Safa Otoum

PH.D., MIEEE, P.ENG.

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H-Index: **23** | Citations: **2350+** | Documents: 59

SUMMARY

- Excellent young researcher and activities.
- Listed among the **Top 15 researchers** (Out of 1035) in Zayed University according to Scopus h-index.
- Experienced in AI, ML, and Data Science.
- Experienced in Networks and Information Security.

ACADEMIC DETAILS

Assistant Professor, CTI, Zayed University, Abu Dhabi, UAE — *Jan. 2020 - Present*
Adjunct Professor, University of Ottawa, Ottawa, Canada — *May 2023 - Present*
Postdoctoral Fellow, University of Ottawa, Ottawa, Canada — *Sept. 2018-Dec. 2018*

INDUSTRIAL PROFILE

- Data Scientist, CheetahNetworks Inc. (Consultant), Ottawa, Canada (Jun. 2019- Dec. 2019)
- Senior Research Scientist, Gnowit Inc., Ottawa, Canada (Jan. 2019-Dec. 2019)

EDUCATION

University of Ottawa, Ottawa, Canada — *Jan. 2019*
Ph.D. in Computer Engineering
University of Ottawa, Ottawa, Canada — *May 2014*
M.A.Sc. in Computer Engineering

SUMMERY RESEARCH GRANTS

- **[PI]** TII-ZU Grant, "An Adaptive Ai-Based Real-Time Hybrid Intrusion Detection System Using Zero Trust" 2022/11- Now, 2.8M AED.
- **[PI]** ASPIRE Visiting Professorship Award (VPC), "Intelligent Transportation Management in Abu Dhabi for Beyond 5G Networks", ZU, 2021/12-Now, 3.0M AED.
- **[Co-PI]** Interdisciplinary Research Grant, "Transforming Learning and Teaching experience through Metaverse and AI". 200.0K AED, 2023.
- **[PI]** Research Incentive Fund (RIF), "Preventing and Controlling Epidemics in the UAE Using an Intelligent Healthcare Framework" ZU, 2023/5-Now, 300.0K AED.
- **[PI]** Research Incentive Fund (RIF), "Leveraging Futuristic Technologies for Securing Smart Cities Networks in the Era of 6G and Beyond" ZU, 2020/9-2023/4, 300.0K AED.
- **[PI]** Start-up Grant, Zayed University, 2020/7 – 2021/11, 30.0K AED.
- **[PI]** Short Term Grant (STG), Zayed University, 2020/5 – 2020/9, 6.0K AED.

AWARDS

- Best Paper Award, IEEE iMeta Conference, 2023.
- Exceeds Expectations Award, Zayed University, 2021.
- Best Journal Paper Award, Ad Hoc Networks, 2019.
- NSERC Alexander Graham Bell Canada Scholarship (CGS D), 2017/9 – 2019/4.
- NSERC Doctoral Scholarship – PGS2, 2017/5 to 2017/8.
- University of Ottawa Excellence Scholarship, 2017/5-2019/4.
- FRQNT Doctoral (B2X) scholarships (Declined), 2017/5 to 2019/4.
- Ontario Graduate Scholarship (OGS), (Declined), 2017/5 to 2018/4.
- Undergraduate Assistance Scholarship, Ministry of Education in Jordan, 2004-2006.

Research Interests

- Metaverse Security.
- Malware detection using FL.
- Artificial Intelligent (AI)-based critical infrastructures.
- Security and Privacy of Digital Healthcare Infrastructures.
- Internet of Things (IoT) and Wireless Sensor Networks (WSNs).
- Intrusion Detection Prevention Systems.
- Blockchain Applications

Skills

- ML Tools
  TensorFlow, Scikit-learn, PyTorch
- Programming Languages
  C/C++/C#, Assembly, Python
- Networking
  OpenFlow, Omnet++/NS-3

Certificate And Training

➢ **Certificate in University Teaching**

Successfully passed the Certificate in University Teaching for Graduate Students and Postdoctoral Fellows at the University of Ottawa. The training program was one year long (3 terms) and included the following courses:

- A course in university teaching (ESG5300 - Theory and Practice of Undergraduate Teaching);
- A course in university teaching and technology (ESG6100 - Technology and University Teaching);
- A practicum in university teaching (ESG8300 – Practicum in University Teaching).

➢ **Certificate of Achievement**

- Recognition of Performance in 2021 with a rating of Exceeds Expectations from Zayed University

Summary of Qualifications

- Strong analytical and data skills.
- Strong programming skills in object-oriented languages.
- Excellent software and simulation quality assurance techniques.
- High capability in communication, presentation skills, and active teamwork member.
- Ability to learn, retain and apply new information and procedures quickly.
- Flexible and receptive to new situations.
- Sample of volunteer work:
  - SIG Leader on Security in Software Communication, IEEE ComSoft TC, 2022-Now.
  - uOttawa Women in Engineering (WIE)
  - Vice President of the uOttawa EEGSA Association 2015-2019.
  - Active in several Committees like IEEE, CSIM, and ACM.

Theses Projects Description And Outcomes

- ***Ph.D.****: Machine Learning-driven Intrusion Detection Techniques in Critical Infrastructures.*

My Ph.D. thesis presents a comparative study of Artificial Intelligence (AI)-driven intrusion detection techniques in critical infrastructures monitored by sensor networks. The comparative study compares the performance of IDS using different learning mechanisms, including machine learning, deep learning, and reinforcement learning. In my thesis, I proposed four different IDSs, namely the Clustered Hierarchical Hybrid-IDS (CHH-IDS), an Adaptively Supervised and Clustered Hybrid IDS (ASCH-IDS), a Clustered Restricted Boltzmann Machine IDS(RBC-IDS) and a Q- learning-based-IDS (QL-IDS) for wirelessly connected sensor clusters that monitor critical infrastructures. All proposed IDS are built on a hybrid framework to detect both known and unknown attacks.

Outcome Publications: *Ad Hoc Networks, IEEE Sensor Letters, IEEE ICC2019, IEEE ICC2018, IEEE ICC2017, IWCMC2017, IEEE Internet of Things Journal, IEEE Networking Letters.*

- ***MA.Sc.****: Sensor medium access control protocol-based epilepsy patients monitoring system*.

My master's thesis focuses on using WSNs for monitoring applications on epilepsy patients. This research has a major contribution to epilepsy patients' well-being. I devised and implemented a monitoring system that decreases the seizure response time. The research uses advanced sensors over a wireless sensor network, which helps make the patient feel more comfortable. I was the main player responsible for developing the entire work, under the guidance of my co-supervisors.
Outcomes Publications: IEEE CCECE2014.

SERVICE AND MEMBERSHIPS

- **Course Coordinator:**
  - Wireless Sensor Network course, Zayed University, 2022.
- **Department committees Memberships:**
  - Research Group
  - Teaching Group
  - Graduate Group
- **Organizing Committee:**
  - IEEE International Conference on Blockchain and Cryptocurrency, Dublin, Ireland, 2024
  - IEEE International Conference on Blockchain and Cryptocurrency, Dubai, UAE, 2023
- **Workshop Organizer:**
  - The 21st IEEE International Conference on Dependable, Autonomic & Secure Computing (DASC), 2023.
- **Organization Chair:**
  - The Fifth International Conference On Blockchain Computing And Applications (BCCA), 2023.
- **Publication Chair:**
  - IEEE CyberScience and Technology Congress CyberSciTech / DASC / PICom / CBDCom, UAE, 2023.
  - International Conference on Intelligent Metaverse Technologies & Applications (iMeta), 2023.
- **Organizer:**
  - International Workshop on Cyber-Physical Systems Security and Privacy (CP3SP), 2023.
- **Co-Chair:**
  - Communication and Information System Security Symposium, IEEE GLOBECOM, 2023.
- **Students co-chair:**
  - 6G Summit, Abu Dhabi, UAE (6gsummitabudhabi.com/committee.php).
  - 2nd IEEE International Mediterranean Conference on Communications and Networking (IEEE MeditCom 2022).
- **Vice Chair:**
  - Young Professionals – IEEE UAE Section
- **Founder:**
  - The International Workshop on Securing Next-Generation Connected Healthcare Systems using Futuristic Technologies in conjunction with IEEE Globecom 2022.
- **Area Editor:**
  - Cluster Computing, Springer, 2020-Now.
- **General Co-Chair:**
  - The First International Workshop on Securing Next-Generation Connected Healthcare Systems using Futuristic Technologies in conjunction with GLOBECOM 2021, Madrid, Spain.
- **Technical Program Co-Chair:**
  - The 13th IEEE International Workshop on Performance Evaluation of Communications in Distributed Systems and Web-based Service Architectures (PEDISWESA'2021) in conjunction with the 26th IEEE Symposium on Computers and Communications (ISCC) 2021, Athens, Greece.
  - 16th ACS/IEEE International Conference on Computer Systems and Applications AICCSA, Abu Dhabi, UAE, 2019.
  - The Second International Workshop on Intelligent Transportation and Connected Vehicles Technologies (ITCVT), Granada, Spain, 2019.
- **Guest Editor:**
  - Electronics at MDPI, Reinforcing Preventative Healthcare Solutions with AI, Blockchain and Next Generation Networks, Sep. 2021.
- **Publicity Chair**
  - International Wireless Communications and Mobile Computing Conference (IWCMC), 2022.
  - The Fourth International Conference on Blockchain Computing and Applications (BCCA)2022.
  - The Second International Workshop on Network Meets Intelligent Computations (NMIC) In conjunction with IEEE ICDCS 2020.
  - EAI ADHOCNETS, online conference, 2020.
  - The 12th International Conference on Ad Hoc Networks (ADHOCNETS), 2020.
  - The International Symposium on Blockchain Computing and Applications (BCCA), 2019.
  - The First International Workshop on Intelligent Transportation and Connected Vehicles Technologies (ITCVT), 2018.

- **Journal Reviewer Activities (More can be found on Publons.com)**
  - IEEE Access, 2016-Present, IEEE Transactions on Vehicular Technology, since 2014. IEEE Communication Magazine, since 2015. Vehicular Communications, 2017.
- **Memberships**
  - IEEE Member
  - IEEE ComSoc Member.
  - IEEE CS Member
  - IEEE YP Member
  - Professional Engineers of Ontario (P. Eng.).
- **Keynotes and Tutorials**
  - Keynote 1 on "Blockchain- supported Federated Learning for Trustworthy 5G/6G Networks", Blockchain and 5G Summit, Morocco, March 2023.
  - Keynote 2 on "Leveraging Futuristic Technologies for Securing Smart Cities Networks.", CSE-KCST University, Kuwait, April 2021

TEACHING EXPERIENCE

Assistant Professor, Zayed University, Abu Dhabi, UAE | 01/2020- to-Present
Student Evaluation: **4.5-5.0/5.0 (Spring 2020 to Spring 2023)**

- **NET 351: Computer Network Technologies**

***Description**:* This course covers the architecture, components, and operations of computer communication networks. The covered topics include packet and circuit switching, routing, multimedia networks, and network management. Network management paradigms are also discussed, along with the Internet-standard network management framework.

- **NET455: Wireless Sensor Networks**

***Description**:* This course covers core wireless sensor networking concepts, including wireless sensor network architectures, components, and operation; wireless sensor network communication protocols; and wireless sensor network operating systems and programmability. Several sensor-based application areas such as wireless healthcare and environmental applications are addressed as part of the practical component of the course.

- **SEC605: Information Security**

***Description**:* This course advances a critical analysis of information, computer, and network security principles and practices. Topics include technical solutions and management issues around computer security, network security, firewalls, cryptosystems, authentication, access control, public key infrastructures, web security, and common attacks such as viruses, Trojans, worms, and memory exploits. Non-technical aspects, including ethical, legal, social, standardization, and professional issues, are also introduced.

- **CIT499: Senior Project**

***Description**:* This is a capstone course in which one or, preferably, two students complete a substantial "real-world" project that may be provided by sponsors drawn from private or government organizations in the UAE. The execution of each project normally encompasses the following phases: requirements analysis, design, implementation, documentation, and release of a developed IT product, service, or technical report.

- **CIT490: Internship**

***Description**:* The internship provides the student with on-the-job experience at a local company or government organization. Students follow an agreed-upon work plan over a defined period and are mentored by a supervisor on-site. Students send reports to their university supervisor on a regular basis summarizing their weekly activities. At the end of the period, students write and present a critical reflection on their internship experience and how they achieved their learning outcomes.

Teaching Assistant (TA), University of Ottawa, Ottawa, Canada | 01/2013- to-04/2019

Student Evaluation: **Excellent**!

Graduate Teaching Assistantship - Part-Time, Supervising and Teaching Undergraduate Labs

- **ITI1100: Digital System I** (Every Year)

Description: An introduction to digital computers. Design and implementation of combinational and sequential circuits

- **GNG1106: Fundamentals of Engineering Computation (Every year)**

Description: Introduction to problem-solving for engineering case studies using C.

- **CEG2136: Computer Architecture I**

Description: An introduction to the fundamentals of computer organization and computer elements, and the detailed principles of computer architecture.

- **CEG3136: Computer Architecture II**

Description: Microprocessors and their general architecture. CISC and RISC architectures. Microcontrollers. Embedded systems. designing computers using microprocessors.

- **ITI1121: Introduction to Computing I**

Description: Object-oriented programming. Abstraction principles: information hiding and encapsulation. Linked lists, stacks, queues, and binary search trees. Iterative and recursive processing of data structures. Virtual machines.

- **CSI5148: Wireless Ad Hoc Networking (Winter 2015)**

Description: Self-organized, mobile, and hybrid ad hoc networks. Physical, medium access, and network layers; transport and application layers, and cross-layering issues. Power management. Security in ad hoc networks. Topology control and maintenance. Data communication protocols, routing, and broadcasting. Location service for efficient routing.
Duties:

- Described basic programming concepts, as well as, conducted tutorials and laboratory experiments where students are asked to develop codes in C++ and Java for various scenarios.
- Helped the students detect potential logical errors and bugs in their solutions.
- Preparing course assignments and exams.

SUPERVISION:

Postdoctoral:

PD Name	Affiliation	Co-Supervisor	Duration	Project	Output
Muhammad Asad *On-site*	*ZU*	-	*March 2023-Now*	*An Adaptive AI-based Real-time Hybrid IDS Using Zero Trust*	Several publications

Ph.D. Students:

PD Name	Affiliation	Co-Supervisor	Duration	Project	Output
Vahida Hayyolalam Remote	KoC, Tuerky	Oznur Ozkasap	*Sept., 2021 - Aug., 2022*	Leveraging Futuristic Technologies for Securing Smart Cities	1 journal paper & 1 conference paper

Master Students:

PD Name	Affiliation	Co-Supervisor	Duration	Project	Output
Fatema Alshehhi *On-site*	ZU	-	*Jan. 2023 - Now*	*Zero-Trust Metaverse*	1 conference paper
Hala Shamseddine Remote	Lebanese American University	*Mourad Azzam*	*Jan. 2022 - Aug. 2022*	*Federated ML for Multi-Aspect Neuro-developmental Disorders: ASD Detection*	1 journal paper and 1 conference paper
Mario Chahoud Remote	Lebanese American University	*Mourad Azzam*	*Jan. 2022 - Aug. 2022*	On-Demand Client Deployment and Selection in Federated Learning	1 journal paper and 1 conference paper

Research Assistants*:*

PD Name	Affiliation	Co-Supervisor	Duration	Project	Output
Sawsan Abdul Rahman Remote	ZU	-	*June 2022 – Sept. 2023*	Leveraging Futuristic Technologies for Securing Smart Cities	Several publications
Haya Elayan Remote	JUST university/ Jordan	-	*June 2022 – Oct. 2022*	Leveraging Futuristic Technologies for Securing Smart Cities	1 conference paper
Belsabel Woldemichael *On-site*	ZU	-	*Dec. 2022 – Sept. 2023*	*An Adaptive AI-based Real-time Hybrid IDS Using Zero Trust*	1 conference paper
Betiel Welday *On-site*	ZU	-	*Dec. 2022 – June 2023*	*An Adaptive AI-based Real-time Hybrid IDS Using Zero Trust*	1 conference paper
Feven Araya *On-site*	ZU	-	*Dec. 2022 – June 2023*	*An Adaptive AI-based Real-time Hybrid IDS Using Zero Trust*	1 conference paper
Snit Zerea *On-site*	ZU	-	*Dec. 2022 – June 2023*	*An Adaptive AI-based Real-time Hybrid IDS Using Zero Trust*	1 conference paper
Henos Weldesamuel *On-site*	ZU	-	*Dec. 2022 – June 2023*	*An Adaptive AI-based Real-time Hybrid IDS Using Zero Trust*	1 conference paper
Mehdi Letafati Remote	Doctoral Researcher at Center for Wireless Communications, University of Oulu	-	*Feb. 2023 – Aug. 2023*	*Preventing and Controlling Epidemics in the UAE using an Intelligent Healthcare Framework*	Several publications
Tomas Issac *On-site*	ZU	-	*Dec. 2022 – Now*	*An Adaptive AI-based Real-time Hybrid IDS Using Zero Trust*	1 conference paper + Product
Mohamed Yalouh *Remote*	University of California, Berkeley	-	*June 2023 – Now*	*Preventing and Controlling Epidemics in the UAE using an Intelligent Healthcare Framework*	-
Fithi Ghebreamlak *On-site*	ZU	-	*June 2023 – Sept. 2023*	*An Adaptive AI-based Real-time Hybrid IDS Using Zero Trust*	Lab website Personal website
Ruth Simon *On-site*	ZU	-	*June 2023 – Now*	*Preventing and Controlling Epidemics in the UAE using an Intelligent Healthcare Framework*	1 conference paper

Sened Abraham *On-site*	ZU	-	*June 2023 – Now*	*Preventing and Controlling Epidemics in the UAE using an Intelligent Healthcare Framework*	-
Selam Zeray *On-site*	ZU	-	*July 2023 – Sept. 2023*	*An Adaptive AI-based Real-time Hybrid IDS Using Zero Trust*	-
Tomas Gebreluul *On-site*	ZU	-	*June 2023 – Now*	*An Adaptive AI-based Real-time Hybrid IDS Using Zero Trust*	1 conference paper+ Product
Noof Obaid Almarar *On-site*	ZU	-	*Sept. 2023 – Now*	*Preventing and Controlling Epidemics in the UAE using an Intelligent Healthcare Framework*	-

PUBLICATIONS

Peer-Reviewed Journals:

2023:

1. Mario Chahoud**, S. Otoum**, Azzam Mourad, *"On the feasibility of Federated Learning towards on-demand client deployment at the edge*", Information Processing & Management, Volume 60, Issue 1, 2023.
2. Mehdi Letafati, **S. Otoum**, "*On the privacy and security for e-health services in the metaverse: An overview*", Ad Hoc Networks, Volume 150, 2023, 103262, 2023.
3. S. AbdulRahman, **S. Otoum**, O. Bouachir, and A. Mourad, "*Management of Digital Twin-driven IoT using Federated Learning*," in IEEE Journal on Selected Areas in Communications, 2023.
4. M. Letafati, **S. Otoum**, "*Digital Healthcare in The Metaverse: Insights into Privacy and Security*", IEEE Consumer Electronics Magazine (CEMAG), 2023. (Minor Revision)
5. M. Asad, **S. Otoum**, "*CELP: Clients Eligibility-based Lightweight Protocol in Federated Learning*", IEEE Transactions on Network and Service Management, 2023. (Submitted)
6. M. Asad, **S. Otoum**, "*Federated Learning and Zero-Trust Security: A Quantum Leap in Securing Wireless Communications",* IEEE Wireless Communications, 2023. (Submitted)
7. M. Asad, **S. Otoum**, "*Hybrid Intrusion Detection and Prevention Systems: A Comprehensive Survey*", ACM Computing Surveys, 2023. (Submitted)
8. I. Ridhawi, **S. Otoum**, M. Aloqaily, "*Decentralized Zero-Trust Framework for Digital Twin-based 6G*", ArXiv. /abs/2302.03107, 2023.

2022:

9. **S. Otoum**, I. A. Ridhawi and H. Mouftah, "*A Federated Learning and Blockchain-enabled Sustainable Energy-Trade at the Edge: A Framework for Industry 4.0*," in IEEE Internet of Things Journal, 2022.
10. **S. Otoum**, N. Guizani and H. Mouftah, "*On the Feasibility of Split Learning, Transfer Learning and Federated Learning for Preserving Security in ITS Systems*," in IEEE Transactions on Intelligent Transportation Systems, vol. 24, no. 7, pp. 7462-7470, July 2022.
11. Hayyolalam, V., **S. Otoum** & Özkasap, Ö. "*Dynamic QoS/QoE-aware reliable service composition framework for edge intelligence*", Cluster Computing, 25, 1695–1713, 2022.
12. I. Al Ridhawi and **S. Otoum**, "*Supporting Next-Generation Network Management with Intelligent Moving Devices*," in IEEE Network, vol. 36, no. 3, pp. 8-15, 2022.
13. V. Balasubramanian, **S. Otoum** and M. Reisslein, "*VeNet: Hybrid Stacked Autoencoder Learning for Cooperative Edge Intelligence in IoV*," in IEEE Transactions on Intelligent Transportation Systems, vol. 23, no. 9, pp. 16643-16653, Sept. 2022.
14. H. Shamseddine, **S. Otoum,** A. Mourad, "*A Federated Learning Scheme for Neuro-developmental Disorders: Multi-Aspect ASD Detection*", ArXiv. /abs/2211.00643, 2022.

2021:

15. **S. Otoum**, I. A. Ridhawi and H. Mouftah, "*Securing Critical IoT Infrastructures with Blockchain-Supported Federated Learning*," in IEEE Internet of Things Journal, 2021.

16. **S. Otoum**, I. Al Ridhawi and H. T. Mouftah, "*Preventing and Controlling Epidemics Through Blockchain-Assisted AI-Enabled Networks,*" in IEEE Network, vol. 35, no. 3, pp. 34-41, 2021.
17. **S. Otoum**, Burak Kantarci, and Hussein Mouftah. 2021. "*A Comparative Study of AI-Based Intrusion Detection Techniques in Critical Infrastructures*", ACM Trans. Internet Technol. 21, 4, Article 81, 2021.
18. **S. Otoum** and H. T. Mouftah, "*Enabling Trustworthiness in Sustainable Energy Infrastructure Through Blockchain and AI-Assisted Solutions*," in IEEE Wireless Communications, vol. 28, no. 6, pp. 19-25, 2021.
19. **S. Otoum**, S., Ucar, S., & Özkasap, Ö, "*DHT-based Communications Survey: Architectures and Use Cases*". ArXiv. /abs/2109.10787, 2021.
20. Ridhawi, **S. Otoum**, M. Aloqaily and A. Boukerche, "*Generalizing AI: Challenges and Opportunities for Plug and Play AI Solutions*," in IEEE Network, vol. 35, no. 1, pp. 372-379, 2021.
21. David Berdik, **S. Otoum**, Nikolas Schmidt, Dylan Porter, Yaser Jararweh, "*A Survey on Blockchain for Information Systems Management and Security*", Information Processing & Management, V. 58, Issue 1, 2021. **[Highly Cited Article]**

2020:

22. V. Balasubramanian, **S. Otoum**, M. Aloqaily, "*Low-latency vehicular edge: A vehicular infrastructure model for 5G.*", Simul. Model. Pract. Theory, 98, 2020.
23. M. Al-Khafajiy, **S. Otoum**, T. Baker, "*Intelligent Control and Security of Fog Resources in Healthcare Systems via a Cognitive Fog Model*", ACM Trans. Internet Technology, v.21, 2020.
24. L. Tseng, L. Wong, **S. Otoum**, M. Aloqaily, Jalel Ben-Othman, "*Blockchain for Managing Heterogeneous Internet of Things: A Perspective Architecture.*", IEEE Network 34(1): 16-23, 2020. **[Highly Cited Article]**
25. H. Salameh, **S. Otoum**, M. Aloqaily, R. Derbas, et al., "*Intelligent jamming-aware routing in multi-hop IoT-based opportunistic cognitive radio networks*". Ad Hoc Networks, V. 98, 2020.
26. I. Ridhawi, **S. Otoum**, "*Providing secure and reliable communication for next generation networks in smart cities*", Sustainable Cities and Society, V. 56, 2020. **[Highly Cited Article]**
27. L. Tseng, X. Yao, **S. Otoum**, et al., "*Blockchain-based database in an IoT environment: challenges, opportunities, and analysis*", Cluster Computing, 23, 2020.
28. Y. Jararweh, **S. Otoum**, I. Al Ridhawi, "*Trustworthy and sustainable smart city services at the edge*", Sustainable Cities and Society, Volume 62, 2020.

2019:

29. **S. Otoum**, B. Kantarci and H. T. Mouftah, "*On the Feasibility of Deep Learning in Sensor Network Intrusion Detection*," in IEEE Networking Letters, vol. 1, no. 2, 2019. **[Highly Cited Article]**
30. M. Aloqaily, **S. Otoum,** I. Al Ridhawi. "*An Intrusion Detection System for Connected Vehicles in Smart Cities*", Ad Hoc Networks, 2019. **[Highly Cited Article]**

2017:

31. **S. Otoum**, B. Kantarci and H. T. Mouftah, "*Detection of Known and Unknown Intrusive Sensor Behavior in Critical Applications*," in IEEE Sensors Letters, vol. 1, no. 5, pp. 1-4, Oct. 2017.

Peer-Reviewed Conferences:

2023:

32. C. Helbig, **S. Otoum** and Y. Jararweh, "*Modeling and Evaluation of the Internet of Things Communication Protocols in Security Constrained Systems*," IEEE 20th Consumer Communications & Networking Conference (CCNC), USA, 2023.
33. S. AbdulRahman, O. Bouachir, **S. Otoum**, A. Mourad, "*Towards Boosting Federated Learning Convergence: A computation Offloading & Clustering Approach*", IEEE International Conference on Communications, 2023.
34. F. Alshehhi, **S. Otoum**, "*On the Feasibility of Zero-Trust Architecture in Assuring Security in Metaverse*", International Conference on Intelligent Metaverse Technologies & Applications (iMETA2023), 2023. **(Accepted and presented)**
35. M. Letafati, **S. Otoum**, "Global Differential Privacy for Distributed Metaverse Healthcare Systems", International Conference on Intelligent Metaverse Technologies & Applications (iMETA2023), 2023. **(Accepted and presented) [Best paper award]**
36. M. Asad, **S. Otoum**, O. Alfandi, "Edge Computing for the Metaverse: Balancing Security and Privacy Concerns", International Conference on Intelligent Metaverse Technologies & Applications (iMETA2023), 2023. **(Accepted and presented)**
37. M. Asad, **S. Otoum**, "*Towards Privacy-Aware Federated Learning for User-Sensitive Data*", The Fifth International Conference On Blockchain Computing And Applications (BCCA), 2023. **(Accepted)**
38. S. AbdulRahman, O. Bouachir, **S. Otoum**, A. Mourad, " *Overcoming Resource Bottlenecks in Vehicular Federated Learning: A Cluster-Based and QoS-Aware Approach*", IEEE Global Communications Conference (GLOBECOM), 2023. **(Accepted)**
39. T. Petros, H. Ghirmay , **S. Otoum**, R. Salem, M. Debbah, "*FLDetect: An API-Based Ransomware Detection Using Federated Learning",* IEEE Global Communications Conference (GLOBECOM), 2023. **(Accepted)**
40. B. Teklemariam, S. Bokretsion, **S. Otoum**, B. Ouni, "*On the Viability of Federated Deep Autoencoder for Botnet Threat Detection*", The 21st IEEE International Conference on Dependable, Autonomic & Secure Computing (DASC), 2023. **(Accepted)**
41. B. Tesfom, F. Belay, S. Daniel, R. Salem, **S. Otoum**, "*Phishing Detection using Deep Learning and Machine Learning Algorithms: Comparative Analysis*", The 21st IEEE Conference on Dependable, Autonomic & Secure Computing (DASC), 2023. **(Accepted)**

2022:

42. **S. Otoum**, I. A. Ridhawi and H. Mouftah, "*Realizing Health 4.0 in Beyond 5G Networks*," IEEE International Conference on Communications, Korea, 2022.
43. V. Hayyolalam, **S. Otoum** and Ö. Özkasap, "*A Hybrid Edge-assisted Machine Learning Approach for Detecting Heart Disease*," IEEE International Conference on Communications (ICC), 2022.
44. M. Asad, **S. Otoum** and S. Shaukat, "*Resource and Heterogeneity-aware Clients Eligibility Protocol in Federated Learning*," IEEE Global Communications Conference(GLOBECOM), Brazil, 2022.
45. X. Song, W. Pan, I. A. Ridhawi, A. Abbas and **S. Otoum**, "*AI-Enabled Health 4.0: An IoT-Based COVID-19 Diagnosis Use-Case*," IEEE Global Communications Conference (GLOBECOM), Rio de Janeiro, Brazil, 2022.
46. H. Shamseddine, **S. Otoum** and A. Mourad, "*On the Feasibility of Federated Learning for Neurodevelopmental Disorders: ASD Detection Use-Case*," IEEE Global Communications Conference (GLOBECOM), Brazil, 2022.
47. O. Wehbi, S. Arisdakessian, O. A. Wahab, H. Otrok, **S. Otoum** and A. Mourad, "*Towards Bilateral Client Selection in Federated Learning Using Matching Game Theory*," IEEE Global Communications Conference (GLOBECOM), Brazil, 2022.

2021:

48. **S. Otoum**, N. Guizani and H. Mouftah, "*Federated Reinforcement Learning-Supported IDS for IoT-steered Healthcare Systems*," IEEE International Conference on Communications (ICC), 2021.
49. S. M. A. Kazmi, **S. Otoum**, R. Hussain and H. T. Mouftah, "*A Novel Deep Reinforcement Learning-based Approach for Task-offloading in Vehicular Networks*," IEEE Global Communications Conference (GLOBECOM), 2021.

2020:

50. **S. Otoum**, B. Kantarci and H. T. Mouftah, "*A Novel Ensemble Method for Advanced Intrusion Detection in Wireless Sensor Networks*," IEEE International Conference on Communications (ICC), 2020.
51. **S. Otoum**, I. Al Ridhawi and H. T. Mouftah, "*Blockchain-Supported Federated Learning for Trustworthy Vehicular Networks*," IEEE Global Communications Conference (GLOBECOM), 2020.
52. H. Yehdego, **S. Otoum**, O. Alfandi, "*An IoT-Based Non-invasive Diabetics Monitoring System for Crucial Conditions*", In: Foschini, L., El Kamili, M. Ad Hoc Networks, ADHOCNETS, 2020.
53. O. Alfandi, **S. Otoum** and Y. Jararweh, "*Blockchain Solution for IoT-based Critical Infrastructures: Byzantine Fault Tolerance*," NOMS- IEEE/IFIP Network Operations and Management Symposium, 2020.

2019:

54. **S. Otoum**, B. Kantarci and H. Mouftah, "*Empowering Reinforcement Learning on Big Sensed Data for Intrusion Detection*," IEEE International Conference on Communications (ICC), China, 2019.

2018:

55. **S. Otoum**, B. Kantarci and H. Mouftah, "*Adaptively Supervised and Intrusion-Aware Data Aggregation for Wireless Sensor Clusters in Critical Infrastructures*," IEEE International Conference on Communications (ICC), USA, 2018.

2017:

56. **S. Otoum**, B. Kantarci and H. T. Mouftah, "*Hierarchical trust-based black-hole detection in WSN-based smart grid monitoring*," IEEE International Conference on Communications (ICC), France, 2017.
57. **S. Otoum**, B. Kantarci and H. T. Mouftah, "*Mitigating False Negative intruder decisions in WSN-based Smart Grid monitoring*," 13th International Wireless Communications and Mobile Computing Conference (IWCMC), Spain, 2017.

2015:

58. **S. Otoum**, M. Ahmed and H. T. Mouftah, "*Sensor Medium Access Control (SMAC)-based epilepsy patients monitoring system*," *IEEE* 28th Canadian Conference on Electrical and Computer Engineering (CCECE), Canada, 2015.

2013:

59. M. Aloqaily, **S. Otoum** and H. T. Mouftah, "*A novel communication system for firefighters using audio/video conferencing/sub-conferencing in standalone MANETs*," 5th International Conference on Computer Science and Information Technology, Jordan, 2013.

REFERENCES

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