

CURRICULUM VITAE

PERSONAL INFORMATION:

- NAME: **MOHAMMED SALEM ELMUSRATI**
- Home Address (Finland): **Reviisorinkatu 5, 02770 Espoo - Finland**
- Status: **Married + 3 Children**
- Current Position: **Full Professor of Telecommunication, Automation, and Intelligent Systems (Permanent Position)**
- Current Affiliation: **School of Technology and Innovations – University of Vaasa - Finland**
- TELEPHONE (Finland): **+358 50 400 3763** (Also WhatsApp)
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Keywords: Machine Learning Algorithms and applications, 5G, B5G networking, Wireless Automation, Smart Grids, Stochastic Systems and Uncertainties, Biotechnology, Digitalization.

EDUCATION:

- **Doctor of Science in Technology (D.Sc.):** from Control Engineering Laboratory, Helsinki University of Technology on Aug. 2004. The thesis title is “**Radio Resource Scheduling and Smart Antennas in Wireless CDMA Communication Systems**”. The average grade of courses is **5.0/5.0**
- **Licentiate of Technology** from Control Engineering Laboratory, Helsinki University of Technology on 2002. The thesis is under the title “**Power control and MIMO beamforming in CDMA mobile communication systems**” and has been accepted *with distinction*.
- **M.Sc.** in Electrical & Electronic Eng. From Benghazi University (previous name Garyounis University)- Benghazi - Libya in fall 1995 with an average grade of courses **3.89/4.00*** and final thesis under the title “ **Artificial Neural Networks & Applications**” with a grade as *Excellent*.
- **B.Sc.** in Electrical & Electronic Eng. From Benghazi University on spring 1991 with an average **3.27/4.00*** and final thesis under the title “**Low Noise Amplifiers in Satellite communication**” which has been accepted with a grade of **4.0/4.0**.

WORK EXPERIENCE:

- **Full Professor** (*Permanent position*) at School of Technology and Innovations - University of Vaasa - Finland, starting from 1.6.2009 - present. Tasks include:
 - Head of Sustainable Autonomous Systems
 - Leading the Cyber-Physical Research Group/ Computing Sciences Team
 - Head of FiTech 5G Program /(at University of Vaasa)
 - Head of the Postgraduate Program on Telecommunication and Smart Systems
 - Member of the Research Council at University of Vaasa
 - Head of IT For Smart and Sustainable Mobility (EUNICE - IT4SSM) at University of Vaasa

- **Professor** at Telecommunication and Systems Engineering – Faculty of Technology, University of Vaasa starting from 01.08.2007-31.5.2009.
- **Visiting Professor** at Faculty of Electronics, Communications, and Automation, Aalto University (previous name: Helsinki University of Technology) – Finland.
- **Full-Time Senior Lecturer and Researcher** at Department of Computer Science, University of Vaasa – Finland from 1-8-2004 to 31.7.2007.
- **Senior Researcher:** at Control Engineering Lab. - Automation Department- Helsinki University of Technology- Finland. Main task: leading research activities in wireless automation (wireless sensor and actuator networks). Working in many industrial and academic research projects.
- **Visiting Researcher** at Radio Lab. Royal Institute of Technology (KTH) – Stockholm – Sweden during 2003.
- **Visiting Professor** at the High Institute of Industry (HII) in Misrata – Libya, during Summer 2009.
- **Researcher Scientist:** at Helsinki University of Technology, Control Engineering Laboratory from 1-9-1999 until 31-07-2004.
- **Full-Time Lecturer Assistant** at Faculty of Engineering- Benghazi University – Benghazi - Libya, from fall 1995 to spring 1999.
- **Part-Time Lecturer** at the High Institute of Electronics –Benghazi - Libya from Fall 1993 to Spring 1999.
- **Teaching Assistant** at the faculty of Engineering- Garyounis University from fall 1992 to spring 1994

PhD Research Supervision:

Elmusrati has more than 15 years of leading research groups and writing research proposals. Furthermore, he has been supervising several PhD students at university of Vaasa – Finland. Some of his graduated and current PhD students are:

1. Dr. **Duan Ruifeng**, "*On performance analysis of cognitive radios*", defense date: 12.02.2014
2. Dr. **Omar Abu-Ella**, "*Interference mitigation using group decoding in multiantenna systems*", defense date: 17.10.2014
3. Dr. **Hossien Ahmadzadegan**, "*Security-centric analysis and performance investigation of IEEE 802.16 WiMAX*", defense date: 04.06.2015
4. Dr. **Mike Mekkanen** "On Reliability and Performance Analyses of IEC 61850 for Digital SAS" defense date: 20 October 2015
5. Dr. **Veli-Tapani Peltoketo**, "Benchmarking of embedded digital cameras", defense data: 11 August 2016
6. Dr. **Heikki Palomäki**, "Wireless Distributed Intelligence", defense date: 4 December 2017
7. Dr. **Shaima Abdelmageed** "E-Health Diagnosis over Very Limited Power Processors", defense date: 2 May 2019
8. Dr. **Caner Cuhac**, "Machine Learning Implementation in Distributed Wireless Sensors for Climate Tracking", Defense date: 11 November 2019
9. Dr. **Rasheed Alabi**, "Machine Learning Algorithms in Medical Drug Discovery", Defence date: April 2021.
10. Dr. **Sayawu Yakubu Diaba**, "Artificial intelligence application for Cybersecurity in Smart Grids", Defense date: 13 December 2023

11. **Dr. Mahmoud ElSanhuori**, "Machine Learning for Indoor positioning", defense date: 3.11.2024

Current PhDs students

12. Akpojoto Siemuri, "Mini-Machine Learning Algorithms for limited energy IoT localization devices", Expected defense: **December 2025**
13. Olli Karvonen, "AI and Machine learning applications in big project management"
14. Xiaotian Bi, "AI and Machine Learning-Based Digital Twin for Internal Consumption in Large Engines"
15. Adel Mohamed, "Reinforcement learning based jamming and spoofing mitigation of GNSS"
16. Wassim Kribaa, "AI-based resource management and predictions for Microservices-centric 5G/B5G networks", CoDoc Agreement
17. KADOUMA Abdelhak, "AI-Driven Application Profiling for Optimized Lifecycle Management", CoDoc agreement
18. Joel Reijonen, "Decentralized Machine Learning with Cloud Computing", Expecting defense date: August 2025
19. Wiqar Khan, "Visible Light Communication under 6G Networking for Smart Cities", expected defense September 2025
20. Benjamin Addo-Mensah, "Optimizing radio resources allocation for D2D Communication under 5G networks"
21. Tewodros Ambow, "Communication & Configuration Performance Impediment Resolution in Smart Grids' Telecontrol Systems"
22. Abdulla Mohamed, Machine learning for resources allocations in IoT with 6G networking"

Moreover, Elmusrati has supervised about 130 Master theses as well as many B.Sc. projects. Hence, due to Elmusrati's research duties, he has a wide scope of multidisciplinary research activities.

Elmusrati has been the PI of one project funded by the Academy of Finland titled "Joint project call: Nanoscience and ICT (Academy and NRF, Korea)" in 31.05.2012. Besides that, Elmusrati has been active in several funded projects but not as PI.

RESEARCH INTERESTS:

- Machine Learning Algorithms and Applications
- Biotechnology and Drug Discovery
- Smart Systems (mainly smart energy)
- 5G Networks with Industrial Applications
- Radio Resource Management in all Generations Mobile Communication Networks.
- Beamforming and Spatial Multiplexing.
- Stochastic Processes: Modeling, Estimation and Control
- Game Theory and Multi-Objective Optimization.
- Wireless Sensor Network with Agricultural applications
- Artificial Judge (Philosophical Views)

Teaching Statement:

Elmusrati has about 25 years of teaching experience in different international universities. During this period, I have taught many courses in different areas/fields and for different scientific levels. Some of the courses are:

1. Undergraduate (B.Sc.) courses:

- Telecommunications
- Control Engineering
- Numerical Analysis
- Microwaves Laboratory
- RF Technology
- Analogue and Digital Electronics
- Logic Design
- Linear Systems

2. Graduate (M.Sc.) courses:

- Advanced Signals and Systems
- Machine Learning
- Broadband Wireless Communication
- Mobile Networks
- Digital Communication
- Advanced Telecommunication Theory
- Radio Resources Management
- Computer Simulations

3. Postgraduate (PhD) courses and seminars:

- Game Theory with Engineering Applications
- Kalman Filters
- Stochastic Estimation with Engineering Application
- Advances on Telecommunications^[1]_{SEP}
- Wireless Automation
- Advances on Machine Learning: Algorithmic Approach

Besides his direct involvement in the teaching, he has been also involved in the design of three master study programs: the International master program on Communication and Systems Engineering, the International master program on Wireless Industrial Automation, and the International master program on Industrial Digitalization. Furthermore, he has been designing and preparing all courses and seminars of the Ph.D. programs in Telecommunications at the University of Vaasa.

PROFESSIONAL ACTIVITIES

- **Senior Member of the IEEE**
- **Member of the Automation Society in Finland**
- **Member of SIAM (Society for Industrial and Applied Mathematics)**

- **General Chair** of the *1st Vaasa Workshop on Machine Intelligence and Learning with Applications*. Place and Date: Vaasa, November 29, 2018.
- **General Conference Chair** for the international Workshops on Wireless Communications and Applications, which has been held in Vaasa – Finland during 2008, 2010, and 2012.
- **Editor-in-Chief** of Almadar Journal of Communication, IT, and Applications.
- **Editor:** Journal of Wireless Networks, Springer Publisher
- **TPC Committee Chair** for the International Conference of Electrical and Computer Engineering – Benghazi, March 26-28, 2013
- **Leading research groups for several projects.**
- **Leading Committees for Education Courses in Engineering and the Evaluation Processes.**
- **Evaluator/ Examiner for > 12 PhD/Licentiate manuscripts.**
- **Member of the technical program committee (TPC) in many international conferences**
- **Reviewer for many international.**

PUBLICATION ACTIVITIES

- Author and co-author for about 180 papers, book chapters, reports, and textbooks (see the attached Publication List).

AWARDS:

The first **INNOVATION AWARD** at University of Vaasa 2024

REFERENCES:

Available upon request!

PUBLICATION LIST

A-Textbooks

- [1] H. Koivo and M. Elmusrati, ***Systems Engineering in Wireless Communication***, Wiley, 2009, USA, ISBN: 978-0-470-02178-1
- [2] M. Elmusrati, ***Modelling Stochastic Uncertainties: From Monte Carlo Simulations to Game Theory***, De Gruyter, 2024, Germany, ISBN: 9783111584706

A-International Journals, Book Chapters, and Reports:

- [3] M. Elsanhoury, J. Koljonen, M. Elmusrati, H. Kuusniemi, "Massive MIMO Beam ID-Based Positioning Method With Low Earth Orbit Satellite Mega Constellations", *IEEE Journal of Radio Frequency Identification*, Aug. 2025
- [4] H. Kahil, S. Sharma, P. Välisuo, M. Elmusrati, "Reinforcement learning for data center energy efficiency optimization: A systematic literature review and research roadmap", ***Applied Energy***, Elsevier, Vo. 389, July 2025
- [5] R. Alabi, A. Mäkitie, M. Elmusrati, E. Almangush, , Y. Ehrsson, and G. Laurell, "Machine learning explainability for survival outcome in head and neck squamous cell carcinoma" ***International Journal of Medical Informatics***, Elsevier (July 2025), <https://doi.org/10.1016/j.ijmedinf.2025.105873>
- [6] Sayawu Yakubu Diaba a, Miadrize S.K. , Mohammed Elmusrati, "Cyber-physical attack and the future energy systems: A review," *Energy Reports*, Volume 12, December 2024, <https://doi.org/10.1016/j.egyr.2024.08.060>
- [7] Sayawu Yakubu Diaba a, Andrew Adewale Alola b, Marcelo Godoy Simoes c, Mohammed Elmusrati, "Deep learning-based evaluation of photovoltaic power generation," *Energy Reports*, Volume 12, December 2024, <https://doi.org/10.1016/j.egyr.2024.08.007>
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- [9] Kumar, H.; Shafiq, M.; Kauhaniemi, K.; Elmusrati, M. A Review on the Classification of Partial Discharges in Medium-Voltage Cables: Detection, Feature Extraction, Artificial Intelligence-Based Classification, and Optimization Techniques. *Energies* 2024, 17, 1142. <https://doi.org/10.3390/en17051142>
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- [11] Sayawu Yakubu Diaba. Theophilus Anafo, Lord Anertei, Michael Alewo, Andrew Adewale, Miadreza Shafie-khah, Mohammed Elmusrati, "SCADA securing system using deep learning to prevent cyber

infiltration", *Neural Networks* 165 (2023) 321–332, June 2023, <https://doi.org/10.1016/j.neunet.2023.05.047>

- [12] R. Alabi, M. Elmusrati, I. Leivo, A. Almangush, and A. Makitie, "Machine learning explainability in nasopharyngeal cancer survival using LIME and SHAP", [Scientific Reports, volume 13, Number: 8984 (2023)]
- [13] Alabi, Rasheed Omobolaji; Sjöblom, Anni; Carpén, Timo; Elmusrati, Mohammed; Leivo, Ilmo; Almangush, Alhadi; Mäkitie, Antti A, "Application of Artificial Intelligence for Overall Survival Risk Stratification in Oropharyngeal Carcinoma: A Validation of ProgTOOL and literature review", *International Journal of Medical Informatics*, 2023
- [14] S. Diaba, M. Shafie-Khan, and M. Elmusrati "Cyber Security in Power Systems Using Meta-Heuristic and Deep Learning Algorithms", *IEEE Access*, 2023
- [15] R. Alabi, E. Almangush, M. Elmusrati, M., Ilmo L., and A. Mäkitie, "Advanced-stage tongue squamous cell carcinoma: a machine learning model for risk stratification and treatment planning", *Acta Otolaryngologica*, 143:3, 206-214, DOI: 10.1080/00016489.2023.2172208, 2023
- [16] S. Diaba and M. Elmusrati, "Proposed algorithm for smart grid DDoS detection based on deep learning," *Neural Networks*, 2022, ISSN 0893-6080, <https://doi.org/10.1016/j.neunet.2022.12.011>.
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- [20] A. Gargoom, M. Elmusrati, A. Gaouda, "Enhancing the operation of smart inverters with PMU and data concentrators", ***International Journal of Electrical Power & Energy Systems***, Elsevier, 2022
- [21] M. Elsanhoury, P. Mäkelä, J. Koljonen, P. Välisuo, A. Shamsuzzoha, T. Mantere, M. Elmusrati, H. Kuusniemi, "Precision Positioning for Smart Logistics using Ultra-Wideband Technology-Based Indoor Navigation: A Review", ***IEEE Access***, 2022
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- [24] S. Y. Diaba, M. Shafie-khah, and M. Elmusrati, "On the Performance Metrics for Cyber-Physical Attack Detection in Smart Grid", ***Journal of Soft Computing***, SpringerNature, 2022

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- [31] M. Elmusrati and N. Ashammakhi, "Cancer-on-a-Chip and Artificial Intelligence: Tomorrow's Cancer Management", **Journal of craniofacial surgery**, 2018
- [32] M. Elmusrati, "Symbol-Multicast Mutual Coding for Massive MIMO Broadcasting", **IET Journal of Communication**, Vol. 11, No. 3, pp. 437-443, 2017
- [33] M. Elmusrati, "Interference Boosting for Green and Efficient Wireless Networks", **IEE Electronic Letters**, Vol.51, No. 23, 2015
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- [36] M. Elmusrati, H. El-Sallabi, and H. Koivo, "Applications of multi-objective techniques in radio resource scheduling of cellular communication systems," **IEEE Transaction of Wireless Communication**, Jan. 2008
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- [38] M. Elmusrati, *Power control and MIMO beamforming in CDMA mobile communication systems*, Licentiate thesis, Control Eng. Lab. - Helsinki University of Technology, Finland 2002.
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- [52] P. Oni, R. Duan, and M. Elmusrati, "Dual Analysis of the Capacity of Spectrum Sharing Cognitive Radio with MRC under Nakagami-m Fading", *Open Access Journal*, CPIS series, Vol. 2013, Article 572383, Hindawi Publisher Co.
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- [57] R. Duan, M. Elmusrati, and R. Virrankoski, "Power allocation for cognitive radios: A survey" *Almadar Journal of Communication, IT, and Applications (AJCITA)*, ISSN: 2313-156X, No. 1, July 2014.
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B- International Peer Reviewed Conferences

- [62] M. Elsanhoury, J. Koljonen, M. Elmusrati and S. Niemi, "State of Charge Estimation for Lithium-Ion Batteries in Hybrid Vessels Using Kalman Filters," *2024 25th International Middle East Power System Conference (MEPCON)*, Cairo, Egypt, 2024, pp. 1-6, doi: 10.1109/MEPCON63025.2024.10850412.
- [63] M. Elsanhoury, J. Koljonen, F. S. Prol, M. Elmusrati and H. Kuusniemi, "Resilient Navigation in GNSS-Denied Conditions Using Novel LEO-Based Fusion Positioning," *2024 IEEE International Conference on Wireless for Space and Extreme Environments (WiSEE)*, Daytona Beach, FL, USA, 2024, pp. 118-123, doi: 10.1109/WiSEE61249.2024.10850284.
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- [67] Akpojoto Siemuri, Elham Ahmadi, Mahmoud Elsanhoury, Kannan Selvan, Petri Välisuo, Heidi Kuusniemi¹, and Mohammed Elmusrati, "Optimal robust positioning using Factor Graph", Accepted for ION GNSS conference, 2024
- [68] Talal Saleh; Petri Välisuo; Kimmo Kauhaniemi; Mohammed Elmusrati, "5G Communication Infrastructure for Smart Grids: A Protection Use Case." 2023 IEEE PES Innovative Smart Grid Technologies Europe (ISGT EUROPE)
- [69] Talal Saleh; Ahmed Anwer, Mohammed Elmusrati; Kimmo Kauhaniemi; Petri Välisuo, "Virtualized Intelligent Relaying of Smart Grid Over 5G Network," International Workshop on Artificial Intelligence and Machine Learning for Energy Transformation (AIE), 2024
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