Name of the Faculty: Dr. Pankaj De

Designation: Associate Prof. in Physics

Contact Details:9733087580

Qualification:M.Sc, Ph.D

Research Experience: 16 Years

Institution : (a) Indian Association for the Cultivation of Science, Jadavpur

Year : 1992 (for Six months as CSIR Fellow)
Title of the Project : Thin film studies.

(b) Institute of Radio Physics and Electronics, (C.U)
Year : 1992-2000 (Eight Years, CSIR Fellow)
Title of the project : Studies on microwave and mm wave solid state devices.

1. Professional Experience :
   Institution :Gobardanga Hindu College
   Year : W.E.F 2000 till date (18 Years +)
2. Academic Professional Achievement (Awards) : Post -Doctoral Research Award (U.G.C, New Delhi) w.e.f 2004 to 2007 (3 Years)

3. Research Projects :

(i) MRP (UGC)

Title : Measurement of series resistance of microwave and mm wave IMPATT diode.
Year : 2003-2004
Fund allotment: Rs. 50,000/- (UGC) Ref. No. PSW/0123/02 dated 22-11-2002

(ii) Post-Doctoral Research (UGC)

Title : Studies on the Series Resistance of IMPATT diodes and its Series Resistance-Power dissipation relationship.
Year : 2004-2007, Award letter No and date : F.30-1/2004 (SA-II),31-03-2004
Fund allotment :Rs. 4,00,000/- (UGC)

(iii) MRP (UGC)

Title : Studies on the microwave and mm wave high power Si and SiC IMPATT diodes.
Year: 2014-2016
Fund allotment :Rs. 4,30,000/- (UGC) Ref. No PSW-157/13-14, ERO ID No WBS-009 dated 18-03-14.

Seminar/Conference/Workshop Attended (last 5 years):

Publications: (Chronological arrangement-Ascending order)

Journal Publications :

(i) ***Indian Journal of Pure & Applied Physics***, Vol 34, February 1996, pp.121-125, **Pankaj De**, Bipul Chandra Paul and S. K. Roy, Computer study of optimum mm wave conductance of GaAs and Si double drift IMPATT diodes for flat and low-high-low structures.

(ii) ***International Journal of Electronics***, Vol 81, No-5, pp. 545-550, 1996, **Pankaj De**, Computer simulation of series resistance of an SDR silicon IMPATT diode in the X band.

(iii) ***Indian Journal of Pure & Applied Physics***, Vol 34, December 1996, pp. 1000-1002. **Pankaj De** and Bipul Chandra Paul, An optimum design guide to low-high-low DDR Si IMPATT diode for (80-150) GHZ band.

(iv) ***Phys. Stat. Sol. (****a)* 162, 765 (1997), **P. De**, N. Mazumder and S. K. Roy, Effect of punch through on the mm wave properties of Si SDR n+np+ IMPATT diode in the 94 GHz window.

(v) ***Phys. Stat. Sol (a)***, 168, 549 (1998), **P De**, Effect of current density on the Series Resistance of SDR (n+np+) Silicon IMPATT diode in the X band.

(vi) ***Semicond. Sci. Technol.***19 (2004) 859-863, **P. De** and P. K. Chakraborty, Effect of punch through on the microwave series resistance of n+np+ Si IMPATT diodes around the X band.

(vii) ***Indian Journal of Pure & Applied Physics,*** Vol 43, October, 2005, pp. 794-798, **P. De**, Effect of charge bump on the series resistance and microwave properties of Si n+np+ IMPATT diode at X band.

(viii) ***Microelectronics Journal,*** 37, (2006) 786-791, **P. De**, Epitaxial layer induced series resistance and microwave properties of n+np+ Si X band IMPATT diodes.

(ix) ***Current Applied Physics,*** 7 (2007), 274-280, **P. De**, Temperature dependence of microwave resistances of n+np+ Si X band IMPATT diode.

(x) ***Indian Journal of Pure & Applied Physics,*** Vol 46, January, 2008, pp. 33-37, **P. De**, Effect of substrate-epitaxy interface doping profile on the series resistance and mm wave performance of Si IMPATT diode.

(xi) ***Journal of Electronics and Communication Engineering,*** Vol 9, Issue 4, Ver 1, pp. 46-49, 2014, **P. De**, Optically induced series resistance and microwave properties of n+np+ X band Si IMPATT diode.

(xii) ***Journal of Electrical and Electronics Engineering,*** Vol 10, Issue 1, Ver II , pp. 46-52, **P. De**, 2015, Temperature dependence of microwave characteristics of n+np+ Si IMPATT diode at X band.,

(xiii) ***Journal of Applied Physics,*** *Vol-8, Issue 3,* Ver-I, pp. 23-26, 2016, P. De, "Aspects of WBG 4H-SiC over Si IMPATT diode at X band "

Conference Publication :

International conference on Microwave and Millimeter Wave Technology, 2007, China, P. De, Optically induced series resistance and microwave properties of n+np+ GaAs and Si IMPATT diode.

In the real world decision making scenario Fuzzy Cognitive Maps (FCM) are used as a modeling/representation technique for simulation or prediction. However, not many real software implementations are explored in literature. In recent years FCM has become a useful Soft Computing technique for modeling and simulation. They are connectionist and recurrent structures involving concepts describing the system behavior, and causal connections.

This paper describes a modeling and experimentation framework where realistic problems of the Human Immunodeficiency Virus (HIV) affected people can be modeled and controlled using FCM as a knowledge representation form. The Human Immunodeficiency Virus (HIV) is a complex retrovirus that progressively deteriorates the immune system of infected patients, eventually causing death. Although antiviral drugs are not able to eradicate the HIV, they are designed to inhibit the function of three essential proteins in the virus replication process: protease, reverse transcriptase and integrase. However, due to a high mutation rate, this virus is capable to develop resistance to existing drugs causing the treatment failure. Several machine learning techniques have been proposed for predicting HIV drugs resistance, but most of them are unable to interpret the problem.

HIV is one of the most dreaded pathogens of the 21st century. With millions of people infected with HIV, it was once thought to result in "medical apocalypse". However, with the advent of antiretroviral therapy (ART), it is now possible to control HIV. Adherence to ART helps to keep the viral load under control and prolong the time of progression to AIDS, resulting in near normal life expectancy. Even with the introduction of ART, a substantial number of patients fail to adhere due to a variety of reasons, including adverse side effects, drug abuse, mental disorders, socioeconomic status, literacy, and social stigma. With the availability of so many options for HIV treatment at each stage of the disease progression, physicians can switch between the treatment regimens to avoid and/or minimize the adverse effects of drugs. Close monitoring, major social reforms, and adequate counseling should also be implemented to circumvent other challenges.

This paper highlights how different acute diseases result as side effects as a consequence of the ART therapy when applied to the human body suffering from HIV Infection. Even though ART therapy has controlled AIDS to a great extent, its side effects cause life risk to people having low immune system. The mathematical modeling of the interpretation of the effects and results of these diseases are explained using Fuzzy Cognitive Maps.

Keywords: Fuzzy Cognitive Maps, HIV, Antiretroviral therapy, Adverse side effectsdue to ARTtherapy for HIV infection treatment.