AYAN MONDAL

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Department of Computer Science and Engineering
Indian Institute of Technology Kharagpur
Kharagpur - 721302, India

Education

Doctor of Philosophy, *TCS Fellow*, Department of Computer Science and Engineering   2020
Indian Institute of Technology Kharagpur   (Thesis Submitted)
Thesis: *Traffic Engineering in Software-Defined Data Center Networks for IoT*
Supervisor: Professor Sudip Misra

Master of Science (by Research), School of Information Technology
Indian Institute of Technology Kharagpur   2015
Thesis: *Distributed Energy Management in Smart Grid*
Supervisor: Professor Sudip Misra
Grade (out of 10): 9.73

Bachelor of Technology, Electronics and Communication Engineering
St. Thomas' College of Engineering and Technology   2012
West Bengal University of Technology
Grade (out of 10): 8.99

Higher Secondary, Pure Science
West Bengal Council of Higher Secondary Education   2008
Percentage: 84.57

Secondary,
West Bengal Board of Secondary Education   2006
Percentage: 92.00

Research Interests

- Software-Defined Network (SDN)
- Software-Defined DCN (SD-DCN)
- Sensor-Cloud
- Game Theory Applications
- Smart Grid Communication
- Smart Grid Energy Management
- Fog Networks
- Wireless Sensor Networks (WSNs)

Publications

Journals

[J18] A. Chakraborty, S. Misra, and **A. Mondal**, "QoS-Aware Dynamic Cost Management Scheme for Sensors-as-a-Service," *IEEE Transactions on Services Computing*, Early Access, pp. 1-12, July 2020. DOI: 10.1109/TSC.2020.3011495

[J17] S. Misra, **A. Mondal**, P. Bhavathankar, and M.-S. Alouini, "M-JAW: Mobility-Based Jamming Avoidance in Wireless Sensor Networks," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 5, pp. 5381-5390, May 2020. DOI: 10.1109/TVT.2020.2982966

[J16] **A. Mondal** and S. Misra, "FlowMan: QoS-Aware Dynamic Data Flow Management in Software-Defined Networks," *IEEE Journal on Selected Areas in Communications*, vol. 38, no. 7, pp. 1366-1373, July 2020. DOI: 10.1109/JSAC.2020.2999682

[J15] A. Roy, **A. Mondal**, S. Misra, and M. S. Obaidat, "ORCID: Opportunistic Re-Connectivity for Network Management in the Presence of Dumb Nodes in Wireless Sensor Networks," *IEEE Systems Journal*, vol. 14, no. 1, pp. 9-16, March 2020. DOI: 10.1109/JSYST.2019.2956324

[J14] **A. Mondal**, S. Misra, and I. Maity, "AMOPE: Performance Analysis of OpenFlow Systems in Software-Defined Networks," *IEEE Systems Journal*, vol. 14, no. 1, pp. 124-131, March 2020. DOI: 10.1109/JSYST.2019.2912843

[J13] S. Misra, **A. Mondal**, and S. Khajjayam, "Dynamic Big-Data Broadcast in Fat-Tree Data Center Networks with Mobile IoT Devices," *IEEE Systems Journal*, vol. 13, no. 3, pp. 2898-2905, September 2019. DOI: 10.1109/JSYST.2019.2899754

[J12] I. Maity, **A. Mondal**, S. Misra, and C. Mandal, "Tensor-Based Rule-Space Management System in SDN," *IEEE Systems Journal*, vol. 13, no. 4, pp. 3921-3928, December 2019. DOI: 10.1109/JSYST.2018.2879321

[J11] A. Chakraborty, **A. Mondal**, A. Roy, and S. Misra, "Dynamic Trust Enforcing Pricing Scheme for Sensors-as-a-Service in Sensor-Cloud Infrastructure," *IEEE Transactions on Services Computing*, pp. 1-12, September 2018. DOI: 10.1109/TSC.2018.2873763

[J10] I. Maity, **A. Mondal**, S. Misra, and C. Mandal, "CURE: Consistent Update with Redundancy Reduction in SDN," *IEEE Transactions on Communications*, vol. 66, no. 9, pp. 3974-3981, September 2018. DOI: 10.1109/TCOMM.2018.2825425

[J9] **A. Mondal**, S. Misra, and I. Maity, "Buffer Size Evaluation of OpenFlow Systems in Software-Defined Networks," *IEEE Systems Journal*, vol. 13, no. 2, pp. 1359-1366, June 2019. DOI: 10.1109/JSYST.2018.2820745

[J8] **A. Mondal**, S. Misra, L. S. Patel, S. K. Pal and M. S. Obaidat, "DEMANDS: Distributed Energy Management Using Non-cooperative Scheduling in Smart Grid," *IEEE Systems Journal*, Vol. 12, no. 3, pp. 2645-2653, September 2018. DOI: 10.1109/JSYST.2017.2723961

[J7] P. Bhavathankar, **A. Mondal**, and S. Misra, "Topology Control in the Presence of Jammers for Wireless Sensor Networks," *International Journal of Communication Systems*, Vol. 30, no. 13, pp. 1-11, January 2017. DOI: 10.1002/dac.3289

[J6] A. Roy, S. Misra, P. Kar, and **A. Mondal**, "Topology Control for Self-Adaptation in Wireless Sensor Networks with Temporary Connection Impairment," *ACM Transactions on Autonomous and Adaptive Systems*, Vol. 11, no. 4, pp. 21:1-21:34, January 2017. DOI: 10.1145/2979680

[J5] **A. Mondal**, S. Misra, and Mohammad S. Obaidat, "Distributed Home Energy Management System with Storage in Smart Grid Using Game Theory," *IEEE Systems Journal*, vol. 11, no. 3, pp. 1857-1866, September 2017. DOI: 10.1109/JSYST.2015.2421941

[J4] **A. Mondal** and S. Misra, "Game-Theoretic Energy Trading Network Topology Control for Electric Vehicles in Mobile Smart Grid," *IET Networks*, vol. 4, no. 4, pp. 220-228, July 2015. DOI: 10.1049/iet-net.2014.0089

[J3] S. Misra, T. Ojha, and **A. Mondal**, "Game-theoretic Topology Control for Opportunistic Localization in Sparse Underwater Sensor Networks," *IEEE Transactions on Mobile Computing*, vol. 14, no. 5, pp. 990-1003, July 2014. DOI: 10.1109/TMC.2014.2338293

[J2] S. Misra, G. Mali, and **A. Mondal**, "Distributed Topology Management for Wireless Multimedia Sensor Networks: Exploiting Connectivity and Cooperation," *International Journal of Communication Systems*, vol. 27, no. 3, pp. 1367-1387, March 2014. DOI: 10.1002/dac.2770

[J1] S. Misra, S. Bera, **A. Mondal**, R. Tirkey, H.-C. Chao, S. Chattopadhyay, "Optimal Gateway Selection in Sensor-Cloud Framework for Health Monitoring," *IET Wireless Sensor Systems*, vol. 3, no. 4, pp. 61-68, December 2013. DOI: 10.1049/iet-wss.2013.0073

Conferences

[C14] **A. Mondal** and S. Misra, "BIND: Blockchain-Based Flow-Table Partitioning in Distributed Multi-Tenant Software-Defined Networks," in *Proceedings of IEEE International Conference on Computer Communications Workshops* (INFOCOM Workshops): *Blockchain for Secure Software defined Networking in Smart Communities* (BlockSecSDN), Toronto, Canada, July 2020, pp. 1-6. (Accepted)

[C13] A. Chakraborty, S. Misra, **A. Mondal**, and Mohammad S. Obaidat, "SensOrch: QoS-Aware Resource Orchestration for Provisioning Sensors-as-a-Service," in *Proceedings of IEEE International Conference on Communications* (ICC), Dublin, Ireland, June 2020, pp. 1-6. DOI: 10.1109/ICC40277.2020.9148621

[C12] S. Misra, **A. Mondal**, and P. Kumar, "D2M: Mobility-Aware Dynamic Data Multicasting in Software-Defined Data Center Networks," in *Proceedings of IEEE International Conference on Communications Workshops* (ICC Workshops): *Secure and Dependable Software Defined Networking for Sustainable Smart Communities* (SecSDN), Shanghai, China, March 2019, pp. 1-6.
DOI: 10.1109/ICCW.2019.8756718 (**Hot Topic Paper Award**)

[C11] S. Misra, A. Mondal, and **A. Mondal**, "DATUM: Dynamic Topology Control for Underwater Wireless Multimedia Sensor Networks," in *Proceedings of IEEE Wireless Communications and Networking Conference* (WCNC), Marrakech, Morocco, December 2019, pp. 1-6. DOI: 10.1109/WCNC.2019.8885632

[C10] **A. Mondal**, S. Misra, and A. Chakraborty, "TROD: Throughput-Optimal Dynamic Data Traffic Management in Software-Defined Networks," in *Proceedings of IEEE Global Communications Conference Workshops* (GLOBECOM Workshops): *Software defined Networking for 5G Architecture in Smart Communities*, Abu Dhabi, UAE, December 2018, pp. 1-6. DOI: 10.1109/GLOCOMW.2018.8644398

[C9] **A. Mondal** and S. Misra, "Dynamic Micro-Grid Selection by Plug-In Electric Vehicles in Smart Grid: An Evolutionary Game," in *Proceedings of IEEE Wireless Communications and Networking Conference* (WCNC), Barcelona, Catalonia, Spain, April 2018, pp. 1-2.

[C8] A. Chakraborty, **A. Mondal**, and S. Misra, "Cache-Enabled Sensor-Cloud: The Economic Facet," in *Proceedings of IEEE Wireless Communications and Networking Conference* (WCNC), Barcelona, Catalonia, Spain, April 2018, pp. 1-6. DOI: 10.1109/WCNC.2018.8377069

[C7] **A. Mondal** and S. Misra, "DCoE: Game-Theoretic Dynamic Coalition Extension with Micro-Grid Failure in Smart Grid," in *Proceedings of IEEE International Conference on Advanced Networks and Telecommunications Systems* (ANTS), Bhubaneswar, India, December 2017, pp. 1-6. DOI: 10.1109/ANTS.2017.8384118

[C6] **A. Mondal** and S. Misra, "Game-theoretic Green Electric Vehicle Energy Networks Management in Smart Grid," in *Proceedings of IEEE International Conference on Advanced Networks and Telecommunications Systems* (ANTS), Kolkata, India, December 2015, pp. 1-6. DOI: 10.1109/ANTS.2015.7413616

[C5] **A. Mondal** and S. Misra, "Dynamic Data Aggregator Unit Selection in Smart Grid: An Evolutionary Game Theoretic Approach," in *Proceedings of the 11th IEEE India Conference on Emerging Trends and Innovation in Technology* (INDICON), Pune, India, December 2014, pp. 1-6. DOI: 10.1109/IN-DICON.2014.7030614

[C4] **A. Mondal** and S. Misra, "Game-Theoretic Distributed Virtual Energy Cloud Topology Control for Mobile Smart Grid," in *Proceedings of the 6th IEEE International Conference on Cloud Computing Technology and Science* (CloudCom), Singapore, December 2014, pp. 54-61. DOI: 10.1109/CloudCom.2014.83

[C3] A. Roy, **A. Mondal**, and S. Misra, "Connectivity Re-establishment in the Presence of Dumb Nodes in Sensor-Cloud Infrastructure: A Game Theoretic Approach," in *Proceedings of Emerging Issues in Cloud (EIC) workshop in conjunction with the 6th IEEE International Conference on Cloud Computing Technology and Science* (CloudCom), Singapore, December 2014, pp. 847-852. DOI: 10.1109/CloudCom.2014.121

[C2] S. Misra, **A. Mondal**, S. Banik, M. Khatua, S. Bera, and Mohammad S. Obaidat, "Residential Energy Management in Smart Grid: A Markov Decision Process-Based Approach," in *Proceedings of IEEE International Conference on Internet of Things* (iThings), Beijing, China, August 2013, pp. 1152-1157. DOI: 10.1109/GreenCom-iThings-CPSCom.2013.200

[C1] **A. Mondal** and S. Misra, "Dynamic Coalition Formation in a Smart Grid: A Game Theoretic Approach," in *Proceedings of IEEE International Conference on Communications Workshops* (ICC Workshops): *Smart Communication Protocols and Algorithms* (SCPA), Budapest, Hungary, June 2013, pp. 1067-1071. DOI: 10.1109/ICCW.2013.6649395

Patent

[P1] **A. Mondal**, S. K. Roy, A. Roy, and S. Misra, "A Cloud Based Automatized System for On Demand and Without Service Delay Supply of Energy to End Users," *Indian Patent Filed*, File No. 201631007632, Date March 4, 2016.

Internship

FogCity: QoS-Aware Resource Management for Smart Cities   June 2019 – September 2019
Myriads team of Inria Rennes Bretagne Atlantique, INRIA, France
Supervisors: Prof. Guillaume Pierre and Prof. Nikos Parlavantzas

Invited Talk

International Conference on Advanced Computing and Intelligent Engineering (ICACIE) 2020 (Springer)
Topic: *Traffic Management in Software-Defined Data Center Networks for IoT*
Université des Mascareignes (UdM), Mauritius
25-27 June, 2020

Session Chair

International Conference on Advanced Computing and Intelligent Engineering (ICACIE) 2018 (Springer)
Siksha 'O' Anusandhan (Deemed to be University)
Bhubaneswar, India
December 22-24, 2018

Memberships

Institute of Electrical and Electronics Engineers (IEEE)   *Graduate Student Member*
IEEE Communications Society
IEEE Computer Society

IEEE Information Theory Society
IEEE Young Professionals

Association for Computing Machinery (ACM)   Graduate Student Member

Teaching Assistant

Software Engineering Lab (CS29006)   January 2020 - July 2020
Department of Computer Science and Engineering
Indian Institute of Technology Kharagpur

Software Engineering Lab (CS29006)   January 2019 - June 2019
Department of Computer Science and Engineering
Indian Institute of Technology Kharagpur

Programming and Data Structures Lab (CS19001)   July 2018 - December 2018
Department of Computer Science and Engineering
Indian Institute of Technology Kharagpur

Software Engineering Lab (CS29006)   January 2018 - June 2018
Department of Computer Science and Engineering
Indian Institute of Technology Kharagpur

Wireless Ad-Hoc and Sensor Networks (IT60119)   July 2017 - December 2017
Department of Computer Science and Engineering
Indian Institute of Technology Kharagpur

Programming and Data Structures Lab (CS19001)   January 2017 - June 2017
Department of Computer Science and Engineering
Indian Institute of Technology Kharagpur

Wireless Ad-Hoc and Sensor Networks (IT60119)   July 2016 - December 2016
Department of Computer Science and Engineering
Indian Institute of Technology Kharagpur

Internet and Web-based Technologies (IT60102)   January 2016 – May 2016
Department of Computer Science and Engineering
Indian Institute of Technology Kharagpur

Underwater Sensor Networks: Theory and Simulations   April 2016
Short-term Course
NPOL, DRDO
Sponsored by: DRDO

Professional Experience

Indian Institute of Technology Kharagpur   February 2016
Sponsored Research and Industrial Consultancy   (Senior Research Fellow)
Sponsored by: DRDO

Indian Institute of Technology Kharagpur   August 2014 – January 2016
Sponsored Research and Industrial Consultancy   (Senior Project Officer)
Sponsored by: DietY

Indian Institute of Technology Kharagpur
Sponsored Research and Industrial Consultancy
Sponsored by: DietY

August 2013 – July 2014
(Junior Project Officer)

Indian Institute of Technology Kharagpur
Sponsored Research and Industrial Consultancy
Sponsored by: DietY

August 2012 – July 2013
(Junior Project Assistant)

Referee Services

IEEE Journal on Journal on Selected Areas in Communications (IEEE JSAC); IEEE Transactions on Smart Grid (IEEE TSG); IEEE Transactions on Communications (IEEE TCOM); IEEE Transactions on Vehicular Technology (IEEE TVT); IEEE Transactions on Mobile Computing (IEEE TMC); IEEE Transactions on Sustainable Energy (IEEE TSTE); IEEE Systems Journal; IEEE Communications Magazine; Pervasive and Mobile Computing Journal (PMC) (Elsevier); IET Networks; IET Generation; IET Wireless Sensor Systems; Transmission & Distribution; International Journal of Communication Systems (Wiley); Wireless Communications and Mobile Computing (WCMC) (Wiley); International Journal of Communication Networks and Distributed Systems (Springer); IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS) 2016; IEEE Students' Technology Symposium (TechSym) 2016; IEEE TechSym 2014

Technical Program Co-Chair

IEEE Students' Technology Symposium (TechSym) 2016; International Conference on Solar Energy & Building (ICSoEB) 2015; International Conference on Engineering & Computational Innovation Sciences (ENCINS) 2015; World Symposium on Mechatronics Engineering & Applied Physics (WSMEAP) 2015; Global Summit on Computer & Information Technology (GSCIT) 2015; International Conference on Single Processing & Data Mining (ICSPDM) 2015; Advancement on Mechanical and Manufacturing Engineering Technology (ADMMET) 2015

Technical Skills

- **Programming Languages**: C, MATLAB, Python, C++, Java
- **Network Simulators**: NS-3 (basics)
- **Web Technologies**: JavaScript, jQuery, CSS
- **Databases**: MySQL
- **Data Analytics**: Hadoop, R
- **Tools**: Latex, GnuPlot, Eclipse

Awards:

- Recipient of the **HoT Topic Paper Award** in the 2nd Secure and Dependable Software Defined Networking for Sustainable Smart Communities (SecSDN) in conjunction with IEEE International Conference on Communications (ICC) 2019 for the paper entitled "D2M: Mobility-Aware Dynamic Data Multicasting in Software-Defined Data Center Networks".
- Recipient of the **Tata Consultancy Services (TCS) Fellowship**, 2015-2019.

- Recipient of the **Institute** (Indian Institute of Technology Kharagpur) **Full Financial Grant** for presenting paper in the IEEE International Conference on Communications (ICC), Shanghai, China, March 2019.

- Recipient of the **Institute** (Indian Institute of Technology Kharagpur) **Travel Grant** for presenting paper in the IEEE Global Communications Conference (GLOBECOM), Abu Dhabi, UAE, December 2018.

- Recipient of the **TCS** (Tata Consultancy Services) **Research Travel Grant** for presenting poster in the IEEE Wireless Communications and Networking Conference (WCNC), Barcelona, Catalonia, Spain, April 2018.

- Recipient of the **Institute** (Indian Institute of Technology Kharagpur) **Full Financial Grant** for presenting paper in the 6th IEEE International Conference on Cloud Computing Technology and Science (CloudCom), Singapore, December 2014.

- Recipient of the **Institute** (Indian Institute of Technology Kharagpur) **Full Financial Grant** for presenting paper in the 11th IEEE India Conference on Emerging Trends and Innovation in Technology (INDICON), Pune, India, December 2014.

- **Winner** in *Poster presentation* on the 6th Research Scholars' Day 2015 of School of Information Technology, Indian Institute of Technology Kharagpur.

- Recipient of the **Merit scholarship** by Government of India Ministry of Human Resource Development Department of Higher Education based on performance in Higher Secondary Examination.

- Recipient of the **Merit scholarship** by Government of India Ministry of Human Resource Development Department of Higher Education for exemplary performance in Secondary Examination.

Achievements:

- **Served** as *Departmental Research Scholar Representative* of School of Information Technology, Indian Institute of Technology Kharagpur for academic year 2015-2016.

- **Organizing team member** of *AICTE/QIP Sponsored Short-term course* on "Internet of Things: Convergence of Sensing, Cloud and Big-Data Networking" at Indian Institute of Technology Kharagpur, July 2015.

- **Organizing team member** of *International Summer and Winter Term* (ISWT) *course* on "Enabling Internet of Things with Cloud and Big Data Networking" at Indian Institute of Technology Kharagpur, June 2015.

- **Served** as *Departmental Research Scholar Representative* of School of Information Technology, Indian Institute of Technology Kharagpur for academic year 2014-2015.

- **Elected** *Student Senate Member* (SSM) and *Vice-President* (VP) of Vikram Sarabhai Residential Complex, Indian Institute of Technology Kharagpur, Kharagpur, West Bengal, India for academic year 2014-2015.

- **Ranked** 3rd and 49th in *Secondary Examination* from District - North 24 Parganas, West Bengal, India and State - West Bengal, India, respectively.