

CURRICULUM VITAE

Muhammad Anan, Ph.D.

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EDUCATION

- 2008 Ph.D., Electrical Engineering and Telecommunications Networking,
University of Missouri-Kansas City, MO, USA
Dissertation: A Slotted Wavelength Assignment Pipeline (SWAP) Scheduler for
Next-Generation Optical Burst Switches (OBS)
- 2003 M.Sc., Computer Science, Software Engineering,
University of Kansas, KS, USA
Thesis: Evaluating Maintainability of Software Architectures
- 1999 M.Sc., Electrical and Computer Engineering,
University of Missouri-Columbia, MO, USA
Thesis: A New Fault Tolerant ATM Switching Architecture
- 1997 B.S., Computer Engineering,
King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia

WORK EXPERIENCE

ACADEMIC APPOINTMENTS:

- Feb. '17 – Present Acting Dean, College of Engineering
Alfaisal University, Riyadh, Saudi Arabia
- Aug. '15 – Jan. '17 Vice Dean of Academic and Students Affairs, College of Engineering
Alfaisal University, Riyadh, Saudi Arabia
- Aug. '14 – Dec. '16 Chair of Software Engineering Department
Alfaisal University, Riyadh, Saudi Arabia
- Aug. '14 – Present Associate Professor of Software Engineering
Alfaisal University, Riyadh, Saudi Arabia
- May. '14 – Aug. '15 Associate Professor of Computer Engineering
Electrical & Computer Engineering Department
Purdue Northwest University (Purdue University Calumet), IN, USA
- Aug. '08 – May. '14 Assistant Professor of Computer Engineering
Electrical & Computer Engineering Department
Purdue Northwest University (Purdue University Calumet), IN, USA
- Dec. '10 – Dec. '14 Adjunct Visiting Professor
Master of Engineering Management Program
Abu Dhabi University, UAE
- Aug. '06 – Dec. '07 Graduate Teaching Assistant
Electrical and Computer Engineering Department
University of Missouri-Kansas City, MO, USA
- Aug. '97 – Dec. '98 Graduate Research Assistant
Electrical and Computer Engineering Department
University of Missouri-Columbia, MO, USA

INDUSTRIAL APPOINTMENTS:

- Nov. '07 – Aug. '08 IT Consultant, IT Department, Kansas City Power & Light (KCPL)
Midwest Consulting Group, Overland Park, KS, USA
- Feb. '06 – Apr. '07 Applications Developer,
IT Network Services and Service Assurance Group,
Sprint Nextel, Lenexa, KS, USA
- Sept. '04 – Feb. '06 IT Specialist, Integrated Service Assurance, Global Services,
IBM, Overland Park, KS, USA
- Dec. '98 – Sept. '04 Software Engineer, Broadband Network Management Development
and Service Establishment Technology Solutions Groups,
Sprint, Overland Park, KS, USA
- Jul. '96 – Sept. '96 System Engineer Intern, Schlumberger-GeoQuest, Saudi Arabia and
Oman

RESEARCH & TEACHING INTERESTS

My main research and teaching interests are in the areas of computer networks, cloud computing, Internet of Things, software defined networking, future Internet architectures, wireless sensor networks, embedded systems, computer architecture, software engineering and visualization.

SELECTED PUBLICATIONS

1. Adversarial Machine Learning in Text Processing: A Literature Survey, *Submitted*
2. Power-Efficient Wireless Coverage Using Minimum Number of UAVs, *Submitted*
3. On the Factors Impacting Adversarial Attack and Defense Performances in Federated Learning Systems, *Submitted*
4. H. Shakhathreh, K. Hayajneh, K. Bani-Hani, A. Sawalmeh, and M. Anan, "Cell on Wheels-Unmanned Aerial Vehicle System for Providing Wireless Coverage in Emergency Situations," *Complexity*, no. 8669824, 2021
5. G. Merabet, M. Essaaidi, M. Ben-Haddou, B. Qolomany, J. Qadir, M. Anan, A. Al-Fuqaha, M. Abid, D. Benhaddou, "Intelligent Building Control Systems for Thermal Comfort and Efficient Energy: A Systematic Review of Artificial Intelligence-Assisted Techniques," *Renewable and Sustainable Energy Reviews*, no. 144, 2021
6. S. Abdel-Razeq, H. Shakhathreh, A. Alenezi, A. Sawalmeh, M. Anan, and M. Almutiry, "PSO-based UAV Deployment and Dynamic Power Allocation for UAV-Enabled Uplink NOMA Network," *Wireless Communications and Mobile Computing*, no. 2722887, 2021
7. K. F. Hayajneh, K. Bani-Hani, H. Shakhathreh, M. Anan, and A. Sawalmeh, "3D Deployment of Unmanned Aerial Vehicle-Base Station Assisting Ground-Base Station," *Wireless Communications and Mobile Computing*, no. 2937224, 2021
8. G. Liu, I. Khalil, A. Khreishah, A. Algosabi, A. Aldalbah, M. Alaneem, A. Alhumam, and M. Anan, "ManiGen: A Manifold Aided Black-box Generator of Adversarial Examples," *IEEE Access*, vol. 8, pp. 197086-197096, 2020
9. D. Benhaddou, F. Attia, M. Anan, L. Afugbuom, "Autonomous Living Building: Adapting to Occupant's Behavior," *IEEE International Wireless Communications and Mobile Computing conference (IWCMC)*, Morocco, pp. 1803-1808, 2019
10. N. Nasser, A. El Ouadrhiri, M. El Kamili, A. Ali, M. Anan, "Crowd Management Services in Hajj: A Mean-Field Game Theory Approach," *IEEE Wireless Communications and Networking Conference (WCNC)*, Morocco, 2019

11. O. Darwish, A. Alfuqaha, G. Ben Brahim, I. Jenhani, M. Anan, "Towards a Streaming Approach to the Mitigation of Covert Timing Channels," *IEEE International Wireless Communications and Mobile Computing conference (IWCMC)*, Cyprus, 2018
12. N. Nasser, L. Karim, A. Ali, M. Anan, N. Khelifi, "Routing in the Internet of Things," *IEEE GLOBECOM*, Singapore, 2017
13. N. Nasser, M. Anan, M. Chikh Awad, H. Bin-Abbas, L. Karim, "An Expert Crowd Monitoring and Management Framework for Hajj," *The International Conference on Wireless Networks and Mobile Communications (WinCom)*, Rabat, Morocco, 2017
14. M. Anan, A. Al-Fuqaha, N. Nasser, T. Mu, and H. Bustam, "Empowering Networking Research and Experimentation through Software Defined Networking," *Journal of Network and Computer Applications*, vol. 70, pp.140-155, 2016
15. A. Ahmad, N. Nasser and M. Anan, "A Secure Cloud Infrastructure through Power Consumption Statistics," *International conference on selected topics in Mobile and Wireless Networking (MoWNet)*, Cairo, Egypt, 2016
16. M. Anan, A. Ahmed, A. Alfuqaha, and N. Nasser, "Optimization of Power and Migration Cost in Virtualized Data Centers," *IEEE Wireless Communications and Networking Conference (WCNC)*, Doha, Qatar, 2016
17. M. Anan, and N. Nasser, "SLA-based Optimization of Energy Efficiency for Green Cloud Computing," *IEEE GLOBECOM*, San Diego, CA, USA, 2015
18. O. Darwish, A. Al-Fuqaha, M. Anan, N. Nasser, "The Role of Hierarchical Entropy Analysis in the Detection and Time-Scale Determination of Covert Timing Channels," *IEEE International Wireless Communications and Mobile Computing conference (IWCMC)*, pp. 153-159, Dubrovnik, Croatia, 2015
19. M. Guizani, M. Anan, "Smart Grid Opportunities and Challenges of Integrating Renewable Sources: A Survey," *IEEE International Wireless Communications and Mobile Computing conference (IWCMC)*, pp. 63-68, Nicosia, Cyprus, 2014
20. L. Ilyes, M. Anan, A. Alfuqaha, and M. Ayyash, "Cloud-based Autonomic Service Monitoring In The Future Internet," *IEEE International Wireless Communications and Mobile Computing conference (IWCMC)*, pp. 1098-1105, Nicosia, Cyprus, 2014
21. M. Elbes, A. Alfuqaha, and M. Anan, "A precise indoor localization approach based on particle filter and dynamic exclusion techniques," *International Journal of Network Protocols and Algorithms*, vol. 5, no. 2, pp. 50-71, 2013
22. M. Abdelhadi, M. Anan, and M. Ayyash, "Efficient artificial intelligence-based localization algorithm for wireless sensor networks," *Journal of Selected Areas in Telecommunications*, vol. 3, no. 5, pp. 10-18, 2013
23. M. Abdelhadi, and M. Anan, "A Three-Dimensional Localization Algorithm for Wireless Sensor Networks Using Artificial Neural Networks," *The International Workshop on Wireless Sensors, Actuator, and Robot Networks (WiSARN 2012)*, pp. 1-5, Las Vegas, 2012
24. M. Abdelhadi, and M. Anan, "A Fuzzy-based Collaborative Localization Algorithm for Wireless Sensor Networks," *International Conference on Collaboration Technologies and Systems (CTS 2012)*, pp. 152-156, Denver, 2012
25. M. Anan, C. Velazquez, D. Benhaddou, and M. Balakrishnan, "Energy Efficient Data Dissemination in Wireless Sensor Networks Based on Natural Selection," *IEEE International Wireless Communications and Mobile Computing Conference (IWCMC)*, pp. 577-582, Istanbul, Turkey, 2011
26. M. Salahuddin, A. Alfuqaha, and M. Anan, "An Efficient Artificial Landmark-based System for Indoor and Outdoor Identification and Localization," *Invited Paper, IEEE International Wireless Communications and Mobile Computing Conference (IWCMC)*, pp. 583-588, Istanbul, Turkey, 2011
27. Y. Wang, Y. Qin, L. Gao, and M. Anan, "Implementing an OpenFlow switch with QoS feature on the NetFPGA platform," *The 2011 NC-IL/IN ASEE*, Mt Pleasant, MI, 2011

28. L. Jin, C. Liu, and M. Anan, "Open-Source VLSI CAD Tools: A Comparative Study," *The 2010 IL/IN ASEE*, West Lafayette, 2010
29. M. Alzubi, and M. Anan, "User Zoning Handover: An Approach for 4G Mobility," *The International Wireless Communications and Mobile Computing Conference (IWCMC 2010)*, pp. 870-874, Caen, France, 2010
30. M. Alzubi, and M. Anan, "An Efficient Handover Technique for 4G Networks," *Next Generation Mobile Applications, Service and Technologies Conference (NGMAST 2010)*, pp. 79-83, Amman, Jordan, 2010
31. M. Anan, H. Saiedian, and J. Ryoo, "An architecture-centric software maintainability assessment using information theory," *Journal of Software Maintenance and Evolution: Research and Practice*, vol. 21, no. 1, pp.1-18, 2009
32. M. Anan and G. Chaudhry, "SWAP: A slotted wavelength assignment pipeline scheduler for next generation optical switches," *Journal of Optical Communications*, vol. 28, no. 2, pp. 103-111, 2007
33. M. Anan, and G. Chaudhry, "A real-time hardware-based scheduler for next-generation optical burst switches," *International Conference on Communications (ICC'07)*, pp. 2289-2293, Glasgow, UK, 2007
34. M. Anan, G. Chaudhry, and J. Qaddour, "Performance evaluation of an ultra-fast pipeline scheduler for next-generation networks," *International Conference on Computer Systems and Applications (AICCSA '07)*, pp. 650-654, Amman, Jordan, 2007
35. M. Anan, G. Chaudhry, and D. Benhaddou, "Architecture and performance of a next-generation optical burst switch (OBS)," *International Workshop on Optical Burst/Package Switching (WOBS'06)*, pp. 1-9, (In conjunction with *IEEE/CreateNet BROADNETS'06*), San Jose, CA, 2006
36. M. Anan, G. Chaudhry, and D. Benhaddou, "Promises and challenges of Optical Burst Switching (OBS) for next-generation optical networks," *The 7th International Workshop on Optical Networking Technologies: Examining the Case for Optical Burst Switching* (In conjunction with *IEEE GLOBECOM '06*), San Francisco, CA, 2006
37. H. Saiedian, P. Kumarakulasingham and M. Anan, "Scenario-based requirements analysis techniques for real-time software systems: a comparative evaluation", *Journal of Requirements Engineering*, vol. 10, no. 1, pp. 22-33, 2005
38. M. Anan and M. Guizani, "Fault-tolerant ATM switching architectures based on MINs: A survey," *Journal of Informatica*, vol. 25, no. 1, pp. 69-81, 2001
39. M. Anan, and M. Guizani, "Modeling and Simulation of a new ATM switching Architecture", *Advanced Simulation Technologies Conference (ASTC '00)*, pp. 42-47, Washington DC, 2000
40. M. Anan, and M. Guizani, "A Fault-tolerant ATM switching architecture", *19th IEEE International Performance, Computing and Communications Conference (IPCCC '00)*, pp. 295-301, Phoenix, Arizona, 2000

BOOK CONTRIBUTIONS:

1. Book chapter entitled: "Smart Grid Opportunities and Challenges in Integrating Renewable Sources" in the book "Renewable Energy Technologies for Water Desalination", Edited by: H Mahmoudi, N Ghaffour, M Goosen and J Bundschuh, CRC Press (Taylor Frances Group) (Balkema NDL), 2017 (in press)
2. Book chapter entitled: "Introduction to Mobile Ad-Hoc and Vehicular Networks" in the book "Wireless Sensor and Mobile Ad-Hoc Networks", D. Benhaddou and A. Alfuqaha, Springer, to be published in 2015
3. Book chapter entitled: "Fault Tolerant ATM Switching Architectures" in the book "Designing ATM Switching Networks", Mohsen Guizani and Ammar Rayes, McGraw Hill, 1998

TECHNICAL PRESENTATIONS & TALKS:

Presented all published papers in the corresponding conferences and workshops and was invited to give several technical presentations to universities and high-tech companies.

1. M. Anan, and A. Alfuqaha, "Empowering Future Internet Research and Experimentation through Software Defined Networking," Conference Tutorial, IEEE GLOBECOM 2015
2. M. Anan, and A. Alfuqaha, "The Internet of Things (IoT): Applications and Prospects," Conference Tutorial, IEEE International Wireless Communications and Mobile Computing conference (IWCMC), 2015
3. M. Anan, and A. Alfuqaha, "Empowering Future Internet Research and Experimentation through Software Defined Networking," Conference Tutorial, IEEE International Wireless Communications and Mobile Computing conference (IWCMC), 2014
4. M. Anan, "Service-based Internet Infrastructure for the Qatar World Cup 2022," Qatar Foundation Annual Research Conference ARC'13, Qatar, 2013
5. M. Anan, "Cloud-based Autonomic Video Streaming in GENI Networks," Invited Speaker for the Experimenter Roundtable Session, The 16th GENI Engineering Conference, Salt Lake City, 2013
6. M. Anan, "Empowering Future Internet Research and Experimentation through Active and Programmable Networks," Invited Speaker, Al-Faisal University, Saudi Arabia, 2012
7. M. Anan, "Implementation of an OpenFlow switch using NetFPGA platform," Research Day, Purdue University Calumet, 2011 (Winner of the 3rd place for the best paper award)
8. M. Anan, "User Zoning Handover: An Approach for 4G Mobility, " Research Day, Purdue University Calumet, 2010
9. M. Anan, "Dynamic CDMA Ad-Hoc Network with Token Ring Topology for Vehicular Communication," Research Day, Purdue University Calumet, 2010
10. M. Anan, "A Real-Time Hardware-Based Scheduler for Next-Generation Metro Optical Networks," Research Day, Purdue University Calumet, 2009
11. M. Anan, "Optical Burst Switching Model using OPNET," Research Day, Purdue University Calumet, 2009
12. M. Anan, "Performance evaluation of multimedia protocols over Gigabit Ethernet based campus network," Research Day, Purdue University Calumet, 2009
13. M. Anan, "Computer Engineering Career," Futurama 2009 Conference, Lowell High School, Indiana 2009
14. M. Anan, "Engineering at Purdue University Calumet", Academic Learning College Conference at IVY Tech, Valparaiso, Indiana 2008

COURSES TAUGHT

ALFAISAL UNIVERSITY

- SE 416: Mobile Application Development
- EE 210/SE223: Digital Logic Design
- SE 327: Embedded Systems
- EE 305: Computer Networking
- EE 307: Computer Architecture
- SE 410: Software Architecture
- SE 443: Cloud Computing for Software Engineers
- SE 444: Artificial Intelligence
- SE 490/491: Capstone Projects

ABU DHABI UNIVERSITY:

- MEM 509: Information Technology Management

PURDUE UNIVERSITY CALUMET:

- ECE 595: Digital Logic using VHDL
- ECE 495: Microcomputers in Engineering (Embedded Systems)
- ENGR 151: Software Tools for Engineers using MATLAB
- ENGR 190: Elementary Engineering Design (Robotics)
- ECE 464: Computer Architecture and Organization
- ECE 375: Digital Integrated Circuits
- ECE 595: VLSI Design
- ECE 547: Computer Networks
- ECE 595: Client Server Programming and Applications
- ECE 505: Network Programming
- ECE 354: Software Engineering
- ECE 493: Senior Engineering Design

UNIVERSITY OF MISSOURI-KANSAS CITY:

- ECE 535: HDL-Based Digital Systems Design and Modeling
- ECE 426: Microcomputer Architecture and Interfacing

SERVICE ACTIVITIES

SERVICE AT ALFAISAL UNIVERSITY:

2017-pres.	Member, Council of Deans, Alfaisal University
2016-pres.	Member, University Council, Alfaisal University
2016-2017	Chair, College of Engineering Curriculum Committee
2015-2017	Advisor, ClickIT Students Club
2015-2016	Advisor, Robogals Students Club
2015-2016	Chair, Software Engineering Search Committee
2014-2015	Member, College of Engineering Curriculum Committee
2014-2016	Member, Research and Graduate Studies Committee
2014-2015	Member, Students Recruitment Committee
2014-2016	Member, Students Affairs Committee

SERVICE AT PURDUE UNIVERSITY CALUMET:

2013	Judge, Science Olympiad, Purdue University Calumet
2012	Member, Electrical and Computer Engineering search committee
2012	Campus representative, ASEE IL/IN 2012 conference
2010-2014	Chair, Computer Engineering program committee
2010	Session Chair, Faculty/Student research day
2010	Member, First-Year-Seminar Committee
2009	Judge, Science Olympiad, Purdue University Calumet
2009	Member, Computer Education Day planning committee
2009	Member, Electrical and Computer Engineering search committee
2009-2014	Advisor, Muslim Student Association
2008-2014	Member, Engineering graduate program committee
2008-2014	Member, Engineering undergraduate curriculum committee
2008-2014	Advisor, Graduate Student Association

SERVICE AT PROFESSIONAL SOCIETIES:

2013	Organizer and chair, Workshop on Collaborative Mobile Systems and Sensors Networks (CMSSN), San Diego, California
2013	Technical Program Committee (TPC) member. International Conference on High Performance Computing & Simulation, Helsinki, Finland
2013	Technical Program Committee (TPC) member, Workshop on Wireless Sensor, Actuator, and Robot Networks (WiSARN), Cambridge, MA
2012	Technical Program Committee (TPC) member, Workshop on Wireless Sensor, Actuator, and Robot Networks (WiSARN), Las Vegas
2011-2016	Associate Editor, Wiley Journal of Wireless Communications & Mobile Computing
2011-2014	Associate Editor, International Journal of Quality of Service Issues in Networking
2011	Publication co-chair, International Wireless Communications and Mobile Computing Conference (IWCMC), Istanbul, Turkey
2011	Session chair, International wireless communications and mobile computing Conference (IWCMC), Istanbul, Turkey
2010	Technical Program Committee (TPC) member, International Congress on Engineering Education (ICEED), Kuala Lumpur, Malaysia
	Technical Program Committee (TPC) member, International Workshop on Concurrent Communications (ConCom), Seoul, Korea

REFEREEING:

Regular referee for the following journals and conferences:

- Wiley Journal of Wireless Communications and Mobile Computing (WCMC)
- Journal of Security and Communication Networks (JSAC)
- Journal of Optical Network (JON)
- International Journal of Distributed Sensor Networks
- International Journal of Quality of Service Issues in Networking
- International Journal of Communication Systems
- Journal of Security and Communication Networks
- International Conference on Communications (ICC)
- IEEE Globecom Conference (GLOBECOM)
- IEEE International Conference on Communications and Information Technology
- International Workshop in Concurrent Communication
- IASTED Parallel and Distributed Computing Systems Conference
- IEEE Region 5 Conference
- IEEE International Conference on Mobile Ad-hoc and Sensor Systems

CERTIFICATION

- 2020 IBM Business Analysis Mastery
2011 Digital Learning and Distance Education Certificate, Purdue University Calumet

HONORS, AWARDS & GRANTS

- 2019 R&D Office, Ministry of Education, CO-PI, A framework for generating and defending against adversarial examples, SAR 1,200,000, 2020-2023.
2019 Optical Tags Alternative to RFID tags, PI, KACST, SAR 1M, 2019-2021.
2017 Annual Research Award, Alfaisal University.
2018 Designing and Developing Smart Services and Smart Applications for ICT, BOEING, PI, SAR 187,500, 2018-2019.
2016 RFID-based Multimodal Wireless Framework for Crowd Monitoring and Control in Hajj, GDRG-KACST, Co-PI, SAR 1,260,000, 2014-2016.
2015 Internal Research Grant (IRG), Alfaisal University, Co-PI, SAR 44,000, 2015-2016, A hybrid Web/Standalone internet of things framework with natural user interface and robot-enabled immersive telepresence for home automation.
2015 Internal Research Grant (IRG), PI, Alfaisal University, SAR 50,000, 2015-2016, Design Energy Efficient Computing Framework for Cloud Datacenters.
2015 NSF-REU, \$323,846, 2015-2017, Sustained Wireless Communication in Challenging Environments, Senior Personnel
2014 Summer Faculty Research Grant, Purdue Research Foundation (PRF)
2013 International Travel Grant, Purdue Research Foundation (PRF)
2012 Outstanding Leadership Award, Purdue University Calumet
2012 NSF-TCPP Curriculum Initiative Grant on Parallel and Distributed Computing
2012 Driver Distraction Mitigation System, Industry Project Grant, iQ-Telematic Inc., Principal Investigator
2011 International Travel Grant, Purdue Research Foundation (PRF)
2010 Faculty Summer Research Grant, Purdue Research Foundation (PRF)
2009 Faculty Summer Research Grant, Purdue University Calumet
2009-2015 NSF-GENI Travel Grants
2008 Faculty Research Time Release Award, Purdue University Calumet
2003 Sprint Values Excellence Award, Sprint Nextel
2002 Sprint Values Excellence Award, Sprint Nextel
2001 Sprint Values Excellence Award, Sprint Nextel
2003 Sprint Values Excellence Team Award, Sprint Nextel
1999 Electrical Eng. Outstanding Graduate Student Award, Univ. of Missouri-Columbia
1997-1999 Graduate Research Assistantship, University of Missouri

MEMBERSHIPS & AFFILIATIONS

- 2011-2016 Associate Editor, Wiley Journal of Wireless Communications & Mobile Computing
2011-2014 Associate Editor, International Journal of Quality of Service Issues in Networking
1999-pres. Senior Member, Institute of Electrical and Electronic Engineers
1997-pres. Member, Jordan Engineers Association