Junaid Qadir *(Ph.D.)*

Contact:

Via dell'Opera Pia 13, 16145 Genova, GE, Italy
Email: junaidqadirphd@gmail.com / junaid.qadir@edu.unige.it
Website: https://junaidqadirqau.wixsite.com/junaid
GitHub: https://github.com/Junaid-Q / https://junaid-q.github.io/

Professional Summary

Experienced researcher with a Ph.D. (ING-INF/03 – Telecommunications) from the University of Genova, specializing in Internet of Things (IoT) cybersecurity with a focus on the LoRaWAN protocol and lightweight cryptographic schemes. Experience as a Researcher at CNIT on EU-funded Horizon 2020 and Horizon Europe projects, including "5G-INDUCE – Open cooperative 5G experimentation platforms for the industrial sector NetApps" (Grant Agreement No. 101016941) and "6Green - Green Technologies for 5/6G Service-Based Architectures" (Grant Agreement No. 101096925), focused on 5G NFV orchestration. Currently a Postdoctoral Researcher at the University of Genova on the NextGenerationEU-funded PNRR project "RAISE – Robotics and AI for Socio-economic Empowerment" (CUP D33C22000970006), applying deep learning to wearable IMU data for healthcare applications.

European Project Experience

Active participant in EU-funded projects (Horizon 2020, Horizon Europe) with experience in collaborative international research and technical deliverables.

Research Interest

Internet of Things (IoT) with a focus on LoRaWAN protocol security, cybersecurity, and lightweight cryptographic schemes; 5G communication; eHealth applications; Underwater Wireless Sensor Networks (UWSNs); and machine learning and deep learning for sensor data analysis.

Key Skills

- LoRaWAN protocol security and lightweight cryptographic schemes
- Cybersecurity for Internet of Things (IoT) systems
- 5G communication and NFV orchestration
- Underwater Wireless Sensor Networks (UWSNs)
- Machine learning and deep learning for sensor data analysis
- eHealth and wearable sensor applications
- Mobile Edge Computing

Current Position
11-2024 – Present

Postdoctoral Researcher at DSP Lab, DITEN, University of Genova, Italy
PI: Prof Andrea Sciarrone, Prof. Fabio Lavagetto

Professional Experience

11-2024 - Present

Postdoc: Digitial Signal Processing (DSP) Lab, Department of Electrical, Electronic and Telecommunications Engineering, and Naval Architecture (DITEN), University of Genova, Italy
Postdoc research fellow

- Working on Multimedia signal processing through Machine/Deep Learning (M/DL) techniques on wearable sensors within the Internet of Things (IoT) paradigm
- This research is a part of the RAISE (Robotics and AI for Social Economic Empowerment) project: https://www.raiseliguria.it/en/
- Evaluating patients' balance via smart glasses

11-2023 -10-2024

Postdoc: Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT),

The Smart and Secure Networks Lab (S2N), Department of Electrical, Electronic and Telecommunications Engineering, and Naval Architecture (DITEN), University of Genova, Italy
Postdoc research fellow

- Working on the EU project H2020 5G-GPP 5GINDUCE Innovation Action and HORIZON 6GREEN Research and Innovation Action: https://www.5g-induce.eu/ , https://www.cnit.it/
- Developed NFV orchestration solutions using OSM and OpenStack for secure 5G/6G network management
- Contributed to EU-funded 5GINDUCE and 6GREEN projects focused on edge-cloud integration and secure networking

PI: Prof. Roberto Bruschi, Prof. Rafaele Bolla, Prof. Franco Davoli

01.2022 – 30.2022

KTH Royal Institute of Technology, Stockholm, Sweden
Division of Network and Systems Engineering
School of Electrical Engineering and Computer Science
Visiting Ph.D. Student (January 1 – June 30, 2022)

- Working in LoRaWAN cybersecurity

PI: Dr. Ismail Butun, Prof. Robert Lagerstrom

11.2020 – 2024

University of Genova, Genova/ Italy
Department of Electrical, Electronic and Telecommunications Engineering, and Naval Architecture (DITEN)
Ph.D. Research Assistant

- Established LoRaWAN network using the Adafruit feather m0 LoRa node With the Dragino LPS8 Gateway
- Designed and implemented secure key management schemes for LoRaWAN to mitigate cyber attacks.
- Protecting LoRaWAN packets from different attacks

PI: Prof. Paolo Gastaldo, Prof. Daniele D. Caviglia

11.2019 – 09.2020

The University of Valladolid, Valladolid/ Spain
Department of Signal Theory, and Communications,
and Telematics Engineering

- Online research collaboration with Spainish professors
- Designed protocols for mission-critical applications in UWSNs
- Analyzed the state-of-the-art of mobile edge computing
- Worked on sentiment analysis using machine-learning techniques

11.2016 – 06.2019

Quaid-i-Azam University, Islamabad/ Pakistan
Research Assistant at the Department of Electronics

- Examined of various routing-protocols in UWSNs
- Designed cooperative routing techniques for UWSNs
- Proposed robust algorithms for packets reliability
- Proposed energy-efficient routing scheme for UWSNs

PI: Prof. Anwar Khan, Prof. Hasan Mahmood

Academic Development

11.2020 – 03.2024

University of Genova, Genova/ Italy
Department of Electrical, Electronic and Telecommunications Engineering, and Naval Architecture (DITEN)
Dissertation title: Cybersecurity in LoRaWAN Networks: Vulnerability Analysis and Enhancing Security Measures for IoT Connectivity

Short Description: Focused on enhancing cybersecurity in LoRaWAN networks by analyzing vulnerabilities and designing lightweight secure key management schemes to mitigate cyber attacks.
Supervisor: Dr. Daniele D. Caviglia, Dr. Paolo Gastaldo, and Dr. Ismail Butun

11.2016 – 06.2019

Quaid-i-Azam University, Islamabad/ Pakistan
Master of Philosophy in Electronics (MPhil)
Underwater wireless sensor networks (UWSNs), mobile edge computing

Dissertation title: Channel-aware reliable routing for underwater wireless sensor networks (UWSNs)

Short Description: I investigated the robustness of routing protocols. Specifically, I worked on how to efficiently, especially in a resource constrained environment, route the sensed data from the bottom of the water to the top. Also proposed routing protocol for the mission-critical applications.
Supervisor: Dr. Hasan Mahmood

09.2013 – 09.2016

University of Peshawar, Peshawar/ Pakistan
Master of Science in Electronics
Wireless sensor networks (WSNs), power control schemes

Dissertation title: A survey of the power control scheme for wireless sensor networks (WSNs)

Short Description: Presented an overview of the power control schemes. In particular, I highlighted the concerns for researchers and scientists they could focus on while choosing algorithms for deploying WSNs in different scenarios
Supervisor: Dr. Anwar Khan

Submitted Papers

Q, Junaid, I. Bisio, H. Haleem, C. Garibotto, F. Lavagetto and A. Sciarrone,, "*Postural Health Monitoring Using IMU-Integrated Smart Glasses: CoP Trajectory Estimation with an Attention-Based CNN-BiLSTM Model* ", in *ACM Transactions on Internet of Things*

Q, Junaid, I. Bisio, A, Grattola, H. Haleem, C. Garibotto, F. Lavagetto and A. Sciarrone, "*Deep learning-Based Estimation of COP Trajectories Using IMU-Integrated Smart Glasses*", in *IEEE Healthcom International conference on E-health Networking, United Arab Emirates. (Presented in conference, but not published yet)*

Q, Junaid, I. Bisio, A, Grattola, C. Garibotto, F. Lavagetto and A. Sciarrone,, "Explainable Deep learning for IMU-Based Center of Pressure Prediction Using CNN-BiLSTM-Attention", in *IEEE Healthcom International conference on communications, Glasgow, Scotland, UK.*

Ready for submission

Q, Junaid, I. Bisio, H. Haleem, C. Garibotto, F. Lavagetto and A. Sciarrone, " *Explainable AI for Postural Health Monitoring: Interpreting Deep Learning Models Using Wearable Sensor Data*", in *IEEE Internet of Things Journal*

Publications (Journals)

2024

Es-sabery, F., Es-sabery, I., **Qadir, J.** et al.*A hybrid Hadoop-based sentiment analysis classifier for tweets associated with COVID-19 utilizing two machine*

learning algorithms: CNN, and fuzzy C4.5. J Big Data 11, 176 (2024). https://doi.org/10.1186/s40537-024-01014-4

2023 **Qadir, Junaid**, Ismail Butun, Paolo Gastaldo, Orazio Aiello, and Daniele D. Caviglia. "*Mitigating Cyber Attacks in LoRaWAN via Lightweight Secure Key Management Scheme*."IEEE Access (2023). (IF = 3.476: Q1).

2022 Mohamed, A.; Wang, F.; Butun, I.; **Qadir, J**.; Lagerström, R.; Gastaldo, P.; Caviglia, D.D. *Enhancing Cyber Security of LoRaWAN Gateways under Adversarial Attacks*. *Sensors* 2022, *22*,3498.https://doi.org/10.3390/s22093498 (IF = 3.847: Q2).

2022 Fatima Es-sabery, Khadija Es-sabery, Hamid Garmani, **Junaid Qadir**, and Abdellatif Hair, "*Evaluation of different extractors of features at the level of sentiment analysis*", Infocommunications Journal, Vol. XIV, No 2, June 2022, pp. 85-96., https://doi.org/10.36244/ICJ.2022.2.9

2021 F. Es-Sabery, K. Es-Sabery, **J.Qadir** *et al.*, "*A MapReduce Opinion Mining for COVID-19-Related Tweets Classification Using Enhanced ID3 Decision Tree Classifier,*" in IEEE Access, vol. 9, pp. 58706-58739, 2021, doi: 10.1109/ACCESS.2021.3073215.
(IF = 3.745: Q1).

2021 F. Es-Sabery, A. Hair, **J. Qadir**, B. Sainz-De-Abajo, B. García-Zapirain and I. D. L. Torre-Díez, "*Sentence-Level Classification Using Parallel Fuzzy Deep Learning Classifier*," in IEEE Access, vol. 9, pp. 17943-17985, 2021, doi: 10.1109/ACCESS.2021.3053917.
(IF = 3.745: Q1).

2020 **J. Qadir**, B. Sainz-De-Abajo, A. Khan, B. García-Zapirain, I. De La Torre-Díez and H. Mahmood, "*Towards Mobile Edge Computing: Taxonomy, Challenges, Applications and Future Realms,*" in IEEE Access, vol. 8, pp. 189129-189162, 2020, doi: 10.1109/ACCESS.2020.3026938.
(IF = 3.745: Q1).

2020 **J. Qadir**, U. Ullah, B. Sainz-De-Abajo, B. G. Zapirain, G. Marques and I. de la Torre Diez, "*Energy-Aware and Reliability-Based Localization-Free Cooperative Acoustic Wireless Sensor Networks,*" in IEEE Access, vol. 8, pp. 121366-121384, 2020, doi: 10.1109/ACCESS.2020.3006194.
(IF = 3.745: Q1).

2020 U. Ullah, A. R. Shahid, M. Irfan, **J. Qadir**, M. Nawaz and R. Qureshi, "*A Stable and Reliable Short-Path Routing Scheme for Efficient Acoustic Wireless Sensor Networks (AWSNs),*" in IEEE Access, vol. 8, pp. 1458-1474, 2020, doi: 10.1109/ACCESS.2019.2962004.
(IF = 4.098: Q1).

2020 Khan, Anwar, Atiq Ur Rahman, Mahdi Zareei, Najm Us Sama, Cesar Vargas-Rosales, **Junaid Qadir**, and Ehab Mahmoud Mohamed. "*Modem design for underwater acoustic networks: Taxonomy, capabilities, challenges, applications and future trends*." Journal of Intelligent & Fuzzy Systems Preprint (2020): 1-11.

2019 **Qadir, J.**; Khan, A.; Zareei, M.; Vargas-Rosales, C. *Energy Balanced Localization-Free Cooperative Noise-Aware Routing Protocols for Underwater*

	Wireless Sensor Networks. *Energies* 2019, *12*, 4263. https://doi.org/10.3390/en12224263 (IF = 3.004: Q2).
2022	**J. Qadir**, B. Sainz-De-Abajo, A. Khan, B. García-Zapirain, I. De La Torre-Díez and H. Mahmood, "*Towards Mobile Edge Computing: Taxonomy, Challenges, Applications and Future Realms*," in IEEE Access, vol. 8, pp. 189129-189162, 2020, doi: 10.1109/ACCESS.2020.3026938.
Conference Proc.	
2023	**Qadir, J.,** Cabus, J.E.U., Butun, I., Lagerström, R., Gastaldo, P., Caviglia, D.D. (2023). *Analysis of LPWAN: Cyber-Security Vulnerabilities and Privacy Issues in LoRaWAN, Sigfox, and NB-IoT*. In: Butun, I., Akyildiz, I.F. (eds) Low-Power Wide-Area Networks: Opportunities, Challenges, Risks and Threats. Springer, Cham. https://doi.org/10.1007/978-3-031-32935-7_5
2022	**Junaid Qadir**, Ismail Butun, Paolo Gastaldo, and Daniele D. Caviglia "*Review of Security Vulnerabilities in LoRaWAN*" In International Conference on Applications in Electronics Pervading Industry, Environment and Society, 2022.
2022	**Qadir, Junaid**, Ismail Butun, Robert Lagerstrom, Paolo Gastaldo, and Daniele D. Caviglia. "*Towards Smart Sensing Systems: A New Approach to Environmental Monitoring Systems by Using LoRaWAN*." In 2022 IEEE Zooming Innovation in Consumer Technologies Conference (ZINC), pp. 176-181. IEEE, 2022.
2019	U. Ullah, **J. Qadir**, A. Mobin and A. Hussain, "*CSAR: Cooperative Stability Aware Routing Scheme for Acoustic Wireless Sensor Networks*," 2019 22nd International Multitopic Conference (INMIC), 2019, pp. 1-8, doi: 10.1109/INMIC48123.2019.9022784.
2019	**Qadar J.,** Khan A., Mahmood H. (2019) *DNAR: Depth and Noise Aware Routing for Underwater Wireless Sensor Networks*. In: Barolli L., Javaid N., Ikeda M., Takizawa M. (eds) Complex, Intelligent, and Software Intensive Systems. CISIS 2018. Advances in Intelligent Systems and Computing, vol 772. Springer, Cham. https://doi.org/10.1007/978-3-319-93659-8_21
Recognized Journal Reviewer	
02.2025	IEEE Internet of Things Journal (IoTJ)
07.2020	IEEE Sensors Journal
01.2020	International Journal of Distributed Sensor Networks (IJDSN)
09.2019	Network Modeling Analysis in Health Informatics and Bioinformatics
07.2019	Computer Methods and Programs in Biomedicine Elsevier
06.2019	Heliyon
04.2019	IEEE Access
01.2019	Journal of King Saud University – Computer and Information Sciences
10.2019	Acta Acustica united with Acustica: the journal of the European Acoustics Association (EAA)
Awards/Scholarships	
	• **Best paper award at IEEE ZINC conference, University of Novi Sad, Serbia** • Awarded Italian Government Scholarship for Ph.D. studies in Italy (2020-2023)

- Awarded the Laptop from the Government of Pakistan through the Prime Minister's best student award scheme (2019)
- Awarded paid Internship from Government of Pakistan Prime Minister Youth Internship Program - PMYTS (2017-2018)

Technical Skills

Operating Systems & Platforms	*Expert* -- Linux, Windows, Kali, MS Office
Embedded & Hardware Platforms	*Expert* -- Raspberry Pi, Arduino, STM32 Microcontrollers, GNU-Radio
Technical & Engineering Software	*Experienced* -- MATLAB, Simulink, RTL-SDR, MS Visio
Networking & IoT Technologies	*Expert* -- LoRa, LoRaWAN, BLE, MQTT, Wireless Sensor Networks
Version Control and DevOps	*Experienced* -- Git, Docker, Kubernetes, VirtualBox, VMware
Programming languages	*Expert* -- Python, and C/C++
Machine and Deep Learning	*Experienced* -- PyTorch, Scikit-Learn, Pandas, Numpy, and more
Simulation and Network Tools	*Advanced* -- NS2, OMNeT++, MiniNet, ONOS
Documentations & Publishing	*Expert* -- LaTeX, Markdown
Languages	English – business fluent, sound knowledge of scientific terminology; Italian – Basic (A2 level)

Memberships

IEEE member: Institute of Electrical and Electronics Engineers
Membership Number: 97730540 (https://www.ieee.org/)

ACM member: Association for Computing Machinery
Membership Number: 7721139 https://www.acm.org/)

References

Daniele D. Caviglia
Full Professor
Department of Electrical, Electronic and Telecommunications Engineering, and Naval Architecture (DITEN),
University of Genova, Italy
Email: daniele.caviglia@unige.it
Relation: Ph.D. thesis supervisor

Paolo Gastaldo
Assistant Professor
Department of Electrical, Electronic and Telecommunications Engineering, and Naval Architecture (DITEN),
University of Genova, Italy
Email: paolo.gastaldo@unige.it
Relation: Ph.D. thesis co-supervisor

Ismail Butun
Postdoctoral Research Fellow
KTH Royal Institute of Technology, Stockholm, Sweden
Email: drismailbutun@gmail.com
Relation: Ph.D. thesis co-supervisor

Mohammed Ramadan
Assistant Professor
Karlsruhe Institute of Technology (KIT), Germany
Email: mramadan8@hotmail.com
Relation: Advisor

Genova, 18.11.2025

Harun Šiljak
Assistant Professor in Embedded Systems,
Optimisation, and Control
EEE Department, School of Engineering, Trinity College Dublin
Email: harun.siljak@tcd.ie
Email: +353(0)18963412
Relation: Advisor