frank.fleischmann@physik.uni-muenchen.de; phone: 089 289 54056) or Marinus Huber (huber.marinus@physik.uni-muenchen.de).

¹Pupeza, I.; Huber, et al. Field-Resolved Infrared Spectroscopy of Biological Systems. *Nature* 2020, 577 (7788), 52–59. <https://doi.org/10.1038/s41586-019-1850-7>.