

Curriculum Vitae**Dr. BIBHUTI BIKRAMADITYA**

Ph.D (NanoTechnology), **M.Sc Physics**(Advance Electronics)
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Profile Summary

Dr. Bibhuti was awarded Doctor of Philosophy(**Ph.d**) by **Aryabhata Center for Nano Science and Nano Technology ACNN**) under School of Engineering and Technology, **Aryabhata Knowledge University**, Patna doing research in Nano Electronics for the development of Nanomaterial for new LED Devices for warm white lighting. He has already **filed Provisional Patent** on his work on LED. During Ph.D research work, he worked on various nanotechnology tools **esp** Muffle Furnace, XRD, Photoluminescence Spectroscopy, UV-VIS-NIR Spectroscopy, SEM, UV, FTIR, VSM,SEM etc. He has qualified M.Sc in Physics (Advance Electronics) from Patna University Patna.

Before Ph.D research activity, he worked for Electronics System Design and development Industry in India and abroad. He has **22+ years of industrial experience** in VLSI (FPGA/ASIC), Embedded System and hardware technologies-based Design & Development. During his industry career, he worked in **Korean electronics industry for over 6 years** in lead role. Before Korean Immigration, he worked as Project engineer, Project Leader and Project Manager at Pune (India) based companies where he led the team of engineers and guided to develop quality products. **Presently, he is a Director of Smartway Electronics Pvt. Ltd**, an Electronics Research and Development Startup Company incubated at **Incubation Centre, IIT Patna** in January 2020 which works in the field of Medical Electronics, Embedded system, Micro-electronics, Nano electronics, Internet of Things (IOT) and Robotics and system software related Research & Development, product prototyping and Design servicing. Earlier, he worked as Director of TekBrains Pvt. Ltd, *A Complete Electronics System Design and Manufacturing Company based at Patna between 2010 to 2019*. The company has **products** in the field of embedded system and Power Electronics.

He founded **BBrains Development Society** commonly known as BiharBrains (www.biharbrains.org) which is a non-profit organization registered under society Act with special focus on awareness building on education and creating environment for research and development in Bihar. Under this umbrella, **Bihar Science Conference** (www.biharscienceconference.in), an International Conference on science & technology is being organized every year in association with different universities of Bihar.

Apart from this, he is also **Managing Director** of “**Manthan**” (www.bbmanthan.in), an International peer reviewed Journal of Scientific research & Innovation. This society has done many philanthropic works and worked on creating scientific research environment in the state.

Skill Set:

A. Techno-Commercial Skill set

Relationship building, Project cycle handling and management, Sales & Marketing, Confidentiality agreements, Contract management, tenders and bids, Business planning and Development, Use of technical ability at Clients site

B. Technical Skill Set:

Micron Technology: VLSI IP Core development, VLSI (FPGA/ASIC) Technology,

EDA Tools: Xilinx, Model-sim, simplicity, Cadence, Altera, NC-Sim

Embedded Tools: Kiel, Proteus, ORCAD, Arduino (ATMEGA 328P/ATMEGA 2561)

Nanotechnology Tools: Muffle Furnace, XRD, Photoluminescence, SEM, UV, FTIR, VSM

DSP (Image Processing): Video Processing: JPEG, MPEG-4, H.264

Programming Language: VHDL, VERILOG RTL Coding,

Work Profile/Experience and Academic Qualifications

- **Director, Smartway Electronics Pvt. Ltd** (From January 2020 to present). The company is in the process of developing products related to medical electronics devices, embedded system and hardware related products
- **Director, TekBrains Pvt. Ltd, Patna** (March 2010 to 2020) : Developed VLSI, Embedded system, Power electronics, Microcontroller and hardware based products under my supervision.
- **“Project Manager(FPGA)”(June 2008 to May 2009), and Senior ASIC & SOC Engineer**(June 2007 to May 2008), nSYSTechnologies Co., Ltd, Seoul, S.Korea: Worked on Telecom VLSI, Face recognition
- **Senior R&D Engineer”, ” StarVray Co.,Ltd”, Daejeon, South Korea** (from April 2006 to till April 2007): Worked on medical imaging Products
- **“Senior ASIC Engineer”, “IT MAGIC Co. Ltd”, Seoul, South Korea** (July 2004 to Jan 2006): worked on VLSI(FPGA) based development on Video processing, Real time image stabilization.
- **“Technical Leader (DSP)” “DCA InfoTech”, Pune (India)** from Sept, 2003-June-2004: worked on VLSI, DSP Implementation
- **“Team member and Project Leader “Info Dynamics Integration Technologies”, Pune (India)** March 2001- Aug,2003: worked on VLSI, DSP Implementation
- **“Hardware Engineer, National School of Information Technology, Patna** from Jan 2, 1999-Feb 2001.

Educational Qualification

- Doctor of Philosophy(Ph.d) from Aryabhata Center for Nano science and nanotechnology, Aryabhata Knowledge University, Patna.on 15th March 2023.
- Master in Physics (Advance Electronics), Patna University, Patna,1998
- Master of VLSI Design, Silicon Magic Tech Pvt.Ltd, Pune(India)

Projects Undertaken /worked

Ph.d Topic: Synthesis and Characterization of Yttrium Aluminum Borate for LED Application

Description: The main objective of this proposed work is to study Yttrium Aluminum Borate nanomaterial and fabricate white phosphor based LED Lighting which can pave the path for new era of commercial production of inexpensive safe warm white lighting. Chemical method or Physical method can be used for Nanomaterial Synthesis. After preparation of the material, it can be characterized and analyzed by photoluminescence (PL) mechanism. SEM and TEM can be used for getting information about exact particle size and know its other nonmetric properties. The main target of this project is to fabricate Chip for Alternative white phosphor based LED Lighting.

Filed Provisional Patent on 14th March 17, 2023(Application No: 202331017221) on T “A PROCESS FOR PREPARATION OF YTTRIUM ALUMINUM BORATE BASED FUNCTIONAL NANOMATERIAL FOR LIGHT EMITTING DIODE”

Abstract:

The Present disclosure relates to an economical method for preparation of highly efficient Yttrium Aluminum Borate (YAB) nanomaterial sample which showed photoluminescence properties in the entire range of ultraviolet as well as Bluish white colored LED at 400-451 nm wavelength in the Visible region having high coloring index. The disclosed method yields nanomaterial with characteristic band gap energy and can be used in numerous application without any hazard to human or animals from thus prepared LEDs.

Topic: Prototype development of Artificial Intelligence based portable multifunctional Primary Health care Device:

Description: This project is related to development of Artificial Intelligence based AI Based Standalone Primary Health Care Kiosk which can do following tests if the patient stands in front of the system • Height of the person using ultrasonic sensor • Weight using weight sensor • Calculate Body Mass Index • Get Blood pressure • Sugar test using glucometer • ECG • AI Based Digital Stethoscope with Automatic Diagnostic Advice System(optional) • Oximeter with Body temperature After doing these tests with assistance from medical professionals, tests results can be viewed on the LCD screen and the reports test reports can be printed locally using small embedded printer. Then doctor will be consulted for further examination and diagnosis. Artificial intelligence based Digital stethoscope application will have automatic diagnostic advice system which say the problem the problem in the body and its possible solution. This will be good for the patient in remote places where doctor’s accessibility is less.

Status: Funded by Bangalore Bio innovation Centre, Bangalore under Startup India Seed Fund Scheme of govt. of India. This project is under ongoing implementation.

Topic: Prototype development of Bluetooth enabled Smart Pulse Oximeter and IR thermometer based integrated device

Description: The main objective of this project is to develop” Pulse oximeter” and IR Thermometer combined system which can perform above mentioned both task in real time which can also be measured from distant through Bluetooth on mobile App. Internet of things technology may also be implemented in due course. With this integrated device, initial covid19 testing can be done every day, result data can be stored in the mobile and the patients can be monitored online at Patients in house and hospitals.

This integrated device will show the percentage of peripheral oxygen into blood and heart bit rate as well as the current body temperature. These reading can be viewed instantly on an OLED screen and can also be viewed the nearby mobile through Bluetooth Technology on Mobile through our application program. This application may help in getting patient condition in real time.

Status: Product Testing is completed. Final Prototype will be demonstrated in the first week of August 2021. **The Manufacturing and early scaling of this product has been selected by Dept. Of Industries, Govt. of Bihar for funding which is going to start in the month of August 2021.**

Startup Projects: Prototype development of Ubiquitous and Interactive IR Board for Smart Class Solution: Selected for Startup project under Ministry of Electronics & Information Technology, MEITY, Govt. Of India) and Start up Bihar, Dept. Of Industry, Govt. Of Bihar at Technology Incubation Centre, Indian Institute of Technology, Patna

Description: The main objective of this project is to design and develop prototype for low cost Interactive IR LED strip board for making any Desktop, Laptop, LED TV and ceramic white board smart and interactive for class room teaching and interaction.

Complete Interactive board will consist of ST Microelectronics Cortex M3 Processor STM32F103C based controlling of IR Transmitter circuit and IR Receiver circuit. Two sides of board is fitted with Transmitter circuit and other two sides is fitted with Receiver circuit with one controller board fitted any sides of the board. User can use Stylus Pen or Finger to write on the board. Multi user can also be allowed to touch the screen simultaneously to work on the interactive board.

My Role: Project Leading

Client: Extramarks Pvt. Ltd, New Delhi.

Projects: Arduino UNO based Smart Automatic Bell for School and Factories

Description: This project is related to development of Arduino UNO Microcontroller based Smart Automatic Bell for School and Factories. The user will put all periodic bell time which will be shown on LCD. The continuously running system time (RTC) will compare the current bell time and give the signal to electrical bell connected to Electronic Bell which will produce large volume sound.

My Role: Project Leading

Client: In house.

Projects: Wireless Surveillance and centralized monitoring of IP Based CCTV System

Description: This project is related to creating wireless Network for IP based CCTV system in a mobile traffic van. Every van is connected with IP based CCTV camera which are being monitored in centralised office. The traffic van towed away wrongly parked vehicle on the roadside. This project is related to creating wireless Network for IP based CCTV system in

My Role: Project Leading

Client: Smart commuting Service under Dept. of Traffic Police, Govt. of Bihar.

Project: Development of Universal FPGA Board

Description:

This product we developed is related to development of VLSI based FPGA board which is universal board capable of integrating Xilinx FPGA's and CPLD's in PQ packages. It supports devices from XC9500 CPLDs, Spartan-2E FPGA from Xilinx. This protoboard gives a complete learning experience in various PLD architectures and their features. This kit has ADC, LCD, Stepper motor, elevator, LED, Serial communication, Keyboard, PC and other interfaces. This kit is good for academic and research purposes.

Client: Engineering Colleges, R&D Organizations.

Project: Face Recognition Algorithm FPGA Implementation

Description: This project is related to FPGA implementation of adaboost algorithm for face recognition and its AMBA Bus interface. In the design, an integral sum and imaginary sum of the image is stored into SDRAM (external). The integral sum(321x241) images are divided into win sizes (48 x 48, 57x57.....) and each win sizes address is sampled into 21x21 image address,

known as sampled integral sum data. These data are passed thru AMBA Bus to SRAM Buffer (32x32) where Rects (unique point between nose and eye) are determined as per given coordinates and compared with factor. The factor is square root of the imsum data and integral sum of image data. Similarly objects and Phases are also determined and compared with their standard thresholds (stored into ROMs). Therefore, Adaboost algorithm detects rects, objects and phases of the face to recognize face.

My Role: Project Leading, System Architecture design and Algorithm logic design

Client: Asia soft, Kazakistan (www.asia-soft.com)

Project: TP 3406 DASL 34 FPGA Implementation

Description: This project is related to the implementation of DASL (Digital Adapter for Subscriber loop) into FPGA. This is a complete ISDN PBX2- Wire data trans-receiver on twisted pair subscriber loops and is to work as Terminal adapter for communication between network terminal and Terminal equipment and send data to the ISDN line through EPABX. This is also being used for interconnection and intercommunication between terminal equipment of the particular area of space through EPBAX.

My Role: Leading FPGA team and logic design for all blocks

Client: Samsung Electronics, Korea (www.samsung.com)

Project: DISI1400 Scanner

Description: This project is related to scanning of digital image for human DNA /RNA for the laboratory test of the dreaded disease like cancer, AIDS, TV etc. In this, individuals' DNA scanned image is compared with the samples of tested DNA chip for the dreaded disease and then detection of the disease is being done on the PC screen.

My Role: In a team of engineers, my work for this project was to design and development of Door Logic, Panel control, Temperature monitor controller (max9957) and laser control logic into FPGA.

Client: Vidar Systems Corporation USA (www.vidar.com)

Project: Dual Camera Board (DCB) Design & Development for Large Format Scanner

Description: The project is related to design and development of dual camera board for the SB-42, a 42-inch large format scanner. It utilizes five fully compatible CSI CA463G Contact Image Sensors (CIS), connected with three DCB boards (FPGA). Each DCB is interfaced with up to two CIS sensor modules which uses two Wolfson WM8199 image processors (scanner processors). The FPGA generates clocks for the CISs. The Input clock for FIM is 5MHz (16 slices of 80MHz clock) which selects 4 valid words from 8 words input data; To process the video data, RAM (SDRAM AND SRAM) is used for image preprocessing elements. The data processing in the FPGA is done at speeds higher than the 20 MHz clock.

My Role: Designing DCB (DCB-CIS Controller and Segment Descrambler), Testing on Hardware board. **Client:** Contex Corporation USA (www.contex.com)

Project: Real Time Image Stabilization

Description: This project is related to digital image stabilization with sub-image novel phase correlation based global motion estimation and maximum peak filtering based motion correction. Global motion is estimated from the local motion of four sub-images each of which is detected using phase correlation (PC) based motion estimation. The correlation surface using Phase correlation techniques determine local motion vector (LMV) and most peak amplitude from block of LMV decides its global motion vector (GMV), thereby Accumulating motion vector (AMV) for panning. The proposed algorithm can make a robust digital image stabilization when camera affected by vibration or unwanted movement.

The Design algorithms have been implemented and verified with Frame grabber board (Matrox Meteor-II Mil-lite software) that is interfaced with camcorder and PC. Similarly, the

same design has also been tested by us in the ARM Emulator and ported into DM320 Board (ARM9TDMI core, DSP core).

My role: algorithm development and leading the team from the Present Employer and collaborate with the team of University Researchers.

Client (Project Partner): Image Processing and Intelligent Systems Laboratory Image Engineering, Graduate School of Advanced Imaging Science, Multimedia, and Film, Chung-Ang University, Seoul. We developed PCM based stabilization algorithm in association with university sent two international papers for the journal:

Paper accepted:

- a. GSPX 2005 (www.gspx.com) ON VLSI Architecture design of Real time image stabilization
- b. Electronic Journal : Technical Acoustics: <http://ejta.org/en/bibhuti1>

Project: H.264/AVC IP core Development

Description: This project is related to VLSI (VIRTEX 4 FPGA) implementation of H.264 which is used for the compression and decompression of real time video and their processing. The input image (CIF) is divided into frames of 16x16 pixels called as micro blocks and each micro block is encoded in intra (I frame) and (P) frame mode. The residual or difference block (Between I and P) is transform by performing DCT on it and then quantized by a given set of pixel values, known as scalar quantization to get set of quantized transform Coefficients. These transform coefficients are reordered (like Zigzag Scan) and then Entropy coding is used to get compressed image bit stream and this is passed to the Network Abstraction Layer (NAL) for transmission or storage. For the entropy coding, CAVLC is used. The inverse procedures are used for the reconstruction of the encoded quantized image. In this the Quantized micro block coefficients are re-scaled (Inverse quantization) and inverse Transformed (IDCT) to produce difference micro block (Dn) and analyzed the distorted micro blocks from the previous block because after quantization, some part of bit frame may be lost.

My Role: Hardware Design, RTL Coding, functional verification and Synthesis of the Two Major Blocks: CAVLC Decoder and Deblocking Filter.

Client: in house project of ITMagic, Seoul

Project: JPEG CODEC for B/W Camera

Description: This project is related to digital image coding & compression into FPGA by performing Discrete Cosine Transform(DCT) on input images, quantization and zigzag scanning and test its affectivity by performing inverse DCT and inverse procedure to get original images. The given input images are converted into FPGA readable input files using C program and are stored into memory. Similarly, FPGA generated out files are converted to PGM images by another C program. These FPGA perform all the DCT & IDCT fetching data from existing memory with these devices.

My Role: Team Leading, Hardware Design, RTL Coding, functional verification and Synthesis

Client: Fulcrum Logic. Inc, Pune

List of Research Papers Published in Journals

1. Studies on Structural, optical and Magnetic properties of Yttrium Aluminum Bromate (YAB) Nanomaterials, prepared at high annealing temperature

Bibhuti Bikramaditya¹, Rakesh Kumar Singh¹, Nishant Kumar¹ and Pushpendra Kumar Verma²

Journal of Physics: Conference Series, Volume 2070, Second International Conference on Advances in Physical Sciences and Materials 2021(ICAPSM 2021) 12-13 August 2021, India (Virtual)

2. **Structural, optical, and magnetic properties of Yttrium aluminum bromate (YAB) nanomaterial, prepared by low cost sol-gel chemical method**
Bibhuti Bikramaditya, Rakesh Kumar Singh, Nishant Kumar and R.K.Verma
3. **Reconfigurable VLSI architecture design for real time image stabilization:** Paper Published in International Journal "Technical Acoustics" <http://ejta.org/en/bibhuti1>, 2004
Bikramaditya B, Kwon O, Sateesh Kumar TVS, Ryu B, Paik J. 2006, 1.Reconfigurable VLSI architecture design for real time image stabilization. Technical acoustics, http://www.ejta.org, 1-15
4. **Bikramaditya B, Kwon O, Paik J. 2006, 1. Digital Image stabilization by adaptive phase correlation motion vector filtering.** Manthan,
<http://www.bbmanthan.info>, 6-10

International Conference:

- To *organize* a **Bihar Science Conference, An International Conference on Science & Technology** every year since 2008 at different universities of Bihar as **Patron of the conference and head of the organizing society.**
www.bbscindia.com/ScienceConference

D. SOCIETY/ ORGANIZATION:

- **Founder Chairman**, B.Brains Development Society commonly known as 'BiharBrains', a society of scientists, engineers & educated people of Bihar who lives in different parts of India and abroad. www.biharbrains.org
- Member, "SCIENCE FOR SOCIETY", under NCSTC Network, Dept of Science & Technology, Govt. Of India

E. Managing Editor, Manthan: An international Journal of Scientific Research and Innovation, published by B.Brains Scholastic Center under BBrains Development Society.:

Awards/Achievements/Others:

1. Samaj Ratna Award by Vishwamitra Parivar and Kamdhenu Channel, New delhi 2012
2. **Bihari Asmita Samman Award 2009** by Bihar Helpline at Patna 2009.

Personal Information	
Father's Name:	Late Gauri Shankar Lal
Date of Birth:	12-07-1974
Passport no:	E-6401733
AADHAR NO:	6272-6132-5895
Marital Status:	Married
Postal Address:	Malti Niwas, Road No-1, Dhelwan, Near Bus stand bypass road, Kankarbagh, Patna