

Ahmed M. A. SAYED

a.k.a. Ahmed M. Abdelmoniem

Lecturer (Assistant Professor)

Research Profile

I lead SAYED Systems Lab (<https://sayed-sys-lab.github.io>) in which we build Scalable, Advanced Yet Efficient Distributed Systems of the Future. My research spans across inter-related disciplines of computer science and engineering with focus on system design and optimization for machine learning systems (training and inference efficiency, distributed ML, federated learning), distributed systems (architecture design, performance analysis, resource allocation, algorithmic optimization), computer networks (traffic engineering, congestion control, performance optimization, software-defined networking), and wireless networks (routing in mobile ad-hoc and wireless sensor networks).

Current Research Interests

- Systems for ML
- ML for Systems
- Federated Learning
- Edge/Cloud Computing
- Distributed Systems

Education

2013-2017 **Ph.D., Computer Science and Engineering (GGA 4.0/4.2)**, *Computer Science and Engineering Department, School of Engineering, Hong Kong University of Science and Engineering, Hong Kong.*

PhD Thesis

Title *On Improving The Performance of TCP Applications in Public Cloud Networks*
Supervisor Assoc. Prof. Brahim Bensaou (CSE, HKUST)
Committee Prof. Gary Chan (CSE, HKUST), Prof. Danny Tsang (ECE, HKUST), Assoc. Prof. Kai Chen (CSE, HKUST), Assoc. Prof. Chun Tung Chou (UNSW, Australia)
Description Proposing efficient schemes that have demonstrated to achieve considerable performance gains for cloud applications via mathematical modeling, empirical analysis, simulation, hardware prototyping and real-testbed implementation and experiments on various network scenarios and topologies.

2008-2012 **M.Sc., Computer Science (Distinction, ranked 1st)**, *Computer Science Department, Faculty of Computers and Information, Assiut University, Egypt.*

Masters Thesis

Title *Routing Optimization of Mobile AD-HOC Networks Based on Ant Colony Algorithms*
supervisor Prof. Hosni Ibrahim, Prof. Marghany H. Mohamed, Asst. Prof. Abdel-Rahman Hedar

- Description Proposing efficient routing optimizations based on Ant Colony Algorithms (ACO) that have demonstrated to achieve considerable performance gains for Mobile Ad-Hoc Networks (MANET) routing protocols via mathematical modeling, simulation analysis and implementation on various network scenarios and topologies.
- 2003–2007 **B.Sc., Computer Science (Distinction with Honors, ranked 2nd)**, *Computer Science Department, Faculty of Computers and Information, Assiut University, Egypt.*
- Bachelors Thesis**
- Title *Enabling Video Calls over Internet and Bluetooth* - Ministry of Telecommunications, Egypt
- Supervisor Prof. Yousef B. Mahdi
- Description Full system implementation and delivery of a fully functional system for enabling video calls over bluetooth and Internet using C# as back-end server and J2ME as the front and back-end on various camera-ready mobile devices.
- 2000–2003 **Egyptian General Secondary Examination (98.2%, ranked in the top 200 out of 400K+ student)**, *Almoshir Ahmed Esmail Secondary School, Assiut, Egypt.*

Work Experience

- 2021–Now **Lecturer (Assistant Professor)**, *School of Electronic Engineering and Computer Science, Queen Mary University of London, UK.*
- Head I lead SAYED Systems Lab (sayed-sys-lab.github.io) in which we build Scalable, Advanced Yet Efficient Distributed Systems of the Future.
- Duties **“Research:”** Conducting scientific research in computer science and publishing high quality papers, supervising M.S./Ph.D. students and preparing research grant proposals. **“Teaching:”** Teaching and organizing and delivering modules at both the undergraduate and postgraduate levels. Performance assessment of students in weekly self-practice tasks. Interacting with students within office hours. Preparing and mentoring written examination and course projects. **“Administrative highlights:”** Active membership in school meetings to discuss departmental and school matters (teaching, research and school management). Organizing research seminars.
- Modules Module organizer and sole lecturer for ***ECS765P - Big Data Processing*** module taught as part of the MSc Data Science Program for the postgraduate level (level-7)
- Co-organize and teach the ***ECS637U/ECS757P - Digital Media and Social Networks*** module for both undergraduate (level-6) and postgraduate (level-7) levels
- 2020–2021 **Research Scientist**, *Extreme Computing Research Center (ECRC), King Abdullah University of Science and Technology (KAUST), Saudi Arabia.*
- Duties Develop and write research proposals for obtaining research funding grants. Supervise graduate students. Collect resources and work with team members to complete the research plan. Present research results at meetings and engages in result publications. Be up-to-date with new research directions and findings by attending research seminars, workshops, and conferences. Review literature and analyze their results. Conduct system research in a systematic manner with a focus on improving performance, scalability, and interpretability of distributed machine learning. Find efficient solutions for challenging computer science research problems. Design experiments to verify existing and new solutions and techniques. Write papers on novel ideas and new findings and publish them in reputed venues and journals. Communicate ideas and results with members. Understand relevant scientific literature.
- 2019–2020 **Post-Doctoral Research Fellow**, *Extreme Computing Research Center (ECRC), King Abdullah University of Science and Technology (KAUST), Saudi Arabia.*

Duties Find efficient solutions for challenging computer science research problems. Design experiments to verify existing and new solutions and techniques. Collect resources and work with team members to complete the research plan. Develop and write research proposals for obtaining research funding grants. Present research results at meetings and engage in result publications. Attend research seminars, workshops and conferences to be aware of the new research directions and findings. Review literature and analyze their results. Conduct computer and network system research with focus on improving performance, scalability and interpretability of distributed machine learning applications. Prepare manuscripts of novel ideas and findings to publish them in reputed venues and journals. Communicate ideas and results with members. Understand relevant scientific literature. Help and work closely with our group members.

2018– **Assistant Professor**, *Faculty of Computers and Information, Assiut University, Egypt.*

Duties **“Research:”** Conducting scientific research in computer science and publishing high quality papers, supervising M.S./Ph.D. students and preparing research grant proposals. **“Teaching:”** Teaching and managing Computer Science courses at both the undergraduate level such as *Software Engineering, Project Management, Software Development and Technical Practice, Computer Security* and *Parallel Computing* and postgraduate level such as *Object-Oriented Software Engineering* and *Intro to Computers - Fine Arts*. Performance assessment of students in weekly self-practice tasks. Interacting with students within office hours. Preparing and mentoring written examination and course projects. **“Administrative highlights:”** Active membership in faculty committee meetings to discuss departmental and school matters (teaching, research and school management). Active membership in department and school councils. Organizing research seminars. Director of Information Technology unit of the school. Membership in research and library council committees.

2017-2018 **Senior Researcher**, *Future Network Theory Lab. Huawei Technologies Investing Co. Ltd..*

Duties Conducting advanced research in network control, traffic engineering and resource management. Leading the system research directions. Research proposals preparation. Research publications. Patent development. Collaboration work management. Recruitment.

Contributions I have contributed with our team in the redefinition and formulation of the ADN vision and its system implementation and evaluation both in simulation and real-testbed environment. ADN (and specifically fast-slow control) is a major long-term project in the lab which is the main focus of the lab and so far resulted in few paper and patent submissions. Have participated and taken lead on several projects, few of the projects are direct collaboration with renowned professors in Stanford, CalTech, Cornell, CUHK, CityU, HKUST, Nanjing, and Tsinghua Universities. Moreover, finished a stalled project in a record time. Other projects involved working closely with 4 interns to bring them to completion. Been actively responsible for the recruitment process for new hires and interns to our lab during different venues (e.g., SIGCOMM & NSDI & INFOCOM, etc). Successfully recruited for the Lab 3 new full-time hires and 1 intern.

2012–2018 **Assistant Lecturer**, *Faculty of Computers and Information, Assiut University, Egypt.*

Duties Conducting scientific research in computer science and publishing high quality papers. Pursuing my Doctorate degree. Teaching in classes and laboratories *Computer Networking, Network Programming* and *Network Analysis and Design* to undergraduate students. Performance assessment of students in weekly self-practice tasks. Interacting with students within office hours. Mentoring and grading written examination and course projects

2018-2021 **Technical Advisor**, *DeepCloudAI - a Decentralized AI-Driven Cloud Computing Infrastructure.*

- Duties Advising throughout the development of DeepCloudAI (www.deepcloudai.com) project, including but not limited to, advising the development of white paper and technical paper, advising the development of the prototype. Consultation on the technical questions and technical problem solutions. Advising on the technical-related activities that is required for the completion of the Initial Coin Offering campaign.
- Fall 2017 **Teaching Assistant**, *Department of Computer Science and Engineering, The Hong Kong University of Science and Engineering.*
- Duties Assist in teaching **Computer Networks: An Internet-Perspective - CSIT5610** MSCIT course to post-graduate students. Grading examination papers. Students' consultation. Examination proctoring.
- Spring 2017 **Linux Kernel Network Programming Assignment/Quiz Handler**, *Department of Computer Science and Engineering, The Hong Kong University of Science and Engineering.*
- Fall 2016 **Teaching Assistant**, *Department of Computer Science and Engineering, The Hong Kong University of Science and Engineering.*
- Duties Assist in teaching **Computer Networks - COMP 5621** PG Core and **Computer Networks: An Internet-Perspective - CSIT5610** MSCIT course to post-graduate students. Grading examination papers. Students' consultation. Examination proctoring.
- 2007–2012 **Teaching Assistant**, *Faculty of Computers and Information, Assiut University, Egypt.*
- Duties Conducting scientific research in computer science and publishing high quality papers. Pursuing my Masters degree. Teaching in classes and laboratories **Computer Networking, Network Programming, Object-Oriented Programming using C++, Introduction to JAVA Programming, Introduction To Computers, Software Testing, Data Structure, Algorithms, Artificial Intelligence, Operating Systems, Distributed Database** and **IT Project Management** to undergraduate students. Performance assessment of students in weekly lab tasks. Interacting with students within office hours. Mentoring and grading written examination and course projects

Relevant Research Experience and Interests

- Computer Networking, Congestion Control, and Traffic Engineering
- Software Defined Networking and Network Function Virtualization
- Feedback Control of Hybrid and Switched Systems
- Mobile Ad-hoc Networks and Wireless Sensors Network
- AI Optimization and Genetic algorithms

Projects

- ML Congestion Control in SDN-based Data Center Networks, 2022 – Now
- Moderation in Decentralised Social Networks (DSNmod), 2022 – Now
- Machine Learning Architecture for Task-based Information Transfer, 2021 – Now
- Efficient Decentralized Learning in Heterogeneous Mobile Edge Computing, 2020 – Now
- Resource Efficient Federated Learning, 2020 – Now
- Design, Implementation and Analysis of Methods to Improve Performance of Distributed Machine Learning Systems, 2019–2020
- Implementation, Evaluation and Analysis of Fast-Slow Network Control Framework for Application-Driven Networking, 2017–2018
- Implementation, Evaluation and Analysis of Efficient, Scalable and Easily-Deployable Congestion Traffic and Control Schemes in Data Centers and Cloud, 2013–2017

- Design, Implementation and Analysis of various routing protocols optimized for Mobile Ad-Hoc Networks (MANET) via leveraging Artificial Intelligence algorithms inspired from Ant Colonies, 2008–2012
- Implementation of a complete system for enabling video calls over bluetooth and Internet using C# as back-end server and J2ME as the mobile front-end, 2007

Grants and Proposals

- 2022 **EPSRC - REPHRAIN Center**, *Moderation in Decentralised Social Networks (DSNmod)* - Granted 86K GBP.
- 2022 **HKRCG - GRF**, *ML Congestion Control in SDN-based Data Center Networks* - Granted 600K HKD.
- 2021 **KAUST - Competitive Research Grant**, *Machine Learning Architecture for Task-based Information Transfer* - Granted 400K USD.
- 2021 **KAUST - Industrial Grant of Ericsson**, *Resource Efficient Federated Learning*.
- 2017 **Huawei - Internal Grant**, *Application Driven Networking*.
- 2016 **HKUST - Google Research Grant**, *Fake it till you make it or how to reduce TCP latency in data center networks with fake signaling*.
- 2016 **HKUST - HK Research Grand Council**, *Energy-efficient virtual cluster embedding in data centers*.
- 2013 **HKPFS - HK Research Grand Council**, *Efficient Optimizations for Water Pipes Monitoring Wireless Sensor Networks*.

Student Supervision

- 2022 **Intern - QMUL**, *Energy-Aware Methods for Federated Learning on Battery-Powered Clients*.
- 2021 **MS/PhD - KAUST**, *Mitigating Device Heterogeneity in Federated Learning via Asynchronous Stale Updates*.
- 2021 **MS/PhD - KAUST**, *Prioritizing Participant Selection for Efficient Federated Learning*.
- 2020 **MS/PhD - KAUST**, *Identifying the Limits of Gradient Sparsification Methods for Distributed Machine Learning*.
- 2020 **Research Student Inters - KAUST**, *Study of Fairness and Bias in Federated Learning settings*.
- 2020 **Research Student Inters - KAUST**, *An Efficient compression technique to reduce Communication in Distributed Deep Learning*.
- 2019 **MS/PhD - KAUST**, *Survey and Empirical Analysis of Compressed Communication for Distributed Deep Learning*.
- 2019 **MS/PhD - KAUST**, *Theoretical and Empirical Analysis of Layerwise and Whole-Model Compressed Communication Methods in Distributed Machine Learning*.
- 2019 **Research Student Intern - KAUST**, *Energy-Efficiency of Hardware Offloading: Case-Study on Distributed Machine Learning*.
- 2019 **Research Student Intern - KAUST**, *Scaling Distributed Machine Learning with In-Network Aggregation using Smart NICs*.
- 2019 **Research Student Intern - KAUST**, *Accelerating Distributed Deep Learning with Adaptive Compression and Communication Scheduling*.
- 2018 **PhD Research Student Intern - Huawei Research**, *Leveraging Programmable Data Plane to Accelerate Distributed Applications*.

- 2018 **PhD Research Student Intern - Huawei Research**, *An Online Learning Multi-Path Selection Framework for Multi-path Transmission Protocols.*
- 2018 **Research Student Intern - Huawei Research**, *Implementation of an SDN-based Fast-Slow Control system to Realise an Operational Prototype of the Application-Driven Networking (ADN) Framework.*
- 2007-2013 **FYPs Undergraduate Students - Assiut University**, *Management System for controlling Wireless Access Points, HoneyPot Server Application, WiiMote Body Tracking & Robot Control System, Steganography Application to hide data in images and videos, Remote Desktop Control using Mobile Phones, Mobile Application in Traffic Service, Tourist Heaven - a tourist social networking application and Egyptian tourism company web system.*

Honors, Awards and Scholarships

- 2013–2017 **Hong Kong PhD Fellowship (HKPFS) award**, *HK Research Grants Council.*
- 2013–2017 **HKPFS research travel grant award.**
- 2017 **Student Participation Grant**, *Local Computer Networks (IEEE LCN), IEEE CompSoc.*
- 2015 **Travel Grant award**, *Global Communications (GlobeCom) conference, IEEE ComSoc.*
- 2007 **FYP sponsorship award**, *Ministry of Telecommunications, Egypt.*
- 2003-2007 **Undergraduate Distinction award**, *for TGA of 85%-above, Assiut University.*
- 2003–2007 **Dean's Honors**, *TGA of 85%+, Faculty of Computers and Information, Assiut University.*

Programming, Presentation, Modeling and System Skills

Presentation	Power Point, Beamer	Typography	L ^A T _E X, MicroSoft office
AI/ML	Tensorflow, PyTorch, Distributed ML, Federated Learning, Horovod, BytePS, WANDB		
Modeling	Mathematical, Queueing theory, MatLab, Simulink		
Info.	Awk, Gnuplot, Matplotlib, Pandas, Bokeh, Perl, Excel, SPSS		
Extraction			
Simulation	NS-2, NS-3, OPNET Modeler, Mininet		
Programming,	C, C++, Java, Python, C#, Git, Network Programming, SDN Applications, Ryu SDN		
Web & DB	Controller, P4/Tofino, Verilog, Tcl, shell scripting, HTML, PHP, SQL Server, Oracle DB		
System	Linux Kernel Modules, NetFilters, TCP/IP Stack, RDMA/RoCE/PFC, NetFPGA, Ku-		
Prototyping	bernetes, Kprobes, Open vSwitch, OVN, OpenFlow, OpenStack, DPDK, JUJU, CONDA, Ubuntu MASS, Broadcom OpenNSL & OFDPA API, Amazon EC2, Microsoft Azure		
Virtualization	KVM, Qemu, Xen Hypervisor, Virtual Box		
OS	Linux (Desktop/Server), Windows (Pro/Server), MacOS, Open Network Linux, SONiC		

Personal Strengths and Evidence of Steam

- Resilience, Eager to learn, Critical thinking, Objective-oriented, Good team player, Good listener and speaker, Sense of humor, and Work ethics compliant.
- Cultivating ideas to prepare research plans and produce research proposals
- Renovate the contents of established courses with up-to-date sources
- Propose out-of-box solutions to outstanding challenges in the department
- Attend and participate in professional development courses
- Active Technical Committee Member (TPC) for several renowned conferences and journals
- Co-organizer of international workshops and events

Language Proficiencies

Arabic Native
English Fluent

Listening, Reading, Speaking and Writing
Listening, Reading, Speaking and Writing

Professional Membership

IEEE IEEE and IEEE ComSoc Society Regular Member
ACM ACM Regular Member
USENIX USENIX Regular Member
Cisco Cisco Networking Academy Certified Instructor and FCI Assiut Uni Academy Leader.
Comp Soc Hong Kong Computer Society Member.

Professional Courses and Certification

Nvidia NVIDIA training: Data Science at Scale
Nvidia JNvidia-HKUST(DBI) Joint Deep Learning Workshop
Cisco Cisco Certified Networking Associate (CCNA)
Oracle Oracle Database Administration (Oracle DBA)

Surplus Courses

QMUL PGCAP - ADP7216 - Learning and Teaching in Higher Education
PGCAP - ADP7217 - Learning and Teaching in the Disciplines
KAUST Industrial Course on Deep Learning
HKUST ELEC4320 - FPGA-based Design ELEC4010G - Control System Design
COMP4511 - System and Kernel Programming in Linux
COMP6611A - Data Center Networks and Cloud Computing
COMP6611B - Cloud Computing and Data Analysis Systems
FINA6900N - Startup Financing and Operations
IELM5570 - Network Optimization in Transport Systems
Stanford CVX101 - Convex Optimization
MIT 6.00.1x - Introduction to Computer Science and Programming Using Python
UPValencia DC201x - Dynamics and Control
Microsoft DAT202.1x - Processing Big Data with Hadoop in Azure HDInsight

Professional Development Courses

QMUL	Challenging Unconscious Bias	Equality and Diversity Briefing
	Anti Bribery Essentials	Safeguarding Essentials
	GDPR for Staff	Cyber Security Training
KAUST	Scientific Writing	Communicating with Confidence
	Effective Scientific Writing	Research Communication Skills
	The Art and Science of Communication	Proven Techniques for Technical Communication
	Conveying messages with graphs	Making the most of your presentation
	The art and science of communication	Proven techniques for technical communication
HKUST	Effective Teaching Skills	Marking & Grading
	High-Tech Entrepreneurship	Understand the World of Work
	What Takes to be a Good Researcher	Conducting Labs

	Effective Presentation for Teaching	How to Write a Journal Paper
	How to Write CS Papers	How to Get Published
	Research ethics: Communities, choices, and values	
	Balancing Time between TA Duties and Research	
	Presenting Myself Through a Winning Profile	
AUN	Effective and Efficient Presentation	Academic Work and Research Ethics
	Scientific Publishing	Teaching Methodologies and Skills
	Credit Hour System	Time and Meeting Management
	Quality Assurance of Education Process	
	Communication Skills for Different Educational Approaches	

Voluntary Services

Program Chair	5th International Workshop on Embedded and Mobile Deep Learning (EMDL) co-located with ACM MobiSys, Virtual Online, 2021
	KAUST-NeurIPS Workshop on Advances of Machine Learning, KAUST, 2019
Tutorial	Distributed Deep Learning Clinic, KAUST, Saudi Arabia, 2020
	Data Analytics in the Cloud in the International BioDialog Project, Exhibition and Hackathon on BioDiversity Informatics, Egypt, 2018
Topic Preview	Congestion Control Session, ACM SIGCOMM, 2022
Reviewer	ACM/IEEE Transactions on Networking (ACM/IEEE ToN)
	IEEE Transactions on Neural Networks and Learning Representation (IEEE TLNLS)
	IEEE Journal on Selected Areas in Communications
	ACM Transactions on Modeling and Performance Evaluation of Computing Systems
	IEEE Transactions on Cloud Computing (IEEE TCC)
	IEEE Transactions on Mobile Computing (IEEE TMC)
	IEEE Transactions on Network and Service Management (IEEE TNMS)
	IEEE Access
	Journal of Computer Standards and Interfaces, Elsevier
	Journal of Computer Networks, Elsevier
	Journal of Computer Communications, Elsevier
	Journal of Telecommunication Systems, Springer
	International Journal of Artificial Intelligence (IJ-AI)
	USENIX ATC 2021
	IEEE HPSR 2021
	13th International Conference on Computational Intelligence and Communication Networks 2021
	10th International Conference on Communication Systems and Network Technologies 2021
	34 th AAAI Conference On Artificial Intelligence (AAAI 2020)
	15th International Conference on Systems and Networks Communications 2020
	ACM SIGCOMM 2018
	IEEE Conference on Network Protocols 2018 (IEEE ICNP)
	Journal of King Saud University - Computer and Information Sciences
	The Computer Journal by Oxford Academic

The Arabian Journal for Science and Engineering (AJSE)
 International Journal of Systems, Control and Communications (IJSCC)
 36th IEEE International Performance Computing and Communications Conference (IPCCC'2017)
 41st IEEE Conference on Local Computer Networks (LCN'2016)
 18th ACM International Conference on Modeling and Simulation of Wireless and Mobile System (MSWiM'2015)

TPC International Conference on Machine Learning (ICML), 2022
 ACM Workshop on Data Privacy and Federated Learning Technologies for Mobile Edge Networks (FedEdge), ACM MobiCom, 2022
 2nd European Workshop on Machine Learning and Systems (EuroMLSys), ACM EuroSys, 2022
 IEEE Conference on High Performance Switching and Routing (IEEE HPSR), 2022
 IEEE Vehicular Technology Conference (IEEE VTC), 2022
 1st Workshop on Machine Learning for Softwarized Networks (NetLearn 2020)
 3rd IEEE International Conference on Trends of Computer Engineering (ITCE'2020)
 2nd IEEE International Conference on Trends of Computer Engineering (ITCE'2019)
 87th IEEE International Vehicular Technology Conference (VTC'2018)
 International Conference on Computer Applications and Information Security (ICCAIS'2018)
 Saudi Computer Society - National Computer Conference (SCS-NCC'2018)
 International Conference on Computer Intelligent Systems and Networking (ICCISN'2018)
 IEEE World Symposium on Computer Applications and Research (WSCAR'2017)
 International Conference on Computers, Data Management and Technology Applications (ICCDMTA'2017)
 International Conference on High Performance Compilation, Computing and Communications (HP3C'2015)
 International Conference on Signal Processing and Data Mining (ICSPDM'2015)
 International Conference on Advances in Computing, Communications and Informatics (ICACCI'2014)
 International Bio-Metrics and Smart Government Summit (IBMSGs'2014)
 IEEE World Symposium on Computer Applications and Research (WSCAR'2014)

References - available upon request

Assoc. Prof.	Brahim Bensaou	<i>CSE Dept., HKUST, brahim@cse.ust.hk</i>
Assoc. Prof.	Marco Canini	<i>CEMSE Division, KAUST, macro@kaust.edu.sa</i>
Assoc. Prof.	Kai Chen	<i>CSE Dept., HKUST, kaichen@cse.ust.hk</i>
Dr.	Bai Bo	<i>Huawei's Theory Lab, ee.bobbai@gmail.com</i>

Research Accomplishments-see [Google Scholar](#)

Thesis

- o Ahmed M. Abdelmoniem, “On Improving the Performance of TCP Applications in Public Cloud Networks”. Ph.D. Thesis, HKUST, Hong Kong, <https://1bezone.ust.hk/bib/991012554564103412>, 2017.

- Ahmed M. Abdelmoniem, “Routing Optimization of Mobile AD-HOC Networks Based on Ant Colony Algorithms”. M.Sc. Thesis, Assuit University, Egypt, http://www.aun.edu.eg/thesis_files/4341.pdf, 2012.

Published International Refereed Journal Publication

- S Abdulah, W Atwa, Ahmed M. Abdelmoniem. **Active clustering data streams with affinity propagation**. *ICT Express* 8 (2), 276-282, 2022
- Ahmed M. Abdelmoniem and Brahim Bensaou. “T-RACKs: A Faster Recovery Mechanism for TCP in Data Center Networks”. *ACM/IEEE Transactions on Networking (ToN)*, 2021.
- Jiaqing Dong, Chen Tian, Ahmed M. Abdelmoniem, Huaping Zhou, Bo Bai, Hao Yin, Gong Zhang. “Uranus: Congestion-proportionality among Slices based on Weighted Virtual Congestion Control”. *Computer Networks, Elsevier*.
- Ahmed M. Abdelmoniem, Brahim Bensaou, and Amuda James Abu. “Mitigating Incast-TCP Congestion in Data Centers with SDN”. *Annals of Telecommunications - Springer. Special issue on Cloud Communications and Networking*.
- Ahmed M. Abdelmoniem, Hosny M. Ibrahim, Marghny H. Mohamed, and Abdel-Rahman Hedar. “Ant Colony and Load Balancing Optimizations for AODV Routing Protocol”. *International Journal of Sensor Networks and Data Communications*, volume 1, 2011. doi:10.4303/ijsndc/X110203

Published International Refereed Conference Publications

- Ahmed M. Abdelmoniem, AN Sahu, M Canini, SA Fahmy. **REFL: Resource Efficient Federated Learning**. *To appear In Proceedings of ACM EuroSys, 2023*
- Amna Arouj, Ahmed M. Abdelmoniem. **Towards Energy-Aware Federated Learning on Battery-Powered Clients**. *To appear in Proceedings of the ACM Workshop on Data Privacy and Federated Learning Technologies for Mobile Edge Networks (FedEdge), ACM MobiCom, 2022*
- Ahmed M. Abdelmoniem, CY Ho, P Papageorgiou, M Canini. **Empirical analysis of federated learning in heterogeneous environments**. *Proceedings of the 2nd European Workshop on Machine Learning and Systems (EuroMLSys), ACM EuroSys, 2022*
- Atal Sahu, Aritra Dutta, Ahmed M Abdelmoniem, Trambak Banerjee, Marco Canini, Panos Kalnis. **Rethinking gradient sparsification as total error minimization**. *Proceedings of NeurIPS, Spotlight (Top 3%), Virtual Conference, 2022*.
- Kelvin H.T. Chiu, Jason Min Wang, Ahmed M. Abdelmoniem, Brahim Bensaou. “A Two-tiered Caching Scheme for Information-Centric Networks”. *Proceedings of IEEE High Performance Switching and Routing (IEEE HPSR), Paris, France, June 2021*.
- Ahmed M. Abdelmoniem, Marco Canini. “DC2: Delay-aware Compression Control for Distributed Machine Learning”. *Proceedings of IEEE Computer Communications Conference (IEEE INFOCOM), Virtual Conference, May 2021*.
- Ahmed M. Abdelmoniem, Marco Canini. “Towards Mitigating Device Heterogeneity in Federated Learning via Adaptive Model Quantization”. *Proceedings of EuroMLSys workshop at ACM European Conference on Computer Systems (ACM EuroSys), Virtual Conference, Apr 2021*.
- Hang Xu, Chen yu-ho, Ahmed M. Abdelmoniem, Aritra Dutta, Elhoucine Bergou, Konstantinos Karatsenidis, Marco Canini, Panos Kalnis, “GRACE: A Compressed Communication Framework for Distributed Machine Learning”. *Proceedings of IEEE International Conference on Distributed Computing Systems (IEEE ICDCS), Virtual Conference, 2021*.

- **Ahmed M. Abdelmoniem**, Ahmed Elzanaty, Mohamed Slim-alouini, Marco Canini. “**An Efficient Statistical-based Gradient Compression Technique for Distributed Training Systems**”. *Proceedings of the International Conference on Machine Learning and Systems (MLSys), Virtual Conference, Apr 2021.*
- Rishikesh R. Gajjala*, Shashwat Banchhor*, **Ahmed M. Abdelmoniem***, Aritra Dutta, Marco Canini, Panos Kalnis. “**Huffman Coding Based Encoding Techniques for Fast Distributed Deep Learning**”. *Proceedings of Distributed ML workshop at 16th ACM International Conference on emerging Networking EXperiments and Technologies (ACM CoNEXT), Virtual Conference, Dec 2020.*
- **Ahmed M. Abdelmoniem**, Brahim Bensaou, Hengky Susanto. “**Reducing Latency in Multi-Tenant Data Centers via Cautious Congestion Watch**”. *Proceedings of 49th ACM International Conference on Parallel Processing - ICPP, Edmonton, Canada, 2020.*
- Aritra Dutta, Houcine Bergou, **Ahmed M. Abdelmoniem**, Chen-yu Ho, Atal Sahu, Marco Canini, Panos Kalnis, “**On the Discrepancy between the Theoretical Analysis and Practical Implementations of Compressed Communication for Distributed Deep Learning**”. *Proceedings of Thirty-Forth AAAI Conference on Artificial Intelligence (AAAI-20), New York, USA, Feb 2020.*
- **Ahmed M. Abdelmoniem**, Brahim Bensaou and Hengky Susanto. “**Taming Latencies in Data Center Networks via Active Congestion-Probing**”. *Proceedings of IEEE International Conference on Distributed Computing Systems (ICDCS), Dallas, Texas, USA, July 2019.*
- Hengky Susanto, **Ahmed M. Abdelmoniem**, Benyuan Liu, Honggang Zhang, Don Towsley. “**A Near Optimal Multi-Faced Job Scheduler for Datacenter Workloads**”. *Proceedings of IEEE International Conference on Distributed Computing Systems (ICDCS), Dallas, Texas, USA, July 2019.*
- Hengky Susanto, **Ahmed M. Abdelmoniem**, Hao Jin, Brahim Bensaou. “**Creek: Inter Many-to-Many Coflows Scheduling for Datacenter Networks**”. *Proceedings of IEEE Communications Conference (IEEE ICC), Shanghai, China, May 2019.*
- **Ahmed M. Abdelmoniem** and Brahim Bensaou. “**Hysteresis-based Active Queue Management for TCP Traffic in Data Centers**”. *Proceedings of IEEE Computer Communications Conference (IEEE INFOCOM), Paris, France, Apr 2019..*
- **Ahmed M. Abdelmoniem**, Yomna M. Abdelmoniem and Brahim Bensaou. “**On Network Systems Design: Pushing the Performance Envelope via FPGA Prototyping**”. *Proceedings of IEEE Recent Trends in Computer Engineering Conference (IEEE ITCE), Aswan, Egypt, Feb 2019..*
- **Ahmed M. Abdelmoniem**, Brahim Bensaou, Victor Barsoum “**IncastGuard: An Efficient TCP-Incast Congestion Effects Mitigation Scheme for Data Center Network**”. In *Proceedings of IEEE Global Communications Conference (IEEE GlobeCom), UAE, Dec 2018.*
- **Ahmed M. Abdelmoniem** and Brahim Bensaou. “**Curbing Timeouts for TCP-Incast in Data Centers via A Cross-Layer Faster Recovery Mechanism**”. *IEEE Conference on Computer Communications (IEEE INFOCOM), Honolulu, HI, April 2018.*
- Abadhan S. Sabyasachi, H M Dipu Kabir, **Ahmed M. Abdelmoniem**, Subrota K. Mondal. “**A Resilient Auction Framework for Deadline-Aware Jobs in Cloud Spot Market**”. *IEEE 36th Symposium on Reliable Distributed Systems (IEEE SRDS), Hong Kong, Sept 2017.*
- **Ahmed M. Abdelmoniem** and Brahim Bensaou. “**Enforcing Transport-Agnostic Congestion Control via SDN in Data Centers**”, In *IEEE Conference on Local Computer Networks (IEEE LCN), Singapore, Oct 2017.*

- **Ahmed M Abdelmoniem**, Brahim Bensaou and Amuda James Abu. “**SICC: SDN-based Incast Congestion Control for Data Centers**”. *IEEE International Conference on Communications (IEEE ICC)*, Paris, France, May 2017.
- Amuda James Abu, Brahim Bensaou, **Ahmed M Abdelmoniem**. “**Inferring and Controlling Congestion in CCN Via the Pending Interest Table Occupancy**”. Proceedings of the 40th IEEE Conference on Local Computer Networks (IEEE LCN), Dubai, UAE, Oct. 2016
- **Ahmed M Abdelmoniem**, Brahim Bensaou, Amuda James Abu. “**HyGenICC: Hypervisor-based generic IP congestion control for virtualized data centers**”. In *Proceedings of IEEE International Conference on Communications (IEEE ICC)*, Kuala Lumpur, Malaysia, May 2016.
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- Wenwen Fu, Tao Li, **Ahmed M. Abdelmoniem**, and Zhigang Sun, “**STRIDE: Single-Trip-time based Reliable Data Transport Protocol for the Reconfigurable Cloud**”. Accepted In Proceedings of IEEE Global Communications Conference (IEEE GlobeCom), UAE, Dec 2018. *Withdrawn due to company policy, published later in ICC'18 without any Huawei authors.*

Under Review/Pending Publications

- **Ahmed M. Abdelmoniem**, Pantelis Papageorgiou, Chen-yu Ho, Marco Canini, Muhammed Bilal. “**On the Impact of Device and Behavioral Heterogeneity in Federated Learning**”. *Submitted - Under Review.*
- Atal Naryna Sahu, Aritra Dutta, **Ahmed M. Abdelmoniem**, Panos Kalnis, Marco Canini. “**Identifying the Limits of Gradient Sparsification**”. *Submitted - Under Review.*
- **Ahmed M. Abdelmoniem**, Omar Alama, Jiawei Bao, Marco Canini, **Accelerating Distributed Deep Learning via Layerwise Adaptive Compressed Communication**. *Under Preparation.*

- Ahmed M. Abdelmoniem, Sebastian Franco, Marco Canini, **Efficient Layerwise Delayed Aggregation for Distributed Machine Learning**. *Under Preparation*.
- Ahmed M. Abdelmoniem, Brahim Bensaou. **“Enhancing TCP via Hysteresis Switching: Theoretical Analysis and Empirical Evaluation”**. *Pending Submission*.
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- Ahmed M. Abdelmoniem **“DC2: Delay-aware Compression Control for Distributed Machine Learning”**. *Proceedings of IEEE Computer Communications Conference (IEEE INFOCOM), Virtual Conference, May 2021*.
- Ahmed M. Abdelmoniem **“Towards Mitigating Device Heterogeneity in Federated Learning via Adaptive Model Quantization”**. *Proceedings of EuroMLSys workshop at ACM European Conference on Computer Systems (ACM EuroSys), Virtual Conference, Apr 2021*.
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- Hengky Susanto and Ahmed M. Abdelmoniem. **“Reducing Latency in Multi-Tenant Data Centers via Cautious Congestion Watch”**. *Proceedings of 49th ACM International Conference on Parallel Processing - ICPP, Virtual Conference, 2020*.

- Ahmed M. Abdelmoniem. “Taming Latencies in Data Center Networks via Active Congestion-Probing”. *IEEE ICDCS 2019, Dallas, Texas, USA, July 2019*.
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- Ahmed M. Abdelmoniem. “Hands-on Tutorial on Data Analytics in the Cloud”. *The International BioDialog Project, Exhibition and Hackathon on BioDiversity Informatics, Egypt, Nov, 2018*.
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- Abadhan S. Sabyasachi, H M Dipu Kabir, **Ahmed M. Abdelmoniem**, Subrota K. Mondal. “A Resilient Auction Framework for Deadline-Aware Jobs in Cloud Spot Market”. *IEEE 36th Symposium on Reliable Distributed Systems (SRDS)*, 6-Pages Hong Kong, Sept 2017.

Invited Abstracts/Keynotes/Talks

- Ahmed M. Abdelmoniem. “Distributed Deep Learning Clinic”. *KAUST-NeurIPS meet-up workshop, Saudi Arabia, Dec. 2019*
- Ahmed M. Abdelmoniem. “Data Analytics in the Cloud (hands-on tutorial)”. *The BioDialog Project: Exhibition and Hackathon on BioDiversity Informatics, Assiut University, Egypt, Nov. 2018*
- Ahmed M. Abdelmoniem. “VRC: Fast and Slow Control for Bandwidth Guarantee and Bounded-Delay in Data Centers”. *Joint Workshop among Huawei’s Research Labs and Academic Advisory Board, Beijing, Mar. 2018*.
- Ahmed M. Abdelmoniem. “Improving Applications’ Performance in the Cloud and the Road toward Application Driven Networking”. *Invited Talk, School of Science and Technology, Singapore University of Social Sciences (SUSS), Singapore, Nov. 2017*.
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