isoSTED nanoscopy [1] utilizes a 4Pi-interferometric double lens configuration in order to create an efficient 3D-STED depletion pattern [2]. It offers isotropic resolution in the 30 nm range within fixed cell samples [3], where bright and stable dyes are available as markers, and sample conditions can be tightly controlled.

**Figure:** Three-dimensional dual-color isoSTED nanoscopy of cultured hippocampal boutons showing the localization of surface-stranded Syt1 at synapses identified by the postsynaptic marker Homer1. z-Projection (left) and volume rendered data (right). Scale bar 1µm. [4]

Living specimen however still present a considerable challenge, as they potentially react to the incident light and often deteriorate the point spread function to the point where only selected structures remain accessible for imaging.

Building upon the concepts of isoSTED and low power RESOLFT, we present a robust method that offers isotropic, nanoscopic resolution for the imaging of arbitrary shaped structures, anywhere inside a living cell.