

# ALAKESH KALITA

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## EDUCATION

<b>Indian Institute of Technology Guwahati, India</b> QS rank 2022: Overall: #395, as Research Institute: #41 <i>Pursuing Ph.D.(Final Year), Industrial Internet of Things,</i>	<i>January 2018– Till</i>
<b>Assam Central University, India</b> <i>Master of Technology, Computer Science and Engineering,</i> CGPA: 8.34/10	<i>July 2014 - May 2016</i>
<b>Assam Don Bosco University, India</b> <i>Bachelor of Technology, Computer Science and Engineering,</i> CGPA: 7.26/10	<i>July 2008 - June 2012</i>

## WORK EXPERIENCE

<b>Indian Institute of Technology Guwahati, India</b> <i>Senior Research Fellow: 2020-Till</i> <i>Junior Research Fellow: 2018-2020 now</i>	<i>January 2018 - Till</i>
<b>Indian Institute of Information Technology Guwahati, India</b> <i>Research Scholar &amp; Junior Research Fellow</i>	<i>July 2017 - December 2017</i>
<b>Nalbari Polytechnic, Assam, India</b> <i>Lecturer</i>	<i>April 2017 - June 2017</i>
<b>North-Eastern Hill University, Shillong, India</b> <i>Project Scientist</i>	<i>August 2016 - June 2017</i>
<b>Shriram Transport Finance Company Ltd.</b> <i>Management Trainee</i>	<i>September 2012 - October 2013</i>

## TEACHING ASSISTANTSHIP

<b>Indian Institute of Technology Guwahati, India</b> <ul style="list-style-type: none"><li>CS101: Introduction to Computing Lab (C Programming), January - July, 2018</li><li>CS343: Data Communication, July - December, 2018</li><li>CS348: Computer Networks, January - July, 2019, 2020</li><li>CS578: Internet of Things, July - December, 2019, 2020</li><li>CS558: Computer Networks and Operating System Lab, January - July, 2021</li></ul>	<i>2018 - Till</i>
<b>Assam Central University, India</b> <ul style="list-style-type: none"><li>C Programming Lab</li></ul>	<i>2015 - 2016</i>

## PUBLICATIONS

### Journals

- J6. **A. Kalita** and M. Khatua, “6TiSCH Network Formation: A Review,” in **IEEE Internet of Things Journal**, **IF-11.7**, (To be submitted soon)
- J5. **A. Kalita** and M. Khatua, “A Non-cooperative Gaming Approach for Control Packet Transmission in 6TiSCH Network,” in **IEEE Internet of Things Journal**, **IF-11.7**, (Accepted)
- J4. **A. Kalita** and M. Khatua, “Adaptive Control Packet Broadcasting Scheme for Faster 6TiSCH Network Bootstrapping,” in **IEEE Internet of Things Journal**, **IF-11.7**, Early Access, [Link](#)
- J3. **A. Kalita** and M. Khatua, “Autonomous Allocation and Scheduling of Minimal Cell in 6TiSCH Network,” in **IEEE Internet of Things Journal**, **IF-11.7**, Early Access, [Link](#), [Code](#)
- J2. **A. Kalita** and M. Khatua, “Opportunistic Transmission of Control Packets for Faster Formation of 6TiSCH Network,” in **ACM Transactions on Internet of Things**, **IF-NA**, vol. 2, no. 1, pp. 1-29, 2021, [Link](#)
- J1. **A. Kalita** and M. Khatua, “Channel Condition Based Dynamic Beacon Interval for Faster Formation of 6TiSCH Network,” in **IEEE Transactions on Mobile Computing**, **IF-5.112**, vol. 20, no. 7, pp. 2326–2337, 2021 [Link](#)

## Conferences

- C1. **A. Kalita** and M. Khatua, “Opportunistic Priority Alternation Scheme for Faster Formation of 6TiSCH Network,” in 21st International Conference on Distributed Computing and Networking (ICDCN), Jan 2020, pp. 1-5. [Link](#)
- C2. **A. Kalita** and M. Khatua, “Faster Joining in 6TiSCH Network using Dynamic Beacon Interval,” in 11th International Conference on Communication Systems Networks (COMSNETS), Jan 2019, pp. 454–457. [Link](#)
- C3. **A. Kalita**, N. Ahmed, H. Rahman, and M. I. Hussain, “A QoS-aware MAC protocol for large-scale networks in Internet of Things,” in 2017 IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS), Dec 2017, pp. 1–6. [Link](#)
- C4. **A. Kalita**, K. Ray, A. Biswas, and M. A. Hussain, “A topology for network-on-chip,” in 2016 International Conference on Information Communication and Embedded Systems (ICICES), Feb 2016, pp. 1–7. [Link](#)
- C5. K. Ray, **A. Kalita**, A. Biswas, and M. A. Hussain, “A multipath network-on-chip topology,” in 2016 International Conference on Information Communication and Embedded Systems (ICICES), Feb 2016, pp. 1–7. [Link](#)
- C6. A. Biswas, M. A. Hussain, and **A. Kalita**, “An improved congestion free modified fat tree network,” in 2016 International Conference on Signal Processing, Communication, Power and Embedded System (SCOPEs), Oct 2016, pp. 759-763. [Link](#)
- C7. **A. Kalita**, A. Biswas, Md. Anwar Hussain, “A Multipath Fault Tolerant Topology for Network-On-Chip,” accepted in Springer, International Conference on Computing and Communication Systems 2016 (IC3S2016)-2016. (**Withdrawn**)

## WORKSHOP & TRAINING

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- An active volunteer of in the organizing committee of the 3<sup>rd</sup> ISEA International Conference on Security and Privacy (ISEA-ISAP 2020) in IIT Guwahati from 27 Feb - 1 Mar 2020
- An active member of organizing committee in two days workshop on “Internet of Things: It’s Inside Out” at NEHU, Shillong, Meghalaya from 12 May - 13 May, 2017
- Faculty Development Programme (FDP) in “Cloud Computing with AWS” in association with IIIT Guwahati , organized by E&ICT Academy at IIIT Guwahati from 05 Dec - 10 Dec, 2016
- Two days workshop on “Internet of Things: A Gateway to Smart and Intelligent Future” at NIT Meghalaya, organized by E&ICT Academy in 2016
- Fifteen days Summer Training on Networking at IOCL, Bongaigaon in 2011

## ACHIEVEMENTS & AWARDS

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- Received travel grant to attend ICDCN’2020 conference from IIT Guwahati, India.
- Qualified UGC-NET (National Eligibility Test) for Assistant Professor (India)
- Received travel grant to attend COMSNETS’2019 conference from the conference organizer
- MHRD scholarship for Ph.D. (2018-till)
- Bagged second prize in Regional Innovators Conclave conducted by Government of Meghalaya for the “Smart Lighting Model”, Meghalaya, India 2017
- Qualified GATE’2017
- TEQIP-II scholarship during M-Tech (2014-2016)
- Bagged first prize in line follower robotics competition, was held in Assam University, India 2016

## DOCTORAL THESIS

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**Title:** *Adaptive Resource Allocation for Faster Formation of 6TiSCH Network*

**Objectives:** The main objective of this work is to make the 6TiSCH network formation process faster by providing various resources such as bandwidth, transmission opportunity, transmission rate of various control packets depending on network situation. The main contributions are listed below,

- Proposed a Markov Chain-based model for analyzing the node joining process in a multihop 6TiSCH network.
- A channel condition based dynamic beacon interval (C2DBI) scheme is proposed for efficient joining of nodes in 6TiSCH network based on channel congestion status.
- Identified and analytically proved the demerits of EB’s highest priority, absence of routing information, and uncertainty of shared channel access during bootstrapping in 6TiSCH network.
- An opportunistic priority alternation and rate adjustment (OPR) scheme is proposed to deal with the demerits of EB’s highest priority and absence of routing information.

- An opportunistic channel access (OCA) scheme is proposed to transmit urgent packets with minimum delay.
- An autonomous minimal cell allocation scheme (ALLOT) is proposed for faster transmission of control packets to all nodes.
- A hierarchical odd-even minimal cell scheduling scheme (CHOICE) is proposed along with *ALLOT* for maintaining synchronization between a sender and a receiver in a network.
- All the proposed schemes are evaluated by means of analytical analysis, simulation and real Testbed experiments.

## MASTER'S THESIS

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**Title:** *A Fault Tolerant Topology For Network-on-Chip*

**Objectives:** The main objective of this work was to design a new topology for NoC by keeping in mind various factors such as minimum chip area, high throughput, minimum latency and path diversity. Some of the other tasks were to design an adaptive routing algorithm for the proposed topology and to make it fault tolerant.

- A novel topology was designed for NoC, which provides low latency, better throughput and high path diversity by consuming less chip area.
- An adaptive routing algorithm was proposed for the proposed topology, which changes the routing path depending on loads in each IP core.
- Few spare routers were used dynamically during run time to make the proposed topology fault tolerant.

## R&D PROJECT

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**Title:** *QoS Provisioning in Internet of Things*

**Role:** *Project Scientist*

**Funding Agency:** Department of Electronics & Information Technology (DeitY)

The main contribution are as follows,

- Implemented IoT based smart lighting application
  - Bagged second prize (of cash 25000 INR) in Regional Innovators Conclave conducted by Government of Meghalaya.
- Designed and implemented 6LoWPAN-based IoT Prototype
  - Deployed smart street light in NEHU campus, controlled from multi-hop distance.
- Proposed and designed A QoS-aware MAC protocol for large-scale networks in Internet of Things.
  - Accepted in IEEE ANTS'2017 conference.

## TECHNICAL SKILLS

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<b>Technical Skill:</b>	Testbed setup
<b>Programming:</b>	C, C++
<b>Documentation language:</b>	LaTeX, Microsoft Word
<b>Databases:</b>	MySQL
<b>Software &amp; Tools:</b>	<b>Operating System:</b> Windows, Linux <b>Network Simulator:</b> Cooja, OMNeT++, NS-3 <b>IDE:</b> NetBeans, Arduino, MATLAB, VB

## PROFESSIONAL MEMBERSHIP

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- ACM student membership since November 2019 (ID: 9926691)

## REVIEWER

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- IEEE Transactions on Mobile Computing
- IEEE Internet of Things Journal

Date: 26/07/2021  
Place: IIT Guwahati

  
Signature