

# Sanjit Kumar Roy

## PERSONAL DATA

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CURRENT POSITION: Ph.D. Research Scholar, Dept. of CSE, IIT Guwahati.  
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## EDUCATION

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- **(Current Affiliation:)**  
**Indian Institute of Technology Guwahati**, Guwahati, India JUL. 2013 -TILL DATE  
*Doctor of Philosophy (Thesis submitted on 9<sup>th</sup> August, 2021).*  
**Thesis Title:** Task and Message Co-scheduling Strategies in Real-time Cyber-Physical Systems.  
**Supervisors:** Dr. Arnab Sarkar and Dr. Chandan Karfa.
- **National Institute of Technology Durgapur**, Durgapur, India JUN. 2013  
*Master of Technology in Information Technology*  
**Thesis Title:** Application of Distributed Key Generation in Secured Sealed-Bid Auction Mechanism.  
**Supervisor:** Dr. Jaydeep Howlader.  
CGPA: 8.96/10
- **MAKAUT** (Formerly known as West Bengal University of Technology), Kolkata, India AUG. 2008  
*Bachelor of Technology in Information Technology*  
DGPA: 7.26/10

## RESEARCH INTEREST

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Real-time Systems, Cyber-Physical Systems, Embedded Systems, Scheduling.

## TEACHING INTEREST

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Data Structures, Algorithms, Digital Design, Operating Systems, Computer Organization & Architecture.

## RESEARCH EXPERIENCE

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- **Dept. of CSE, IIT Guwahati (Jul. 2013 -Till Date)**  
*Doctor of Philosophy (Thesis submitted).*  
**Thesis Title:** Task and Message Co-scheduling Strategies in Real-time Cyber-Physical Systems.  
**Supervisors:** Dr. Arnab Sarkar and Dr. Chandan Karfa.

The principal aim of the Ph.D. dissertation has been to investigate a few important theoretical and practical aspects of task-message co-scheduling strategies in safety-critical Cyber-Physical Systems (CPSs), keeping in view the challenges/hurdles related to timing requirements, resource constraints, energy minimization, etc. In particular, the objectives of the work are as follows:

- Development of co-scheduling strategies for a set of independent periodic tasks executing on a bus-based homogeneous multiprocessor system, with the objective of maximizing system level Quality of Service (QoS).
- Design and implementation of QoS adaptive scheduling mechanisms for real-time systems modeled as Precedence-constrained Task Graphs (PTGs), on fully-connected heterogeneous multiprocessor systems.

- Development of optimal and heuristic co-scheduling strategies for PTGs executing on a shared-bus based heterogeneous distributed platform.
- Design of an energy-aware processor-bus co-scheduling strategy for multiple independent PTGs executing on a bus based heterogeneous platform.

## PUBLICATIONS

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### Journal Papers

#### Published/Submitted

1. **Sanjit Kumar Roy**, Rajesh Devaraj, Arnab Sarkar, Sayani Sinha and Kankana Maji. "Contention-aware optimal scheduling of real-time precedence-constrained task graphs on heterogeneous distributed systems." *Elsevier Journal of Systems Architecture (JSA)*. Volume 105, May 2020, 101706.
2. **Sanjit Kumar Roy**, Rajesh Devaraj and Arnab Sarkar. "Contention Cognizant Scheduling of Task Graphs on Shared Bus based Heterogeneous Platforms." *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (IEEE TCAD)*, 2021.
3. **Sanjit Kumar Roy**, Rajesh Devaraj, Arnab Sarkar and Debabrata Senapati. "SLAQA: Quality-level Aware Scheduling of Task Graphs on Heterogeneous Distributed Systems." *ACM Transactions on Embedded Computing Systems (ACM TECS)*. Volume 20, No. 5, Pages 1-31, 2021.
4. **Sanjit Kumar Roy**, Rajesh Devaraj and Arnab Sarkar. "SAFLA: Scheduling Multiple Real-time Periodic Task Graphs on Heterogeneous Systems." *IEEE Transactions on Computers*, (Under review).

### Conference Papers

1. **Sanjit Kumar Roy**, Rajesh Devaraj, Arnab Sarkar, Sayani Sinha and Kankana Maji. "Optimal scheduling of precedence-constrained task graphs on heterogeneous distributed systems with shared buses." *22nd IEEE International Symposium on Real-Time Distributed Computing (ISORC)*. Pages 185-192, 2019.
2. **Sanjit Kumar Roy**, Rajesh Devaraj and Arnab Sarkar. "Optimal scheduling of PTGs with multiple service levels on heterogeneous distributed systems." *American Control Conference (ACC)*. Pages 157-162, 2019.
3. Jaydeep Howlader, **Sanjit Kumar Roy**, Ashis Kumar Mal. "Practical Receipt-Free Sealed-Bid Auction in the Coercive Environment". *16th International Conference on Information Security and Cryptology (ICISC)*, Seoul, Korea, Nov. 2013.
4. **Sanjit Kumar Roy**, Arnab Sarkar and Rahul Gangopadhyay. "Processor and Bus Co-scheduling Strategies for Real-time Tasks with Multiple Service-levels." *27th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA)*. Pages 21-30, 2021.

## LANGUAGE/TOOL SKILLS

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C, Python, Matlab, Java, Shell Script, CPLEX.

## TEACHING EXPERIENCE

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- **Indian Institute of Technology Guwahati**, Guwahati, India JUL. 2013 - TILL DATE  
*Teaching Assistant at Dept. of Computer Science & Engineering*  
 Operating Systems Lab (CS342), CAD for VLSI (CS526), Data Structure Laboratory (CS210), Compilers Lab (CS347), Data Structures Lab (CS513), Computer Systems (CS548), Programming Languages Lab (CS431), Computing Lab (CS110), System Software Lab (CS241).
- **National Institute of Technology Durgapur**, Durgapur, India AUG. 2011 - MAY 2013  
*Teaching Assistant at Dept. of Information Technology*  
 Operating System Lab, Microprocessor Lab.

- Teaching Assistant of the NPTEL Online Certification course, “Optimization Techniques for Digital VLSI Design”, funded by the MHRD, Govt. of India, organized at IIT Guwahati, India, Feb-Mar 2018.
- Teaching Assistant of the NPTEL Online Certification course, “Embedded Systems-Design Verification And Test”, funded by the MHRD, Govt. of India, organized at IIT Guwahati, India, Jul-Oct 2018.

## CONFERENCE PRESENTATION

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- ISORC 2019, Valencia, Spain (May, 2019)
- RTCSA 2021, Virtual Conference (August, 2021)

## SCHOLARSHIPS & AWARDS

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- Received **Scholarship** from **MHRD, Govt. of India** to pursue Ph.D. at IIT Guwahati, India. JUL. 2013
- Received **Scholarship** from **MHRD, Govt. of India** to pursue M.Tech at NIT Durgapur, India. AUG. 2011

## PROFESSIONAL ACTIVITY

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- Volunteer in FSTTCS, Dec. 2013, IIT Guwahati, India.
- Volunteer and active participant in GIAN (Global Initiative of Academic Networks) course, “Mixed-Criticality Real-Time Systems”, funded by the MHRD, Govt. of India, organized at IIT Guwahati, May 2018.

## REFEREES

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- **Dr. Arnab Sarkar**  
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Website: <http://www.facweb.iitkgp.ac.in/~arnab/>
- **Dr. Chandan Karfa**  
Professor, Dept. of Computer Science & Engineering, IIT Guwahati,  
Guwahati - 781039, Assam, India  
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- **Dr. Santosh Biswas**  
Professor, Dept. of Electrical Engineering and Computer Science, IIT Bhilai,  
Raipur - 492015, Chhattisgarh, India  
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