Sourangsu Banerji

Contact

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Research Interest

Terahertz Optoelectronics, Nanophotonics, Non Linear Optics, Silicon Photonics, Photovoltaics, Geometrical Ray Optics

Education

2016-Present **University of Utah**, Utah, USA
Major: Ph.D. in Electrical Engineering
G.P.A.: 4/4

2010-2014 **Maulana Abul Kalam Azad University of Technology**, West Bengal, India
Major: B.Tech. in Electronics & Communication Engineering
Thesis: *Study of Electronic & Electromagnetic Properties of One-Dimensional Photonic Crystal*
Advisor: Dr. Arpan Deyasi
G.P.A.: 8.2/10

Professional Experience

Aug.'2015-Present **Graduate Teaching Assistant**
Organization: University of Utah
Courses: Microwave Engineering-I, Fundamental EM & Transmission Lines

Jan.'2015-May'2016 **Programmer Analyst**
Organization: Cognizant Technology Solutions India Pvt. Ltd.
Domain: Integrated Process Management (EAS-IPM)

Oct.'2014-Dec.'2015 **Associate Software Engineer**
Organization: Tech Mahindra Pvt. Ltd.
Domain: Java Application Services

Research and Technical Projects

Jan.'2014-May'2014 **Study of Electronic & Electromagnetic Properties of One-Dimensional Photonic Crystal [Undergraduate Thesis]**
Study and understand the underlying physics governing the electronic and the electromagnetic properties like the density of states (DOS) which characterized the mode density of the fluctuating vacuum fields enabling us to engineer various quantum-mechanical processes which depended on it, band structure and the characteristics of wave propagation in the light of reflectivity and transmission characteristics of one-dimensional photonic crystal to determine how light will propagate through the crystal structure. Use of AlGaN/GaN material composition in all of the research work was due to the combined advantages of enhanced band offset, lattice mismatch induced piezoelectric effect.Its development suggested the possibility of increased miniaturization and efficiency of computing components and other technologies.
Institution: RCC-Institute of Information Technology, West Bengal, India
Department: Department of Electronics & Communication Engineering
Advisor: Dr. Arpan Deyasi

Jan.'2014-May'2014 **Architectural Design of a RAM Arbiter**

Standard memory modules to store (and access) data are designed for use with a single system accessing it. More complicated memory modules would be accessed through a memory controller, which are also designed for one system.For multiple systems to access a single memory module there must be some facilitation that allows them to access the memory without overriding or corrupting the access from the others. This was done with the use of a memory arbiter, which controls the flow of traffic into the memory controller. The Address Clash Problem was nicely tackled and solved. The design was verified in simulation and validated on a Xilinx ML605 evaluation board with a Virtex-6 FPGA.

Institution: RCC-Institute of Information Technology, West Bengal, India
Department: Department of Electronics & Communication Engineering
Advisor: Dr. Abhishek Basu

Mar.'2013-Aug.'2014 **Application of Fractals in Digital Images**

In this project we aimed to model one of the important characteristics associated with fractal geometry i.e. fractal dimension. Since it is widely known that the primary cause of error in any image processing task is the resolution, an analysis of the effect of resolution on fractal dimension was carried out. For varying levels of brightness and contrast, the fractal dimension was also evaluated. Finally, the variation of the fractal dimension on modified images such as high and low grey valued images, edge detected images and filtered images was studied and satisfactory results were obtained.

Institution: Indian Statistical Institute, West Bengal, India
Department: Applied Statistics Unit
Advisor: Dr. Pabitra Pal Choudhury

Jun.'2013-Aug.'2013 **Theoretical Study of Current Flow through Real Dielectric Material**

Mathematical analysis was carried out to calculate the current flow in a real dielectric material.A range of dielectric materials were taken up as a part of this study. Moreover, a comparative analysis was also done with the current flowing through an ideal dielectric. The dissipated energy was also calculated for both the cases (i.e. in the absence as well as the presence of a dielectric) after obtaining current density. The existence of displacement current was established in the case of real dielectric, which was seen to be absent for the ideal one. The results were quite in agreement with the findings in the existing literature.

Institution: RCC-Institute of Information Technology, West Bengal, India
Department: Department of Basic Science & Humanitites
Advisor: Dr. Himadri Mullick

Jun.'2012-Jul.'2013 **Design and Implementation of an Unmanned Ground Vehicle**

In this project we focused at designing and developing an unmanned surface vehicle. But the major disadvantage of these unmanned robots is that they typically make use of RF circuits for maneuver and control. Essentially RF circuits suffer from a lot of drawbacks such as limited frequency range i.e. working range, and limited control. A wireless system for maneuvering the vehicle without the use of the conventional RF circuits was also implemented.

Institution: RCC-Institute of Information Technology, West Bengal, India
Department: Department of Electronics & Communication Engineering
Advisor: Asst. Prof. Saraswati Saha

Internships

Dec.'2012-Jan.'2013 **Winter Research Intern**

Study and Development of a Data Acquisition & Control (DAQ) System Using TCP/Modbus Protocol

The aim of the project was to develop a HMI (Human-Machine Interface) with the help of which a person could remotely control and monitor the Vacuum measurement system. The Vacuum measurement system was constructed using a DAQ (Data Acquisition & Control) implementation instead of a PLC based implementation. The system was to be installed in the Superconducting Cyclotron section of VECC.

Institution: Variable Energy Cyclotron Centre (VECC), West Bengal, India
Department: Cryogenic Instrumentation Section
Advisor: Dr. Tamal Kumar Bhattacharyya

10th - 24th Jun.'2013 **Industrial Trainee**

Radio Broadcasting of All India Radio: Kolkata

The project involved gaining technical knowledge about the Broadcast Studio. Knowledge about transmitter, principal features of 1KW Radio transmitter, transmitter block diagram, switching networks, Earth station and Simulcast Earth Station etc were also gained.

Organization: All India Radio, Akashbani Bhawan, West Bengal, India

Publications

Book Chapters

Arpan Deyasi, **Sourangsu Banerji**, Sayan Bose, Abhishek Halder, *"Analytical Computation of Band Structure of 1D Photonic Crystal under Normal Incidence of Electromagnetic Wave"*, Lecture Notes in Electrical Engineering: Computational Advancement in Communication Circuits and Systems, part 6: Advances in Devices and Circuit, vol. 335, Chapter 36, p. 331-338, 2014 [Springer, DOI 10.1007/978-81-322-2274-3_36]

Monograph

Arpan Deyasi, **Sourangsu Banerji**, *"Study of Electronic Properties of 1D Photonic Crystal"*, Lap-Lambert Academic Publishing, Germany, 2014 [ISBN: 978-3-659-61682-2]

Journal

Sourangsu Banerji, Arpan Deyasi, *"Simulating Reflectivity Property for Propagating Wave inside One-Dimensional Photonic Crystal with Different Material Systems"*, Journal of Electron Devices, Volume-21, pp. 1823-1829, March 2015. [ISSN: 1682-3427]

Sourangsu Banerji, Abhishek Halder, Arpan Deyasi, Sayan Bose, Subhasis Mandal, *"Analytical Computation of Density of States of One-Dimensional Photonic Crystal under Polarized Incident Wave for Different Materials"*, Journal of Electron Devices, Volume-19, pp. 1654-1662, April 2014. [ISSN: 1862-3427]

Conference

Arpan Deyasi, **Sourangsu Banerji**, *"On the Comparative Analysis of the Band Structure of One-Dimensional Photonic Crystal with Different Material Composition under Oblique Wave Incidence"*, National Level Conference on Frontline Research in Computer, Communication and Device, pp.: 155-166, December 2015. [ISBN: 978-93-8592-600-6]

Sourangsu Banerji, Arpan Deyasi, *"Application of Group Theory in Transfer Matrix Technique for Band Structure Calculation in 1D Photonic Crystal"*, International Conference on Computer, Communication and Control), pp. 1-5, September 2015 [IEEE Xplore, Print ISBN: 978-1-4799-8163-2, DOI-10.1109/IC4.2015.7375647]

Sourangsu Banerji, Arpan Deyasi, *"Computing Photonic Eigen-Modes and Bandwidth for 1D Photonic Crystal with Different Material Compositions"*, 2nd National Conference on Emerging Trends in Engineering & Sciences, pp. 239-244, July 2015 [ISBN: 978-93-84869-63-2]

Sourangsu Banerji, Arpan Deyasi, Abhishek Halder, Sayan Bose, *"Analysis of Reflectivity for Propagating Wave inside 1D Photonic Crystal with Different Material Systems"*, International Conference on Computing, Communication & Manufacturing, pp. 162-166, December 2014 [ISBN: 978-0-9940194-0-0, ACEEE-CPS]

Arpan Deyasi, **Sourangsu Banerji**, Abhishek Halder, Sayan Bose, *"Theoretical Investigation on Photonic Bandgap Tailoring in One-Dimensional Photonic Crystal using Different Numerical Methods"*, International Conference on Devices, Circuits and Communications, pp. 1-6, September 2014 [IEEE Xplore, Print ISBN: 978-1-4799-6052-3 DOI: 10.1109/ICDCCom.2014.70247461]

Sayan Bose, Abhishek Halder, **Sourangsu Banerji**, Arpan Deyasi, *"First-order Calculation of Band Structure of One-Dimensional Photonic Crystal"*, National Conference on Materials, Devices and Circuits in Communication Technology, pp.: 20-23, February 2014. [ISBN: 978-93-80663-20-3]

Sourangsu Banerji, Arpan Deyasi, Abhishek Halder, Sayan Bose, *"Comparative Study of Density of States of 1D Photonic Crystal for Different Polarization Conditions of Incident Wave"*, International Conference on Electronics, Communication and Instrumentation, January 2014. [IEEE Xplore, Print ISBN: 978-1-4799-3982-4, DOI: 10.1109/ICECI.2014.6767359]

Technical Skills

Programming	C, C++, Java, MATLAB, Python
Design Tools & Softwares	Xilinx (VHDL), Microwind, NI LabVIEW, Lumerical MODE Solutions, Lumerical Interconnect, KLayout, Mentor Graphics Pyxis
Others	Windows, IBM System z O/S (Mainframe), Linux, LaTeX

Professional Activities

Reviewer for International Conference on Communication Systems and Network Technologies, Chandigarh, India

Awards and Honors

Mar.'2016	Achieved an All India Rank of 24 in Electronics and Communication Engineering (EC) stream in Graduate Aptitude Test in Engineering (GATE), 2016.
Jan.'2016	Achieved 99.93%tile in Common Aptitude Test (CAT), 2015.
Jun.'2014	Nominated for the Innovative Student Projects Award of Indian National Academy of Engineering (INAE) from college across all engineering departments.
Feb.'2014	Recipient of a Merit Recognition Certificate for securing an All India Rank of 1068 out of around 2,50,000 (approx.) candidates in the 10th NIIT National IT Aptitude Test.
Dec.'2009	Qualified the Regional Mathematical Olympiad (R.M.O-2009) from West Bengal and selected to appear for the Indian National Mathematical Olympiad (INMO-2010) conducted by Homi Bhabha Centre for Science Education-Tata Institute of Fundamental Research (HBCSE-TIFR).
Apr.'2008	Awarded Certificate of Merit and a Gold Medal by St. Marys Ex-Students Association (SMESA) for my performance in the ICSE Examination.