

# Optical Microscopy as a tool for Characterizing Biological Molecules

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## ABSTRACT

Optical microscopy plays a huge role in biological analyses and characterization. The goal of this text is to make the user familiar (expertise comes with working on it!) with the state-of-the-art microscopy equipment that we have in our research facility. The document is divided into six chapters according to the way it went during my research and according to the way I would like new users to understand the research with respect to the system.

Chapter 1 deals mainly with the motivation for optical characterization in the current research that is being pursued by Chrisey group.

Chapter 2 describes the microscope system, its components and how to use it efficiently. This chapter basically is a concise user manual written for a new user to have a handy reference. This can also be useful to correct some of the common mistakes while operating the system.

Chapter 3 impresses upon various techniques of optical microscopy and how they relate to the system that we have.

Chapter 4 shows some of the examples of optical characterization of biological entities for various experiments that were conducted by Chrisey group.

Chapter 5 touches on *in vitro* synthesis, manipulation, characterization and application of microtubules with motor proteins towards a nanoscale transport system.

Chapter 6 gives the conclusion and the future outlook for the current research that is being pursued as well as for the optical characterization.