Dr. Rakesh Biswas
Assistant Professor
PhD (IIT Kharagpur)
Department of Electronics & Communication Engineering
b.rakesh@iiitg.ac.in
Joined the Institute in July 2018

About

Hello, welcome to my home page. I am an Assistant Professor in the Department of Electronics and Communication Engineering at Indian Institute of Information Technology, Guwahati. I joined IIITG in July, 2018. Prior to that, I did MS and PhD from IIT Kharagpur.

For more details visit my Google Scholar or iRINS profile.

Research Interests

Digital VLSI Circuits and Systems, Embedded VLSI Systems Design, Image Processing, Biomedical Signal Processing, Biomedical Instrumentation, Architectural Optimization.

Teaching

At IIITG, I am taking the following courses:

UG Level:

- Digital Design (Monsoon '18, '19, '20, '21, '22)
- Digital Design Lab (Monsoon '18, '23)
- Embedded Systems (Winter '19)
- Embedded Systems Lab (Winter '22)
- VLSI Design Lab (Winter '19, '20, '21, '22, '23)

PG Level:

- VLSI CAD and Testing (Monsoon '21, '22, '23)
- Architectural Design of Digital Integrated Circuits (Winter '20, '21, '22, '23)
- System Modelling Lab (Winter '22, '23)
- Seminar (Winter '22)

Students Supervised

UG Students

- Akash Katiyar (B.Tech 2019)
- Inguva Ananda Prasad (B.Tech 2019)
- Gagan Kalita (B.Tech 2019)
- Ankit Kumar (B.Tech 2020)
- Ayush Raj (B.Tech 2021)
- Vineet Singh (B.Tech 2021)
- Anuj Ashok Narwade (B.Tech 2022)
- Avneesh Yadav (B.Tech 2022)
- Omkar Yeshvant Chute (B.Tech 2022)
- Pratyush Srivastava (B.Tech 2022)
- Sourav Kumar (B.Tech 2022)
- Pritam Patel (B.Tech 2023)
- Rahul Kumar (B.Tech 2023)
- Sanjay Singh Solanki (B.Tech 2023)

PG Students:

- Saurav Bharadwaj (M. Tech 2020, CSP)
- Abhishek Baba (M. Tech 2021, CSP)
- Sucheta Biswas (M. Tech 2021, CSP)
- Swandeep Sarmah (M. Tech 2023, VLSI&ES)
- Md. Mosihur Rahaman (M. Tech 2023, VLSI&ES)

Research Scholars:

- Jitumani Sarma (Thesis Submitted, Aug '23)
- Rajlakshmi Gurumayum (ongoing)

Publication

Journal

- Jitumani Sarma and Rakesh Biswas, "A power-aware ECG processing node for real-time feature extraction in WBAN", Microprocessors and Microsystems,96, (2023), pages. 104724, Elsevier
- Jitumani Sarma and Rakesh Biswas, "A VLSI-Based Hybrid ECG Compression Scheme for Wearable Sensor Node", IEEE Sensors Letters,6, (2022), pages. 1-4, IEEE
- Jitumani Sarma, Shatadal Chatterjee, Rakesh Biswas and Sounak Roy, "A digitally controlled adaptive LDO for power management unit in sensor node", Integration,87, (2022), pages. 23-39, Elsevier
- Biswabandhu Jana, Rakesh Biswas, Pallab Kumar Nath, Goutam Saha, and Swapna Banerjee, "Smartphone-based point-of-care system using continuous-wave portable Doppler", IEEE Transactions on Instrumentation and Measurement,69, (2020), pages. 8352-8361, IEEE
- R. Biswas, S. R. Malreddy and S. Banerjee, "A High Precision-Low Area Unified Architecture for Lossy and Lossless 3D Multi-Level Discrete Wavelet Transform", in Transactions on Circuits and Systems for Video Technology, (2017), DOI: 10.1109/TCSVT.2017.2721113
- Rakesh Biswas, Kishor Prabhakar Sarawadekar, Srinivas Varna and Swapna Banerjee, "An FPGA based Architecture of DSC-SRI Units Specially for Motion Blind Ultrasound Systems", in Journal of real Time Image Processing (JRTIP),Vol- 10, (2012), pages. 573-595,
- Kaushik Bhattacharyya, Rakesh Biswas, Anindya Sundar Dhar and Swapna Banerjee, "Architectural Design and FPGA Implementation of Radix-4 CORDIC Processor", in Microprocessors and Microsystems (MICPRO,Elsevier), Embedded Hardware Design,Vol-34, (2010), pages. 96-101,

Conference

- Pradyut K. Sanki and Rakesh Biswas, "Depth Invariant Real-time Fixed/Random Valued Impulse Noise Removal Algorithm for Back-end of Ultrasonography Systems", 2022 IEEE International Symposium on Smart Electronic Systems (iSES), (2022), pages. 202-207, IEEE
- Jitumani Sarma and Rakesh Biswas, "A Power-Aware ECG Transmission Framework with Server Aided Lossless Compression", 2022 IEEE Asia Pacific Conference on Circuits and Systems (APCCAS), Shenzhen, China, (2022), pages. 95-99, IEEE
- Jitumani Sarma and Rakesh Biswas, "A Power-Aware ECG Transmission Framework with Server Aided Lossless Compression", 2022 IEEE Asia Pacific Conference on Circuits and Systems (APCCAS), Shenzhen, China, (2022), pages. 95-99, IEEE
- Abhishek Baba and Rakesh Biswas, "Pipeline Architecture of Forward and Inverse Photo Core Transform for JPEG XR Image Compression", 2021 International Conference on Intelligent Technologies (CONIT), Hubli, India, (2021), pages. 1-5, IEEE
- Abhishek Baba and Rakesh Biswas, "Multiplier-less Lifting-based Photo Core Transform for JPEG XR Ultrasound Image Compression", 2021 2nd International Conference for Emerging Technology (INCET), Belagavi, India, (2021), pages. 1-6, IEEE
- Sucheta Biswas and Rakesh Biswas, "Data encoding for IoHT ECG Application", 2021 International Symposium on Devices, Circuits and Systems (ISDCS), Higashi-hiroshima, Japan, (2021), pages. 1-4, IEEE
- Jitumani Sarma, Shatadal Chatterjee, Rakesh Biswas and Sounak Roy, "An Adaptive Digitally Tuned Flash-based LDO with Reduced Hardware for Sensor Nodes in WBAN", 2020 24th International Symposium on VLSI Design and Test (VDAT), Bhubaneswar, India, (2020), pages. 1-6, IEEE
- Jitumani Sarma, Shatadal Chatterjee, Rakesh Biswas and Sounak Roy, "A Fast Transient Digitally Assisted Flash-Based Modular LDO for Sensor Nodes in WBAN", 2020 IEEE Computer Society Annual Symposium on VLSI (ISVLSI), Limassol, Cyprus, (2020), pages. 363-367, IEEE
- Jitumani Sarma and Rakesh Biswas, "VLSI based Adaptive Power Management Architecture for ECG Monitoring in WBAN", 2020 33rd International Conference on VLSI Design and 2020 19th International Conference on Embedded Systems (VLSID), Bangalore, India, (2020), pages. 113-118, IEEE
- Jitumani Sarma, Akash Katiyar, Rakesh Biswas and Hemanta K. Mondal, "Power-aware IoT based Smart Health Monitoring using Wireless Body Area Network", 20th International Symposium on Quality Electronic Design (ISQED), Santa Clara, CA, USA, (2019), pages. 117-122, IEEE
- Saravanakkumar S R, Rakesh Biswas and Swapna Banerjee, "Realizing High Speed JPEG-2000 Coder Using GPU-CUDA", in IEEE International Conference on Microelectronic, Circuits and Systems (Micro-2014), Kolkata, 11-13 Jul, (2014),
- Rakesh Biswas, Pallab Kumar Nath and Swapna Banerjee, "A Low Cost Portable Continuous Wave Doppler Ultrasonography System", in IEEE International Conference on VLSI and Signal Processing (ICVSP-2014), IIT-KGP, 10-12 Jan 2, (2014),
- Rakesh Biswas and Swapna Banerjee, "ASIC Implementation of a 512-point FFT/IFFT Processor for 2D CT Image Reconstruction Algorithm", in IEEE TechSym 2010, (2011), pages. 220-225, IIT-KGP, 14-16 Jan. 2011.
- Rakesh Biswas, Kishor Prabhakar Sarawadekar and Swapna Banerjee, "DSC-SRI Algorithms for Motion Blind Detection of Objects in an Ultrasound System", ,in Imaging and Signal Processing in Healthcare and Technology (ISPHT 2011), Washington, DC, USA, 16-18 May, (2011),
- Rakesh Biswas, Deep Bera and Swapna Banerjee, "VLSI Implementation of Real Time Digital Scan Converter for Ultrasound System", in International Conference on Communication,Computers and Devices (ICCCD) (poster). IIT-KGP, (2010),

Award

- "Gandhian Young Technological Innovation Award 2018 (Appreciated under MLM Category)for "Smartphone based portable low-cost continuous wave Doppler Ultrasound system"", (2018),
- "Winner of Cadence Design Contest 2010 in Masters category for the project Low Power and High Speed Realization of Modified Fast Radon Transform using FFT IFFT ASIC", (2010),