Preface

Absorption of photons by any molecule transports its electrons from a singlet ground state (S_0) to a singlet excited state (S_1). As these excited electrons return to the ground state (S_0), they release energy in the form of light, which corresponds to a longer wavelength than the absorbed photon. This phenomenon is known as fluorescence. Utilizing the phenomenon of fluorescence, there exist several specific chemical sensors that can be used in the detection and imaging of biomolecules, biochemicals and other complex mixtures that were previously intractable. These chemical species are known as fluorescent detectors and find application in a multitude of research work, both commercial as well as therapeutic purposes.

Chapter 1 gives a comprehensive idea about the phenomenon of fluorescence, fluorescence dyes and their classes, fluorophores and auxochromes, fluorescent detectors and their role in bioimaging. Additionally, the advancement of amino-based auxochromes over the years has also been broadly discussed.

In **Chapter 2**, we identified the problems associated with existing auxochromes and set our aim and objective for the study.

Chapter 3 outlines the exploration of annulated azacoumarins as potential fluorophores and their further application in the synthesis of hydrogen peroxide-detecting fluorescent probe in living cells.

Chapter 4 demonstrates the identification of cycloalkylamines as potential auxochromes for coumarin fluorophores.

Chapter 5 is a continuation of the previous chapter where the scope of cycloalkylamines as auxochromes are explored further by demonstrating their effect in other fluorophores, such as, naphthalimide and 4-nitrobenzoxadiazole scaffolds.

Chapter 6 outlines the design and synthesis of a cycloalkylamine auxochrome functionalized naphthalimide-based fluorescent probe for the detection of glutathione in living cells.

Chapter 7 comprises the summary and conclusions of the findings of this work, followed by an insight into the future prospects of this research work.

An appendix of additional supporting information, ^{1}H-NMR, ^{13}C-NMR and HRMS spectra of representative compounds, and a list of publications from the course of the Ph.D. are included.