CURRICULUM VITAE

PERSONAL INFORMATION

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EDUCATION

- **Ph.D., 2 0 1 0 - 2014 Communication Engineering, Ain Shams Univ., Cairo, Egypt.**

- **Thesis Title:** Design and Performance Analysis of New Spreading Code and Transceiver Architectures for Optical Code Division Multiple Access Networks.
- **Thesis Abstract:** This thesis presents a design for a new code as well as a "transmitter and receiver" in OCDMA multi-entry encrypted optical communications networks. This code is applied to both coherent and non-coherent multi-entry encrypted optical communications networks. Initially, a new code called EWMPC was designed, with a review of most types of codes used in this type of network. A comparison was made between these types and the new code in terms of the efficiency of the network when the number of users increases and also when the level of receiving power changes, as the design and implementation of each of them is difficult. Noise is considered one of the most important elements that affect network performance, so the effect of different types of noise on receiver performance was studied. The performance level was calculated in three different cases according to the type of receiver used, and then a comparison was made between them. The thesis also presented a study of the types of codes used that rely on delay lines to create the new code, as well as the receivers that are used to decode the code. As follows, we have presented a study of the efficiency of coherent networks of this type of network that uses PPM-BPSK, which is considered one of the most important types of modulation used. in digital communications. Then this code was applied to encrypted optical communications networks with multiple passive entrances (PON-OCDMA) that are used in Internet networks with the presence of the IP Internet protocol, and then the network performance was studied in terms of the number of users and the level of received power. The results have proven that this code is distinct from other codes of the same category and others, such as OOC, in both: 1- The error rate when the number of users increases and, 2- The length of the code no of chips while increasing the percentage of energy in the code and maintaining the orthogonality feature between it and the rest of the codes of the same type.

- **M.Sc., 2004 - 2008** Communication. Engineering, Ain Shams Univ., Cairo, Egypt.
- **Thesis Title:** A Statistical Model of an Encoder/ Decoder In Fiber-Optic Code Division Multiple Access Network

Thesis Abstract: This thesis presents an overview on optical code division multiple access (OCDMA) communication systems of a star configuration. Three basic implementations of the encoding – decoding techniques used in OCDMA systems were studied: time domain encoding using optical delay lines, spectral intensity encoding, and fast frequency hopping CDMA (FFH-CDMA) encoding. Several OCDMA receiver structures were considered. A comparison between them was presented in terms of integration time, electronic bandwidth, and receiver complexity. We then studied the effect of receiver noise on the system performance for the three basic techniques of OCDMA encoding. Each technique gives some advantages and drawbacks in system capacity, and system performance in terms of bit error rate (BER). In the time domain OCDMA, the system is very simple but the performance is limited by splitting the power in the encoder and decoder, and the maximum number of simultaneous active users is limited due to the effect of multiple access interference. In frequency domain OCDMA, the system performance is limited by the ratio between encoded bandwidth and the 3dB bandwidth required to achieve a maximum number of active users, and the effect of multiple access interference is very low. In FFH-OCDMA, system performance is limited by the spacing between fiber Bragg grating (FBG), but this system is simpler than frequency domain system and achieves better performance than time domain OCDMA to a certain threshold value of active number of users after this threshold the time domain OCDMA encoding technique has better performance than FFH-OCDMA. Different types of optical fiber delay lines are then studied, including its basic features and characteristics. Focus oriented to FBGs for use as delay line elements to provide different delays with the same attenuation, we found that outside the FBG stop band the transmitivity can be adjusted to unity at different values of the grating length. A statistical model based on the photon counting technique was developed and used to analyze the fiber-OCDMA system using real time passive encoders-decoders with FBG as delay elements. In this case, the code sequence can be obtained with the same chip amplitudes at the output of the encoder. This system has been compared to the system using conventional optical fibers as delay elements in terms of BER. The high detuning for FBG gives the same transmittivity for all required grating lengths, in contrast to the case of optical fiber which gives different values of attenuation in the code sequence at the output of the encoder. As the code length F increases the transmittivity of optical fiber delay lines decreases which degrade the BER performance of the network. For FBG delay lines, a near ideal transmittivity is obtained, achieving better performance. From the results obtained herein, it can be concluded that at low transmitted power and when the number of active users is less than a certain threshold which in our simulations was around 25 the system using FBG outperforms that using optical fibers as delay elements.

- **B.Sc., 1995 - 2000** Electronics, and comm., Ain Shams Univ., Cairo, Egypt**.**
- **Date:** June, 2000
- **Grade:** Very good with honor degree.
- **Project title:** Design and Implementation of Two Channel Optical Wavelength Division Multiplexing System.
- **Project grade:** Excellent, Highest mark in all graduation projects in the Electronics and Communication Engineering Department (230 student).

ACADEMIC PROFESSIONAL ACTIVITIES

1. Associate Professor, College of Engineering, Shaqra University, Ar Ryadh, Saudi Arabia, from 2021 till now.

2. Assist. Professor, College of Engineering, Shaqra University, Ar Ryadh, Saudi Arabia, from 2017 to 2021.
3. Assist. Professor, Higher Institute of Engineering and Technology, Cairo, Egypt, from 2014 to 2017.
4. Assist. Professor, College of Engineering, Canadian International College, Egypt, from 2013 to 2014.
5. Head of the Information Technology Department, Faculty of Computer Science, Nahda University, Beni Swief, Egypt. From 2015 to 2017.
6. Head of Cairo-1 office, ORASCOM Trading, Mobinil Subcontractor for Mobile Networks Maintenance, Cairo, Egypt From 01/2006 to 12/2008.
7. Owner of Ain Shams Construction Company for Constructions, Designs, Electrical Systems and Light Current Systems. From 2021 till now

COMMITTEES

1. Students' Excuses Committee, Head, College of Engineering, Shaqra University, Saudi Arabia. From 2018/2019 to 2020/2021.
2. Students' Activities Unit, Head, College of Engineering, Shaqra University, Saudi Arabia. From 2018/2019 till now.
3. Scheduling Committee, Head, College of Engineering, Shaqra University, Saudi Arabia, 2018/2019.
4. Academic Supervision Committee, Member, College of Engineering, Shaqra University, Saudi Arabia. From 2018/2019 till now.
5. Community Services Committee, Head, College of Engineering, Shaqra University. From 2020/2021 till now.
6. NCAAA Quality Assurance Committee, Member, College of Engineering, Shaqra University, Saudi Arabia, (Good Experience). Creation 6 supervisor. From 2018/2019 till now.
7. ABET Committee, Member, College of Engineering, Shaqra University, Saudi Arabia, (Good Experience). Creation 8 supervisor. From 2018/2019 till now.
8. Scientific Research and Innovations Unit, Head, College of Engineering, Shaqra University. From 2021/2022 till now.
9. Community Services Unit, Head, College of Engineering, Shaqra University. From 2020/2021 till now.
10. Supervisor of the Engineering Club, College of Engineering, Shaqra University. From 20192020 till now.

TRAINING COURSES

1- Methods of Scientific Research
2- Quality standards in the teaching process
3- Effective communication skills
4- University management
5- The credit hour systems
6- Research projects, local and global competitiveness

7- Strategic Planning
8- Thinking Skills
9- Effective Presentation skills
10- The use of Technology in Teaching
11- Educational programs and courses specifications and evaluation of learning outcomes
12- Statistical analysis skills
13- External reviewer for high educational institutes

COMPUTER SKILLS

1- Microsoft windows and office
2- MATLAB Programming (Communication toolbox, Electromagnetics wave propagation toolbox, Antenna toolbox, Finite Difference Time Domain Analysis (FDTD), System performance evaluation and Control systems toolbox)
3- Lumerical FDTD simulation tools for optical components and PV cells
4- CST antenna simulation tools
5- Multisim electronics simulation tools
6- ORCAD electronics simulation tools
7- Opti-system and Opti-wave simulation tools
8- LabView program

RESEARCH INTERESTS

1. Optical Fiber Communications.
2. Free Space Optical Communications.
3. Underwater Optical Communications.
4. Photonics.
5. Integrated Optics.
6. Optical Communication Networks.
7. Code Design in Optical Networks.
8. Electromagnetic Wave Propagations.
9. RF Circuit Design and RF Energy Harvesting.
10. BER Performance Analysis.
11. Antennas and Wave Propagation.
12. Nano Solar Cells Design and analysis
13. Integrated Solar Antenna Harvesting Systems.
14. Robotic Systems.

RESEARCH PROJECTS

1. New Design and Optimization of Hybrid Passive Wireless Optical Communication Networks for Secured Multi-Purpose Applications, Dean Ship of Scientific Research, Shaqra University, 2023, PI.
2. Performance Enhancement of Under Water Optical Communication Networks, Dean Ship of Scientific Research, Shaqra University, 2023, CO-I.

3. 2D-RF Energy Harvesting System Design Based on h Shape Slot Antenna, Dean Ship of Scientific Research, Shaqra University, 2023, PI.
4. Efficiency Enhancement of Nano Polymer Solar Cells Using Crystalline Light Trapping Layer and Graded Index Active Layer, Dean Ship of Scientific Research, Shaqra University, 2022, PI.
5. Design of 2D-Photonic Antenna Array to Increase the Efficiency of Nano Solar Cells, Dean Ship of Scientific Research, Shaqra University, 2021, PI.
6. Designing a Passive Wireless Receiver for Charging Mobile Phone Batteries and Reduction of the Consumed Power in Saudi Arabia, Dean Ship of Scientific Research, Shaqra University, 2019, PI.

COURSES TAUGHT

1. Antennas and Wave Propagations
2. Optical Communications Systems
3. Electromagnetics I&II
4. Electronics I and II
5. Signals and Systems
6. Digital Logic Design
7. Communication Principles
8. Analog Communication Systems.
9. Digital Communication Systems.
10. Optoelectronics.
11. Automatic Control Systems.
12. Electric Circuit Analysis
13. Physics.

GRADUATION PROJECT SUPERVISION

1. Design and Implementation of Two Channel Optical Code Division Multiple Access Networks, Electrical Engineering Department, College of Engineering, Shaqra University, 2018/2019.
2. Design of Passive RF Energy Harvesting System Based Rectangular Patch Microstrip Antenna, Electrical Engineering Department, College of Engineering, Shaqra University, 2019/2020.
3. Design and Implementation of Two Channel Optical Code Division Multiple Access Networks Based Pulse Position Modulation and Optical Orthogonal Code, Electrical Engineering Department, College of Engineering, Shaqra University, 2020/2021.
4. Design of Passive RF 2D Energy Harvesting System Based h-Shape Slot Antenna, Electrical Engineering Department, College of Engineering, Shaqra University, 2021/2022.
5. Design and Implementation of Two Channel Optical Code Division Multiple Access Networks Based Pulse Position Modulation, Optical Orthogonal Code, and Integrated Solar Antenna System as A

Power Supply, Electrical Engineering Department, College of Engineering, Shaqra University, 2023/2024.

PUBLICATIONS

1. Ismail, M.A.M., Saleh, K. Performance analysis toward 880 m/4.255 Gbps underwater optical wireless communication CDMA network based on hybrid M-ary differential pulse position modulation and double length modified prime code. *Opt Quant Electron* 56, 668 (2024). https://doi.org/10.1007/s11082-024-06353-3

2. Ebrahim E. Elsayed, Mohammed R. Hayal, Irfan Nurhidayat, Mohd Asif Shah, Abdelrahman Elfikky, Ayman I. Boghdady, Davron Aslonqulovich Juraev, **M. A. Morsy**: Coding techniques for diversity enhancement of dense wavelength division multiplexing MIMO-FSO fault protection protocols systems over atmospheric turbulence channels. *IET Optoelectron*. 1–21 (2024). https://doi.org/10.1049/ote2.12111

3. **Morsy, M. A**., and Khalid Saleh. 2023. "Graded-Index Active Layer for Efficiency Enhancement in Polymer Solar Cell" *Energies* 16, no. 9: 3933. https://doi.org/10.3390/en16093933

4. **Ismail, M.A.M**., Galal, O.H. & Saad, W. Coronavirus spread limitation using detective smart system. ISSS J Micro Smart Syst 12, 105–116 (2023). https://doi.org/10.1007/s41683-023-00116-0

5. **Morsy, M.A**. Coherent OCDMA network based on a new BER performance equalization technique for multimedia applications. Opt Quant Electron 55, 167 (2023). https://doi.org/10.1007/s11082-022-04429-6

6. Eqab, H., Salamah, Y.B., Ahmad, I., Ismail, Morsy., Development of source seeking algorithm for mobile robots. Intel Serv Robotics 16, 393–401 (2023). https://doi.org/10.1007/s11370-023-00470-w

7. **M. A. Morsy** and K. Saleh, "Integrated Solar Mesh Dipole Antenna Based Energy Harvesting System," in *IEEE Access*, vol. 10, pp. 89083-89090, 2022, doi: 10.1109/ACCESS.2022.3201127.

8. **Morsy, Morsy A**.; SALEH, Khalid. Efficiency Enhancement of GaAs Nano Solar Cell Based on 2D Photonic Crystal Trapping Layer and 2D Index Modulation Layer. IEEE Access, 2022, 10: 44147-44158.

9. **M. A. Morsy**, "Performance Analysis of Multi-Rate Coherent BPSK-OCDMA Network for Multimedia Applications," 2022 8th International Engineering Conference on Sustainable Technology and Development (IEC), Erbil, Iraq, 2022, pp. 179-184, doi: 10.1109/IEC54822.2022.9807589.

10. **Morsy, M. A**.; GALAL, O. H. Optimized Triple-Band h-Shaped Slot Microstrip Antenna Array Based Wireless Mobile Charger. 2021.

11. **Morsy, Morsy A**., and Moustafa H. Aly. 2021. "A New Hybrid Prime Code for OCDMA Network Multimedia Applications" *Electronics* 10, no. 21: 2705. https://doi.org/10.3390/electronics10212705

12. El-Rawy, M., Haraz, O.M., **Morsy, M.A**. et al. Role of smart technology to increase date productivity and water efficiency in MENA countries: a review of innovative sustainable solutions. Euro-Mediterr J Environ Integr 6, 67 (2021). https://doi.org/10.1007/s41207-021-00274-3

13. V. O. Nyangaresi and **M. A. Morsy**, "Towards Privacy Preservation in Internet of Drones," *2021 IEEE 6th International Forum on Research and Technology for Society and Industry (RTSI)*, 2021, pp. 306-311, http://doi.org/10.1109/RTSI50628.2021.9597324

14. **Ismail, Morsy Morsy**, and Abdulaziz S. Alsayyari. "Performance Analysis of Coherent BPSK-OCDMA Wireless Communication System", J. Wireless Net., Springer, May, 2, (2020).

15. **Ismail, Morsy Morsy**, and Abdulaziz Alsayyari. "Performance Analysis of Optical CDMA Wireless Communication System Based on Double Length Modified Prime Code for Security Improvement." IET Communications (2020).

16. **Ismail, Morsy Morsy**, and Abdulaziz Alsayyari. "BER Performance of OCDMA System Based on Optimized 2D Photonic Crystal Passive Encoder." IET Communications (2020).

17. **Morsy, M. A**., and Abdulaziz S. Alsayyari. "Performance Control of Incoherent Synchronous PPM-OCDMA Networks." In 2019 2nd IEEE Middle East and North Africa COMMunications Conference (MENACOMM), pp. 1-4. IEEE, 2019.

18. **Ismail, Morsy Ahmed Morsy**, Abdulaziz Alsayyari, and Osama Hussien Galal. "Performance analysis of optical code division multiple access networks for multimedia applications using multilength weighted modified prime codes." Optical Engineering 58, no. 3 (2019): 035101.

19. **Morsy, M. A.**, and Abdulaziz S. Alsayyari. "Multi-rate OCDMA system BER performance evaluations for different ML-code sequences." Optical and Quantum Electronics 51, no. 6 (2019): 198.

20. **Morsy, M.A**.: Analysis and design of weighted MPC in incoherent synchronous OCDMA network. Opt. Quant. Electron. 50, 387 (2018).

21. **Morsy, M.A**., Rajab, H.S.A., Al-Obaidan, H.M.: Performance of passive OCDMA networks for different encoder/decoder delay lines. Int. J. Opt. Appl. 3(3), 19–26 (2013).

22. **Morsy, M.A**., Hassan, K.M., Morshed, A.H., Elhennawy, A.: Analysis of OCDMA passive networks for different encoder delay elements. In: IEEE international conference on computer engineering and systems (ICCES-06), Cairo, Egypt, pp. 294–299 (2006).

23. **M. A. Morsy**, A. A. Hafez, A. E. Elhennawy and E. M. Saad, "Performance of EWMPC in Coherent Homodyne BPSK-OCDMA Network," SAP International Journal of optics, vol. 2, no. 5, Oct. 2012.

24. **M. A. Morsy**, A. A. Hafez, A. E. Elhennawy and E. M. Saad, "Performance Analysis of PPM-OCDMA Network Use EWMPC Sequence," SAP International Journal of optics, vol. 3, no. 1, Feb. 2013.

25. **M. A. Morsy**, A. A. Hafez, A. E. Elhennawy and E. M. Saad, "Correlation Analysis for Novel Prime Code in OCDMA Network," SAP International Journal of optoelectronics, vol. 3, no. 1, Feb. 2013.