INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student	:	SURADIP DAS
Roll Number	:	10610612
Programme of Study	:	Ph.D.
Thesis Title:		ARTIFICIAL SCAFFOLDS FOR NEURAL TISSUE ENGINEERING
Name of Thesis Supervisor(s)	:	Prof. Utpal Bora
Thesis Submitted to the Department/ Center	:	Biosciences and Bioengineering
Date of completion of Thesis Viva-Voce Exam	:	18.03.2016
Key words for description of Thesis Work	:	Silk, Polyaniline, nanocomposite, nerve conduit, nerve regeneration

SHORT ABSTRACT

The present study demonstrates the utility of nanocomposite based scaffolds as potential biomaterials for fabricating nerve conduits. Although silk fibroin is one of the most used biomaterial as an implant (sutures), its highly insulating properties render it unsuitable for fabricating scaffolds for mimicking the electrically conductive tissues of the body like nerve and cardiac muscles. We hereby demonstrate how silk based nanocomposites consisting of metallic nanoparticles and conducting polymer enhances functional and morphological regeneration of nerve in a rat sciatic nerve injury model. The novel sheet rolling method utilized for fabricating conduits from nanofibers enables multiple conduit development of varied dimensions from a single electrospun sheet. Pre-seeding the conduits with Schwann cells also enhanced and accelerated neural regeneration through the nerve gap as evident from the extensive electrophysiological and histological studies. Further the long duration studies undertaken herein establish the safety and neuro-regenerative potential of such nanocomposite conduits.