



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI  
SHORT ABSTRACT OF THESIS

Name of the Student : Suman Kalyan Das

Roll Number : 11612228

Programme of Study : Ph.D.

Thesis Title: **DESIGN, SYNTHESIS AND STUDIES ON THE PHOTOPHYSICAL PROPERTIES OF UNNATURAL C-TRIAZOLYL, ARYL FUSED N-TRIAZOLYL NUCLEOSIDES AND HYBRIDISATION ACCOMPANYING FRET EVENT IN ANOTHER SET OF CHIMERIC DNA DUPLEXES**

Name of Thesis Supervisor(s) : 1

Thesis Submitted to the Department/ Center : Yes

Date of completion of Thesis Viva-Voce Exam : 27.10.2017

Key words for description of Thesis Work : Unnatural Oligonucleoside

---

SHORT ABSTRACT

In short **Chapter 1** is a review on the synthesis of unnatural C-nucleosides. **Chapter 2** deals with the cobalt catalyzed conversion of 1'- $\alpha$ -ethynyl sugar to 1'- $\beta$ -ethynyl sugar followed by the synthesis of C-triazolyl- $\beta$ -nucleosides  $\alpha$ BD<sub>o</sub>/Ac and their photophysical study. In **Chapter 3**, the synthesis of an angularly expanded compact hydrophobic Fused triazolyl phenanthrene unnatural nucleoside **FTPhen** and its photophysical properties are described. In addition, its DNA duplex stabilization within a trimeric DNA duplex against all the natural nucleobases was explored theoretically. **Chapter 4** explains the synthesis of an angularly expanded fused triazolyl nucleoside **FTQuon** which retains a donor and an acceptor face to make hydrogen bonds with cytosine and thymine. Theoretical calculation suggested that this angularly expanded fused triazolyl nucleoside can act as a complementary nucleoside against cytosine and thymine. **Chapter 5** illustrates FRET event within a chimeric DNA duplex involving triazolyl phenanthrene labelled unnatural nucleoside  $\tau$ PhenBD<sub>o</sub> as a FRET donor and oxopyrene oxoPyU or perylene PerU labelled natural nucleoside as a FRET acceptor.