MICHEL K. KULHANDJIAN

CONTACT INFORMATION

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Houston, TX, 77005
U.S.A.

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RESEARCH INTERESTS

- Jammer Detection/Anti-jamming
- Holographic MIMO
- Quantum communications
- RF fingerprinting
- Spectrum sharing, Radar
- Error correcting codes
- Optimization algorithms

EDUCATION

State University of New York at Buffalo, Buffalo, NY, USA

Ph.D., Electrical Engineering — Sept. 2007 – June 2012

- Concentrations: Signal Processing and Wireless communication
- Advisor: Prof. Dimitris A. Pados
- Thesis: *Uniquely decoding code-division and low-complexity receivers for advanced signal design, multiplexing, and multiple-access communications*
- Grade point average (GPA): 3.83/4.00

M.S., Electrical Engineering — Sept. 2005 – June 2007

- Concentrations: Code-division multiple access
- GPA: 3.83/4.00

The American University in Cairo, Cairo, Egypt

B.S., Electronics and Communications Engineering — Sept. 2000 – May 2005

- Concentrations: Wireless Communications
- Thesis: *Developed complete phone-to-phone VoIP (H.232) system on the DSK TMS 320C6711 using Code Composer software*
- *Summa Cum Laude*, with Highest Honors
- GPA: 3.90/4.00

PUBLICATIONS

Book Chapters

1. C. Comert, O. M. Gul, **M. Kulhandjian**, A. Touazi, C. Ellement, B. Kantarci, C. D'Amours, "Secure Design of Cyber-Physical Systems at the Radio Frequency Level: Machine and Deep Learning-Driven Approaches, Challenges and Opportunities," in *Artificial Intelligence for Cyber-Physical Systems Hardening, Springer*, Ed. I. Traore, Jul. 2022.

Refereed Journal Publications

2. Y. Berrouche, **M. Kulhandjian**, and H. Kulhandjian, "A Hyperbolic Secant-Based Pulse for Enhanced FTN Signaling in 5G/6G Systems," in *IEEE Wireless Commun. Lett.*, Jan. 2026, vol. 15, pp. 380-384.

3. H. Kulhandjian, J. Barron, M. Tamiyasu, M. Thomposon and **M. Kulhandjian**, "AI-Based Pedestrian Detection and Avoidance at Night Using Multiple Sensors," *J. Sens. Actuator Netw.*, Vol. 13, Issue 3, pp. 1-34, Jun. 2024.

4. B. Zhang, M. Simsek, **M. Kulhandjian**, and B. Kantarci , "Enhancing the Safety of Autonomous Vehicles in Adverse Weather by Deep Learning-Based Object Detection," *Electronics*, Vol. 13, Issue 9, 1765, May 2024.

5. N. Papyan, **M. Kulhandjian**, H. Kulhandjian, and L. Aslanyan, "AI-based Drone Assisted Human Rescue in Disaster Environments: Challenges and Opportunities," *Springer - special issue Logic-combinatorial methods of pattern recognition.*, Vol. 11, pp. 1-15, Dec. 2023.

6. O. Melih Gul, **M. Kulhandjian**, B. Kantarci, C. D'amours, A. Touazi, and C. Ellement, "On the Impact of CDL and TDL Augmentation for RF Fingerprinting under Impaired Channels," *Wireless World Research Forum Magazine (WWRT)*, #48, Dec. 2023.

7. O. Melih Gul, **M. Kulhandjian**, B. Kantarci, A. Touazi, C. Ellement, and C. D'amours, "Secure Industrial IoT Systems via RF Fingerprinting Under Impaired Channels With Interference and Noise," *IEEE Access*, Vol. 11, pp. 26289-26307, Mar. 2023.

8. N. Parvaresh, **M. Kulhandjian**, H. Kulhandjian, C. D'Amours and B. Kantarci, "A Tutorial on AI-Powered 3D Deployment of Drone Base Stations: State of the Art, Applications and Challenges," in *Vehicular Communications*, vol. 36, Aug. 2022.

9. **M. Kulhandjian**, H. Kulhandjian, C. D'amours, H. Yanikomeroglu, D. A. Pados, and G. Khachatrian "Low-Complexity Decoder for Overloaded Uniquely Decodable Synchronous CDMA," *IEEE Access*, Vol. 10, pp. 46255-46275, Apr. 2022.

10. G. Millar, **M. Kulhandjian**, A. Alaca, S. Alaca, C. D'Amours and H. Yanikomeroglu, "Low-Density Spreading Design Based on an Algebraic Scheme for NOMA Systems," in *IEEE Wireless Commun. Lett.*, Jan. 2022.

11. **M. Kulhandjian**, G. Kurt, H. Kulhandjian, C. D'amours, and H. Yanikomeroglu, "NOMA Computation Over Multi-Access Channels for Multimodal Sensing," in *IEEE Wireless Commun. Lett.*, Sep. 2021.

12. **M. Kulhandjian**, H. Kulhandjian, C. D'amours and L. Hanzo, "Low-Density Spreading Codes for NOMA Systems and a Gaussian Separability Based Design," in *IEEE Open Access*, vol. 9, pp. 33963-33993, 2021.

13. R. S. H. Istepanian, **M. Kulhandjian**, and G. Chaltikyan, "Mobile Health (m-Health) in the Developing World: Two decades of progress or retrogression ," in *Journal of International Society for Telemedicine and eHealth*, vol. 8, ed. 24, pp. 1-5, Jan. 2021.

14. **M. Kulhandjian**, E. Bedeer, H. Kulhandjian, C. D'amours, and H. Yanikomeroglu, "Low-complexity detection for faster-than-Nyquist (FTN) signaling based on Probabilistic Data Association," in *IEEE Commun. Lett.*, Dec. 2019.

15. **M. Kulhandjian**, C. D'amours, and H. Kulhandjian, "Multiway Physical-layer Network Coding via Uniquely-Decodable Codes," in *Hindawi, Wireless Communications and Mobile Computing* , Volume 2018, Article ID 2034870, Apr. 2018.

16. M. Li, **M. Kulhandjian**, D. A. Pados, S.N. Batalama, and M. J. Medley, "Extracting Spread-Spectrum Hidden Data From Digital Media," *IEEE Trans. Inf. Forens. Security*, vol.8, no.7, pp. 1201-1210, Jul. 2013.

Refereed Conference Publications

17. S. U. Khan, **M. Kulhandjian**, and D. Roy "Pushing the Boundaries in CBRS Band: Robust Radar Detection within High 5G Interference," in *Proc. IEEE Military Commun. Conf. (MILCOM)*, Los Angeles, CA, USA, 6-10 Oct. 2025, pp. 1278-1283.

18. **M. Kulhandjian** H. Kulhandjian, D. Roy, and M. Rahaim, "Detection and Parameter Estimation of Pulsed LFM Radar for Opportunistic Resource Sharing in Radar-Cellular Coexistence," in *Proc.*

Asilomar conf. on Signals, Systems, and Computers (Asilomar), Pacific Grove, CA, 26-29 Oct. 2025.

19. S. U. Khan, **M. Kulhandjian**, and D. Roy "In-Network Fusion for High Interference Signal Detection within CBRS Band," in *Proc. IEEE Conf. on Computer Commun. Workshops (INFOCOM WKSHPS)*, London, UK, 17-20 May 2025, pp. 1-2.

20. H. Kulhandjian, N. Amely and **M. Kulhandjian**, "AI-Powered Fruit Harvesting System Using a Robotic Arm for Precision Agriculture," in *Proc. Int. Conf. on Computing, Net. and Commun. (ICNC)*, Honolulu, Hawaii, 17-20 Feb. 2025, pp. 505-509.

21. H. Yang, **M. Kulhandjian** H. Kulhandjian, D. Jakubisin, X. Cheng, K. Bondada, and Y. Yang, "ML-based Low-Density Spreading Code Design," in *Proc. Asilomar conf. on Signals, Systems, and Computers (Asilomar)*, Pacific Grove, CA, 27-30 Oct. 2024.

22. M. Rahaim, A. Ahmed, **M. Kulhandjian**, and H. Kulhandjian, "Optical OFDMA for Multi-cell/Multi-User Indoor Optical Wireless Networks," in *Proc. Asilomar conf. on Signals, Systems, and Computers (Asilomar)*, Pacific Grove, CA, 27-30 Oct. 2024.

23. **M. Kulhandjian**, H. Kulhandjian, G. Kurt and H. Yanikomeroglu, "Delay-Doppler Domain Pulse Design for OTFS-NOMA," in *Proc. Int. Conf. on Commun. (ICC)*, Denver, CO, 9-13 Jun. 2024.

24. M. Amini, G. Asemian, **M. Kulhandjian**, B. Kantarci, C. D'Amours, and M. Erol-Kantarci, "Bypassing a Reactive Jammer via NOMA-Based Transmissions in Critical Missions," in *Proc. Int. Conf. on Commun. (ICC)*, Denver, CO, 9-13 Jun. 2024.

25. J. Liu, P. Djukic, **M. Kulhandjian**, and B. Kantarci, "Deep Dict: Deep Learning-based Lossy Time Series Compressor for IoT Data," in *Proc. Int. Conf. on Commun. (ICC)*, Denver, CO, 9-13 Jun., 2024.

26. G. Asemian, **M. Kulhandjian**, M. Amini, B. Kantarci, C. D'Amours, and M. Erol-Kantarci, "The impact of mobility, beam sweeping and smart jammers on security vulnerabilities of 5G cells," in *Wireless World Research Forum (WWRF)*, Virtual, 9-13 Jan. 2024.

27. H. Kulhandjian, B. Poorman, J. Gutierrez, **M. Kulhandjian**, "AI-powered Emergency Keyword Detection for Autonomous Vehicles," in *Proc. Int. Conf. on Computing, Net. and Commun. (ICNC)*, Big Island, Hawaii, 19-22 Feb. 2024.

28. H. Kulhandjian, B. Irineo, J. Sales, **M. Kulhandjian**, "Low-Cost Tree Health Categorization and Localization Using Drones and Machine Learning," in *Workshop on Computing, Net. and Commun. (CNC)*, Big Island, Hawaii, 19-22 Feb. 2024.

29. H. Kulhandjian, J. Torres, N. Amely, C. Nieves, C. Reeves, **M. Kulhandjian**, "AI-based Road Inspection Framework using Drones with GPS-less Navigation," in *Workshop on Computing, Net. and Commun. (CNC)*, Big Island, Hawaii, 19-22 Feb. 2024.

30. G. Dzezyan, H. Kulhandjian, **M. Kulhandjian**, M. Rahaim, "Low-cost Optical Wireless CDMA Transceiver Design for IoT Applications," in *Proc. Latin-American Conf. on Commun. (LATINCOM)*, Panama City, Panama, 15-17 Nov. 2023.

31. **M. Kulhandjian**, H. Kulhandjian, and A. Sabharwal, "AWACS Radar Aircraft Trajectory Tracking via Networked Ground Receiver Stations," in *Proc. Asilomar conf. on Signals, Systems, and Computers (Asilomar)*, Pacific Grove, CA, 27-30 Oct. 2023.

32. N. Perekadan, C. Banerjee, T. Mukherjee, E. Pasiliao, H. Kulhandjian, **M. Kulhandjian**, "MOD3NN: A Framework for Automatic Signal Modulation Detection Using 3D CNN," in *Proc. Int. FLAIRS conf.*, vol. 36, Clearwater, FL, 14-17 May, 2023.

33. H. Kulhandjian, A. Davis, L. Leong, M. Bendot, **M. Kulhandjian**, "AI-based Human Detection and Localization in Heavy Smoke using Radar and IR Camera," in *Proc. Radar Conf. (RadarConf)*, San Antonio, TX, 1-5 May, 2023, pp. 1-6.

34. H. Kulhandjian, J. Barron, M. Tamiyasu, M. Thompson, **M. Kulhandjian**, "Pedestrian Detection and Avoidance at Night Using Multiple Sensors and Machine Learning," in *Proc. Int. Conf. on Computing, Net. and Commun. (ICNC)*, Honolulu, Hawaii, 20-22 Feb. 2023, pp. 165-169.

35. H. Kulhandjian, E. Batz, E. Garcia, S. Vega, S. Velma, **M. Kulhandjian**, C. D'Amours, B. Kantarci, T. Mukherjee, "AI-based RF-Fingerprinting Framework and Implementation using Software-Defined Radios," in *Proc. Int. Conf. on Computing, Net. and Commun. (ICNC)*, Honolulu, Hawaii, 20-22 Feb. 2023, pp. 143-147.

36. **M. Kulhandjian**, G. Dzhezyan, H. Kulhandjian, C. D'Amours, "Pulse Shaping for Faster-than-Nyquist to Enable Low-Complexity Detection," in *Proc. Military Commun. Conf. (MILCOM)*, Rockville, MD, 28 Nov. - 2 Dec. 2022, pp. 920-925.

37. O. Melih Gul, **M. Kulhandjian**, B. Kantarci, C. D'amours, A. Touazi, and C. Ellement, "On the Impact of CDL and TDL Augmentation for RF Fingerprinting under Impaired Channels," *Wireless World Research Forum (WWRT)*, #48, UAE, 2-3 Nov. 2022, pp. 1-6. **Best Paper Award**

38. O. Melih Gul, **M. Kulhandjian**, B. Kantarci, A. Touazi, C. Ellement, and C. D'amours, "Fine-grained augmentation for RF fingerprinting under impaired channels," in *IEEE Int. Workshop on Comp. Aided Model. and Design of Commun. Links and Networks (CAMAD)*, Paris, France, 2-3 Nov. 2022, pp. 115-120.

39. H. Kulhandjian, N. Martinez and **M. Kulhandjian**, "Drowsy Driver Detection Using Deep Learning and Multi-Sensor Data Fusion," in *Proc. IEEE Vehicle Power and Propulsion (VPPC)*, Merced, CA, 1-4 Nov. 2022.

40. H. Kulhandjian, W. Greives and **M. Kulhandjian**, "Smart Traffic Light Controller using Visible Light Communications," in *Proc. IEEE Vehicle Power and Propulsion (VPPC)*, Merced, CA, 1-4 Nov. 2022.

41. C. Comert, **M. Kulhandjian**, O. Meligh Gul, A. Touazi, C. Ellement, B. Kantarci, C. D'Amours, "Analysis of Augmentation Methods for RF Fingerprinting under Impaired Channels," in *Proc. ACM Workshop on Wireless Security and Machine Learning (WiseML)*, San Antonio, TX, 16-19 May 2022.

42. G. Dzhezyan, H. Kulhandjian, and **M. Kulhandjian**, "Implementation of Faster-Than-Nyquist Signaling using Software Defined Radios," in *GnuRadio Conference (GRCon)*, Washington, D.C., 26-30 Dec. 2022.

43. A. Ahmed, G. Dzhezyan, H. Aboutahoun, V. Chu, J. DiVicarro, V. Ohanian, S. Rezaeiboroujerdi, I. Saheb, E. Urban, H. Wu, **M. Kulhandjian**, H. Kulhandjian, and M. Rahaim, "SDR Beyond Radio: An OOT GNURadio Library for Simulation and Deployment of Multi-Cell / Multi-User Optical Wireless Communication Systems," in *GnuRadio Conference (GRCon)*, Washington, D.C., 26-30 Dec. 2022.

44. **M. Kulhandjian**, H. Kulhandjian, and C. D'amours, "Uniquely decodable ternary codes via augmented Sylvester-Hadamard matrices," in *Proc. IEEE Int. Black Sea Conf. on Commun. and Networking (BlacSeaCom)*, Virtual, May 2021.

45. M. Fantuz, **M. Kulhandjian**, and C. D'amours, "Low Complexity PIC-MMSE Detector for LDS Systems over Frequency-Selective Channels," in *Proc. IEEE Wireless Telecomm. Symposium (WTS) 2021*, Virtual, Apr. 2021.

46. M. Fantuz, **M. Kulhandjian**, and C. D'amours, "Low Complexity PIC-MMSE Detector for LDS Systems over Frequency-Nonselective Channels," in *IEEE Int. Workshop on Comp. Aided Model. and Design of Commun. Links and Networks (CAMAD)*, Virtual Conference, Jun. 2020.

47. **M. Kulhandjian**, H. Kulhandjian, and C. D'amours, "Code Design for Noncoherent Detection in Satellite Communication Systems," in *Proc. IEEE Int. Wireless Commun. & Mobile Comput. Conf. (IWCMC)*, Virtual Conference, Jun. 2020.

48. H. Kulhandjian, P. Sharma, **M. Kulhandjian** and C. D'amours, "Sign Language Gesture Recognition using Doppler Radar and Deep Learning," in *Proc. IEEE Global Commun. Conf. (GLOBECOM)*, Waikoloa, HI, Dec. 2019.

49. H. Kulhandjian, N. Ramachadran, **M. Kulhandjian** and C. D'amours, "Human Activity Classification in Underwater using sonar and Deep Learning," in *Proc. of ACM Intl. Conf. on Underwater Networks & Systems (WUWNet)*, Atlanta, Georgia, Oct. 2019.

50. **M. Kulhandjian**, L. Aslanyan, H. Sayakyan, H. Kulhandjian, and C. D'amours, "Multidisciplinary Discussion on 5G from the Viewpoint of Algebraic Combinatorics," in *Proc. IEEE 12th Int. Comp. Sci. and Infor. Technol. (CSIT)*, Yerevan, Armenia, Sep. 2019, pp. 69-76.

51. **M. Kulhandjian**, H. Kulhandjian and C. D'amours, "Improved Soft Decoding of Reed-Solomon Codes on Gilbert-Elliott Channels," in *IEEE Intl. Symposium on Infor. Theory (ISIT) 2019*, Paris, France, Jul. 2019, pp. 1072-1076.

52. **M. Kulhandjian**, H. Kulhandjian, C. D'amours, H. Yanikomeroglu, and G. Khachatrian "Fast Decoder for Overloaded Uniquely Decodable Synchronous Optical CDMA," in *Proc. IEEE Wireless Comm. and Networking Conf. (WCNC) 2019*, Marakech, Morocco, Apr. 2019, pp. 1-7.

53. **M. Kulhandjian**, H. Kulhandjian, C. D'amours, and D. A. Pados, "Digital Recording system identification based on blind deconvolution," in *Proc. IEEE Wireless Telecomm. Symposium (WTS) 2019*, New York, NY, Apr. 2019, pp. 1-8.

54. **M. Kulhandjian**, C. D'amours, and H. Kulhandjian, "Uniquely Decodable Ternary Codes for Synchronous CDMA systems," in *Proc. IEEE Pers., Indoor, Mobile Radio Conf. (PIMRC) 2018*, Bologna, Italy, Sep. 2018, pp. 1-6.

55. H. Kulhandjian, **M. Kulhandjian**, Y. Kim, and C. D'amours, "2-D DOA Estimation of Coherent Wideband Signals with Auxiliary-Vector Basis," in *Proc. IEEE Intl. Conf. on Commun. (ICC) Workshop on Advances in Network Localization and Navigation (ANLN)*, Kansas City, MO, May 2018, pp. 1-6.

56. **M. Kulhandjian** and C. D'Amours, "Design of Permutation-Based Sparse Code Multiple Access System," in *Proc. IEEE Pers., Indoor, Mobile Radio Conf. (PIMRC) 2017*, Montreal, Canada, Oct. 2017, pp. 1-6.

57. M. Li, **M. Kulhandjian**, D. A. Pados, S.N. Batalama, M. J. Medley, and J. D. Matyjas, "On the extraction of spread-spectrum hidden data in digital media," in *Proc. IEEE Int. Conf. Commun. (ICC)*, Ottawa, Canada, Jun. 2012, pp. 1031-1035.

58. **M. Kulhandjian**, and D. A. Pados, "Uniquely decodable code-division via augmented Sylvester-Hadamard matrices," in *Proc. IEEE Wireless Comm. and Networking Conf. (WCNC)*, Paris, France, Apr. 2012, pp. 359-363.

59. M. Li, **M. Kulhandjian**, D. A. Pados, S.N. Batalama, and M. J. Medley, "Passive spread-spectrum steganalysis," in *Proc. IEEE Int. Image Process. (ICIP)*, Brussels, Belgium, Sep. 2011, pp. 1957-1960.

Conference Posters

60. H. Kulhandjian, B. Sharma, and **M. Kulhandjian**, "Development of a Multi-source Energy-Harvesting Buoy for Underwater Acoustic Sensor Networking Application," in *Proc. of ACM Intl. Conf. on Underwater Networks & Systems (WUWNet)*, Atlanta, Georgia, Oct. 2019.

Manuscripts Under Review

61. E. Urban, S. Rezaeiboroujerdi, H. Aboutahoun, V. Chu, H. Saheb, H. Kulhandjian, **M. Kulhandjian**, and M. Rahaim, "An Open-Source WDMA Transmitter for SDR-Based Optical Wireless Communication Systems," submitted to *Open Source Hardware*, 9-13 Jun., 2024.

Manuscripts in Preparation

62. **M. Kulhandjian**, H. Kulhandjian, and M. Rahaim, "Design of Anti-Jamming Waveforms for UAV Communications," preparing to submit to *IEEE Trans. Wireless Communications.*

FELLOWSHIPS AND AWARDS

Honors & Awards

· Best Paper Award at WWRT 2022
−Awarded for our paper "On the Impact of CDL and TDL Augmentation for RF Fingerprinting under Impaired Channels"

· Academic Honors, Cairo, Egypt 2002 - 2005
−Awarded during my five years of education at the American University in Cairo for maintaining high GPA from Fall 2000 till Spring 2005

Scholarships, Assistantships and Fellowships

· Industrial R&D Fellowship, Ottawa, ON, Canada July 2012 - July 2014
· Graduate Research Assistantship, Buffalo, NY, USA Sept. 2008 - Dec. 2011
· Graduate Tuition Scholarship, Buffalo, NY, USA Jan. 2006 - May 2008
· Graduate Research Assistantship, Buffalo, NY, USA Sept. 2005 - Dec. 2005
· Armenian General Benevolent Union, New York, NY, USA March 2011
· Armenian Professional Society, Glendale, CA, USA March 2011
· Armenian Students' Association, Warwick, RI, USA March 2009
· Organization of Istanbul Armenians, Los Angeles, CA, USA March 2008
· Armenian Scholarship at AUC, Cairo, Egypt Sept. 2000 - May 2005
· Calouste Gulbenkian Scholarship, Lisboa, Portugal Sept. 2002 - May 2005
· Armenian General Benevolent Union, Cairo, Egypt Sept. 2000 - May 2005
· Yeghiaian Fund Armenian Scholarship, Cairo, Egypt Sept. 2000 - May 2005

Competition

· Poster Competition, Buffalo, NY, USA March 2011
−Presented "Steganalysis for Spread-Spectrum Steganography" conference paper

GRANTS AND PROJECTS

Projects

· DDSS-RAN: Developing a distributed, dynamic spectrum sensing massive MIMO RAN enhancment platform for real-time prototype , successful - Houston, TX Jan. 2022 - Present
· IDeaS: In collaboration with Prof. Burak Kantarci, BlackBerry, thinkRF, TELUS, and Wesley Clover to conduct research on developing faster, stronger, and more secure 5G-enabled capabilities for use in connected and autonomous vehicles and other applications, successful - Sep. 2022 - Mar. 2023

· ThinkRF: In collaboration with Prof. Burak Kantarci to conduct research on artificial intelligence (AI)-based transmitter fingerprinting to identify and track interference sources or malicious actors will be one of the several key technologies to meet the needs of the next generation wireless networks, successful - Ottawa, Canada Jul. 2021 - Jul. 2022
· AFRL Beyond 5G SDR Challenge: Design and implementation of an open-source multi-cell / multi-user software-define visible light communication (VLC) system, successful - Ottawa, Canada Sep. 2021 - May 2022
· AFRL Beyond 5G SDR Challenge: AI-based RF Fingerprinting Framework Design and Implementation using Software Defined Radios, successful - Ottawa, Canada Sep. 2021 - May 2022

Grants preparation

· NSERC Engage $25,000: PI Claude D'Amours, successful - Ottawa, Canada Dec. 2018 - May 2019
−*An Optimal Low-Density Spreading Code Design*
· NSF $450,000: PI Dimitris Pados, successful - Buffalo, NY, USA Sep. 2011 - Aug. 2015
−*Towards Ubiquitous Multimedia Sensing through Compressive Video Streaming*
· AFOSR $250,000: Co-PI/PD Dimitris Pados, successful - Buffalo, NY, USA Sep. 2007 - Nov. 2009
−*Blind spread-spectrum steganalysis via iterative techniques*

INVITED TALKS AND PRESENTATIONS

- **Pulse Shape Design for OTFS NOMA Communications**, Proc. Int. Conf. on Commun. (ICC), Denver, CO, 9 Jun. 2024.
- **'Bypassing a Reactive Jammer via NOMA-Based Transmissions in Critical Missions**, Proc. Int. Conf. on Commun. (ICC), Denver, CO, 12 Jun. 2024.
- **'Deep Dict: Deep Learning-based Lossy Time Series Compressor for IoT Data**, Proc. Int. Conf. on Commun. (ICC), Denver, CO, 12 Jun. 2024.
- **The impact of mobility, beam sweeping and smart jammers on security vulnerabilities of 5G cells**, Wireless World Research Forum (WWRF), Virtual, 11 Jan. 2024.
- **AWACS Radar Aircraft Trajectory Tracking via Networked Ground Receiver Stations**, Proc. Asilomar conf. on Signals, Systems, and Computers (Asilomar), Pacific Grove, CA, 29 Oct. 2023.
- **Pulse Shaping for Faster-than-Nyquist to Enable Low-Complexity Detection**, Proc. Military Commun. Conf. (MILCOM), Rockville, MD, 29 Nov. 2022.
- **Uniquely Decodable Code-Division via Augmented Sylvester-Hadamard Matrices**, Yerevan Mathematics Colloquium, 03 Dec. 2021.
- **Uniquely Decodable Ternary Codes via Augmented Sylvester-Hadamard Matrices**, Online PHY WG Meeting #2, 03 Aug. 2021.
- **Uniquely decodable ternary codes via augmented Sylvester-Hadamard matrices**, Proc. IEEE Int. Black Sea Conf. on Commun. and Networking (BlacSeaCom), 5 May 2021.
- **Low Complexity PIC-MMSE Detector for LDS Systems over Frequency-Selective Channels**, Proc. IEEE Wireless Telecomm. Symposium (WTS), 23 Apr. 2021.

- **NOMA Computation over Multi-Access Channels for Multimodal Sensing**, 2020-2021 Carleton 6G Workshops # 4 Advanced Physical Layer Technologies, Systems and Computer Engineering at Carleton University, Ottawa, Canada, 15 Apr. 2021.

- **Low Complexity PIC-MMSE Detector for LDS Systems over Frequency-Nonselective Channels**, Proc. IEEE Int. Workshop on Comp. Aided Model, and Design of Commun. Links and Networks (CAMAD), 15 Sep. 2020.

- **Low-complexity detection for faster-than-Nyquist signaling based on probabilistic data association**, 2020-2021 Carleton 6G Workshops # 1 Faster-than-Nyquist Signaling, Systems and Computer Engineering at Carleton University, Ottawa, Canada, 27 Jul. 2020.

- **Code Design for Noncoherent Detection in Satellite Communication Systems**, Proc. IEEE Int. Wireless Commun. & Mobile Comput. Conf. (IWCMC), 15 Jun. 2020.

- **An Optimal Low-Density Spreading (LDS)**, Wireless Seminar, Telecommunication & Signal Processing at Radiophysics Faculty, Yerevan State University, Yerevan, Armenia, 26 Aug. 2019

- **Fast Decoder for Overloaded Uniquely Decodable Synchronous Optical CDMA**, Proc. IEEE Wireless Comm. and Networking Conf. (WCNC) 2019, Marakech, Morocco, 17 Apr. 2019.

- **Uniquely Decodable Ternary Codes for Synchronous CDMA Systems**, SCE Wireless Seminar, Systems and Computer Engineering at Carleton University, 6G-PHY-FEST Workshop, Carleton wireless workshop series, Ottawa, Canada, 18 Dec. 2018.

- **Zonotope Vertex Enumeration**, Seminar, School of Electrical Engineering and Computer Science (EECS), Research Seminar, University of Ottawa, Ottawa, Canada, 14 Dec. 2018.

- **Uniquely Decodable Ternary Codes for Synchronous CDMA Systems**, Seminar, School of Electrical Engineering and Computer Science (EECS), Research Seminar, University of Ottawa, Ottawa, Canada, 15 Nov. 2018.

- **Uniquely Decodable Ternary Codes for Synchronous CDMA systems**, Proc. IEEE Pers., Indoor, Mobile Radio Conf. (PIMRC) 2018, Bologna, Italy, 10 Sep. 2018.

- **Low-complexity Decoder for Overloaded Uniquely Decodable Synchronous CDMA**, Seminar, Department of Computer and Electrical Engineering and Computer Science, Research Seminar, Florida Atlantic University, Roca Raton, Florida, USA, 15 Mar. 2018.

- **Design of Permutation-Based Sparse Code Multiple Access System**, Proc. IEEE Pers., Indoor, Mobile Radio Conf. (PIMRC) 2017, Montreal, Canada, 10 Oct. 2017.

- **Design of Permutation-Based Sparse Code Multiple Access System**, SCE Wireless Seminar, Systems and Computer Engineering at Carleton University, Ottawa, Canada, 28 Sep. 2017.

- **Passive Spread-Spectrum Steganalysis**, SCE Wireless Seminar, Systems and Computer Engineering at Carleton University, Ottawa, Canada, Nov. 5, 2015.

- **Uniquely Decodable Code-Division and Low-Complexity Receivers for Advanced Signal Design, Multiplexing, and Multiple-Access Communications**, SCE Wireless Seminar, Systems and Computer Engineering at Carleton University, Ottawa, Canada, 18 Aug. 2015.

ORGANIZED WORKSHOPS AND SEMINARS

- **Non-orthogonal multiple access schemes**, 5G and Beyond Seminars, American University of Armenia (AUA), 5G and Beyond Workshop, Yerevan, Armenia, 29 Aug., 2019

- **Non-orthogonal multiple access schemes**, 5G and Beyond Seminars, Institute for Informatics and Automation Problems, Armenian National Academy of Sciences, 5G and Beyond Workshop, Yerevan, Armenia, 27 Aug., 2019

UNIVERSITY AND COMMUNITY SERVICE

Invited Speaker – The Kanata Lakes Community Association (KLCA) 29 Feb. 2020

- Career counseling session for high-school students going to IT industry Link.

Volunteer – Ararat Armenian School 26 May 2019

- Giving a presentation on "History of Telecommunications" to high-school students.

Volunteer – Ararat Armenian School Jan. 2019 – May 2019

- Teaching chess for children from six to fifteen year olds students.

EMPLOYMENT HISTORY

Research Associate – Rice University Jan. 2022 – Present
Researcher – Smart Connected Vehicles Innovation Centre Jan. 2020 – Mar. 2023
Algorithm Developer – Ericcson Jan. 2022 – Aug. 2022
Senior Embedded Software Engineer – L3Harris Technologies Oct. 2016 – Jan. 2022
Research Scientist – University of Ottawa Sept. 2016 – Jan. 2022
Visiting Professor – University of Ottawa May 2020 – July 2020
Adjunct Professor – Carleton University Jan. 2019 – Apr. 2019
Visiting Professor – University of Ottawa May 2017 – July 2017
Adjunct Professor – Carleton University Sept. 2016 – Dec. 2016
Patent Researcher / Associate – Global Prior Art, Inc. May 2015 – Sept. 2016
Adjunct Professor – Carleton University May 2015 – June 2015
Embedded Software Developer – Fortinet Mar. 2015 – April 2015
Industrial R&D Fellow – NSERC-OCE July 2012 – July 2014
Software Engineer – Eion Wireless Inc. July 2012 – Feb. 2015
Software Engineer - R&D – Alcatel Lucent Jan. 2012 – June 2012
Embedded Software Engineer – Curbell Medical Feb. 2011 – Dec. 2011
Embedded Software Engineer – Curbell Medical June 2010 – Aug. 2010
Research Assistant – State University at New York at Buffalo Sept. 2008 – Dec. 2011
Teaching Assistant – State University at New York at Buffalo Jan. 2006 – May 2008
Research Assistant – State University at New York at Buffalo Sept. 2005 – Dec. 2005
Teaching Assistant – The American University in Cairo Sept. 2004 – May 2005

TEACHING EXPERIENCE

Visiting Professor – Russian-Armenian University Sep. 2021 – Jan. 2022
Department of Telecommunication - Yerevan, Armenia

· Teaching *Wireless Communication Systems* course for graduate students.
· Preparing class lectures, assignments, midterms and finals for about thirty students.

Visiting Professor – University of Ottawa May 2021 – July 2021
School of Electrical Engineering and Computer Science - Ottawa, ON, Canada

· Taught ELG 5385 *Matrix Methods and Algorithms for Signal Processing* course for graduate students.
· Prepared class lectures, assignments, midterms and finals for about fifteen students.

Visiting Professor – University of Ottawa May 2020 – July 2020
School of Electrical Engineering and Computer Science - Ottawa, ON, Canada

· Taught ELG 5385 *Matrix Methods and Algorithms for Signal Processing* course for graduate students.
· Prepared class lectures, assignments, midterms and finals for about fifteen students.

Adjunct Professor – Carleton University Jan. 2019 – Apr. 2019
Department of Systems and Computer Engineering - Ottawa, ON, Canada

· Teaching SYSC 4700 *Telecommunications engineering* course for undergraduate students.
· Preparing class lectures, assignments, midterms and finals for about sixty five students.
· Assisting in the program accreditation preparation.

Visiting Professor – University of Ottawa May 2018 – July 2018
School of Electrical Engineering and Computer Science - Ottawa, ON, Canada

· Taught ELG 5385 *Matrix Methods and Algorithms for Signal Processing* course for graduate students.
· Prepared class lectures, assignments, midterms and finals for about fifteen students.

Adjunct Professor – Carleton University Sept. 2016 – Dec. 2016
Department of Systems and Computer Engineering - Ottawa, ON, Canada

· Taught SYSC 5606 *Introduction to Mobile Communications* course for graduate students.
· Prepared class lectures, assignments, midterms and finals for about thirty students.

Adjunct Professor – Carleton University May 2015 – June 2015
Department of Systems and Computer Engineering - Ottawa, ON, Canada

· Taught SYSC 5606 *Introduction to Mobile Communications* course for graduate students.
· Prepared class lectures, assignments, midterms and finals for about thirty students.

Teaching Assistant – State University of New York at Buffalo Jan. 2006 – May 2008
Department of Electrical Engineering - Buffalo, NY, USA

· Assisted in teaching undergraduate and graduate level courses:
· EE484 Communications Systems II (undergraduate course) (Spring 2008)
· EE634 Information Theory (graduate course) (Spring 2008)
· EE550 Wireless Multimedia Sensor Networks (graduate course) (Spring 2008)
· EE631 Detection and Estimation Theory (graduate course) (Fall 2007)
· EE483 Communications Systems I (undergraduate course) (Fall 2007)
· EE531 Probability & Stochastic Processes (graduate course) (Fall 2006)
· AES200 Electrical Engineering Concepts/Non-Majors (undergraduate course) (Spring 2006, 2007)

Teaching Assistant – The American University in Cairo Sept. 2004 – May 2005
Department of Physics - Cairo, Egypt

- Assisted in teaching of Physics Optics-Laboratory
- Experimented single/multi mode fiber and wavelength division multiplexing concept in the lab.
- Graded the class reports and exams and provided student with lab instructions.

RESEARCH EXPERIENCE

Research Associate – Rice University Jan. 2022 – Present
Electrical and Computer Engineering - Houston, TX, USA

- Developed a prototype for radar coexistence with 5G for an integrated sensing and communication (ISAC) system.
- Key contributor in developing radar detection and parameter estimation algorithms. Conducted multiple studies and simulations on estimator performance, adapting the algorithms for real-world dynamic environments.
- Optimized the detection and estimation algorithms to meet the project's key performance indicators (KPIs).
- Developed algorithms for the passive tracking of AWACS airborne planes.
- Responsible for developing advanced and high-performance software tools for real-time massive MIMO systems for Electrical and Computer Engineering (ECE) wireless projects, particularly the RENEW project.

Researcher Jan. 2020 – Mar. 2023
Smart Connected Vehicles Innovation Centre - Ottawa, ON, Canada

- Conducted multiple jammer localization techniques, including time difference of arrival (TDOA), angle of arrival (AOA), and received signal strength indicator (RSSI) approaches.
- Developed a higher-order statistical-based 2D MUSIC algorithm for unsupervised jammer detection in 5G environments. This approach enabled blind localization of jammers.
- Developed an unsupervised jamming detection algorithm using adversarial auto-encoders (AAE).
- Developed a novel deep learning-based approach for RF fingerprinting. Using collected data samples from 4G, 5G, and WiFi transmitters, demonstrated improved learning performance of the deep learning model.

Research Scientist – University of Ottawa Sept. 2016 – Jan. 2022
School of Electrical Engineering and Computer Science - Ottawa, ON, Canada

- Working on the design of spreading permutation based space-time block code matrices for MIMO-OFDM in collaboration with Prof. Claude D'amour.

Industrial R&D Fellow July 2012 – July 2014
NSERC-OCE - Ottawa, ON, Canada

- Studies and categorized the field failure data for various subsystems.
- Modeled the ultra rugged wireless network with Quality of Service (QoS).
- Designed and developed a tool based on the model that would help design ultra rugged products.

Research Assistant – State University of New York at Buffalo Sept. 2008 – Dec. 2011
Communications and Signals Laboratory - Buffalo, NY, USA

- Developed spread-spectrum steganography and blind steganalysis algorithms.
- Designed uniquely decodable overloading CDMA code sequences.
- Developed a soft decoding algorithm for Reed-Solomon codes of Gilbert-Elliott channels.

Research Assistant – State University of New York at Buffalo Sept. 2005 – Dec. 2005
Communications and Signals Laboratory - Buffalo, NY, USA

· Developed a digital audio fingerprinting algorithm for digital recording system identification from digital audio files alone, for forensic purposes.

PROFESSIONAL ACTIVITIES AND SERVICE

Leadership Positions

Apr. 2020 – Present

- Review Editor, Frontiers - Editorial board of Wireless Communications, a section within Frontiers in Communications and Networks and Frontiers in Antennas and Propagation, Aug. 2023 - Present
- Associate Editor in Area 2, Annals of Telecommunications - Editorial board of Annals of Telecommunications, Jun. 2023 - Present
- Guest Editor, Journal of Sensor and Actuator Networks (JSAN) - Special Section Journal on Advances in Intelligent Transportation Systems (ITS), Sep. 2021 - May. 2022
- Guest Editor, The Seventeenth International Conference on Wireless and Mobile Communications (IARIA-ICWMC) - Special track on NOMA: Non-Orthogonal Multiple Access for Future Generation Wireless Communications, May 2021 - Aug. 2021
- Guest Editor, Journal of Sensor and Actuator Networks (JSAN) - Special Section Journal on Underwater Communications and Sensor Networks, Apr. 2020 - Nov. 2020

Technical Program Committee (TPC) Session Chair

Sept. 2016 – Present

- IEEE Wireless Communications and Networking Conference (WCNC) 2019
- IEEE Personal, Indoor and Mobile Radio Communications (PIMRC) 2017
- IEEE Vehicular Technology Conference (VTC-Spring) 2016

TPC Member

Jan. 2012 – Present

- IEEE Global Communications Conference (GLOBECOM)
- IEEE International Conference on Communications (ICC)
- IEEE Vehicular Technology Conference (VTC)
- IEEE Wireless and Mobile Computing, Networking and Communications (WiMob)

Referee Service

May 2011 – Present

Journals and Magazines

- *IEEE Transactions on Information Theory*
- *IEEE Transactions on Communications*
- *IEEE Transactions on Image Processing*
- *ELSEVIER Transactions on Journal of Information Security and Applications*
- *SPRINGER Anals of Telecommunications*
- *MDPI Sensors*
- *Transactions Institute of Electronics, Information and Communication Engineers (IEICE)*
- *Hindawi Journal of Sensors*

Conference Proceedings

- **IEEE:** GLOBECOM, ICC, WCNC, ISIT, PIMRC, VTC, WTS

MEMBERSHIPS

Member of Professional Associations

- Association for Computing Machinery (ACM)
- Institute of Electrical and Electronics Engineers (IEEE) - **Senior Member** - 6 Oct. 2020
  - IEEE Communications Society

- IEEE Signal Processing Society

CERTIFICATIONS AND LICENSURE

Certificates

- Algorithms: Design and Analysis, Part 1 - Coursera — Oct. 13, 2014 - Dec. 6, 2014
- Algorithms, Part II - Coursera — Oct. 31, 2014 - Dec. 18, 2014

PROFESSIONAL EXPERIENCE

Algorithm Developer — Jan. 2022 – Aug. 2022
Ericsson - Ottawa, ON, Canada

· Designed and developed digital pre-distortion (DPD) algorithms.
· Investigated the effects of TOR and analog-to-digital converter (ADC) on the DPD algorithm. Modeled IQ impairments and compensators for the transmission chain.
· Developed interface and equalizer filters based on the amplitude response of the downlink (DL) and TOR interface.
· Implemented various advanced optimizers (e.g., SGD, ADAM-A, AdaGradDecay, AdaGrad, AMSgrad, Nadam, RMSprop) to achieve optimal performance of the 1D 3-stage back-propagation DPD algorithm.
· Conducted quantization analysis of fractional delay IQ compensator. Examined the quantization effects on the FDIQ compensator coefficients for the DPD algorithm.

Senior Embedded Software Engineer — Oct. 2016 – Jan. 2022
L3Harris Technologies - Gatineau, QC, Canada

· Developed Software Design Document (SwDD) for a new features for Air-to-Ground communication using Enterprise Architect (EA).
· Implementation and testing the feature. Creating a Unit test using VectorCast.
· Features involve in working with GUI environment and DSP using C.
· SIP protocol stack modifications using C++.
· Designing, developing software platform that complies with high availability requirements, critical real-time constraints for Air Traffic Control systems using C and C++.
· Integrating and upgrading the Air-to-Ground, Ground-to-Ground legacy system to IP-based ATM voice communication systems (e.g. VOIP, SIP protocols) closely complying with ED-136/137/138 standards.

Patent Researcher / Associate — May 2015 – Sept. 2016
Global Prior Art, Inc - Ottawa, ON, Canada

· Worked on prior art patent searching, licensing, invalidating, patent analysis in the field of telecom, cellular communications, CDMA, MIMO, OFDM, 802.11 and adaptive signal processing.

Embedded Software Developer — Mar. 2015 – Apr. 2015
Fortinet - Ottawa, ON, Canada

· Collected and documented user's requirements and developed logical and physical specifications.
· Researched, evaluated and synthesized technical information, then designed, developed and tested embedded SNMP, custom MIBs to communicate to SOAP protocol for FortiVoice which runs on Session Initiation Protocol (SIP), unified threat management (UTM) products using C++.
· Planned, designed and coordinated the development, installation, integration and operation of new product.
· Assessed, tested, troubleshot, documented, upgraded and developed maintenance procedures for real-time operating systems, communications environments and applications software involved in the project.
· Implemented continuous integration for development platform using Jenkins.
· Created firmware development documentation on FortinetWiki.

Software Engineer / Embedded Software Engineer July 2012 – Feb. 2015
EION Wireless, Inc - Ottawa, ON, Canada

- Collected and documented user's requirements and developed logical and physical specifications.
- Researched, evaluated and synthesized technical information, then designed, developed and tested dual-band 2.4/5GHz IEEE 802.11n WiFi Access Point firmware using OpenWRT/LuCI.
- Developed paid WiFi Service using WPA2-Enterprise PEAP-MSCHAPv2 with OpenSSL certificates.
- Added RADIUS extension for custom QoS features in multi-threaded environment using C.
- Developed embedded SNMP, custom MIBs. Written using custom C library.
- Designed and optimized makefiles for SNMP agent to run on controller uisng C.
- Network design of IPSec VPN for network management of remote installations using javascript/C/C++.
- Optimized a very slow MySQL lookup for authentication using efficient queries by analyzing executing plan which improved latency & cpu usage by four times using Perl/C.
- Modeled and validated proposed increased coverage on the level of IEEE 802.11 RTS/CTS messages.
- Researched on Automatic channel Allocation (Auto RF) algorithms for IEEE 802.11 standards.
- Designed end-to-end WiFi hotspot solutions with captive portal for configuration management integrating OpenWRT, CoovaChilli and FreeRADIUS using Lua/C.
- Designed and documented WiFi hotspot feature based acceptance test plans.
- Built automated manufacturing using Expect script.

Software Engineer - R&D Jan. 2012 – Jul. 2012
Alcatel-Lucent - Ottawa, ON, Canada

- Prototyped LTE eNodeB software architecture for next-generation cloud-based wireless networks using C/C++.
- Analyzed messages between LTE eNodeB Call Processing (CallP), operations, administration, and maintenance (OAM) with IPConn and WinPath2 in an Agile environment.

Embedded Software Engineer / Systems Engineer Feb. 2011 – Dec. 2011
Curbell Medical - Orchard Park, NY, USA

- Implemented digital Pillow Speaker with UI touch screen technology using Microchip PIC 32 GUI Development Kit.
- Implemented a digital Pillow Speaker with UI touch screen technology using the Microchip PIC32 GUI Development Kit in C.
- Developed a prototype with a digital design featuring serial connections and real-time audio entertainment (RTOS) using C.
- Proposed an end-to-end communication control protocol based on the Controller Area Network (CAN) communication bus using C/C++.

Embedded Software Engineer / Systems Engineer June 2010 – Aug. 2010
Curbell Medical - Orchard Park, NY, USA

- Converted an analog design with parallel connections into a complete digital design with serial connections (CAN, FlexRay, I2C, and LIN), including audio entertainment, using C/C++.

TECHNICAL SKILLS

Programming	C/C++, Python, JAVA, Javascript, Perl, AWK, Tcl/OTcl, PHP, XML
Machine Learning	TensorFlow, Keras, PyTorch, Scikit-learn
Operating Systems	Linux, Microsoft Windows, Unix/Solaris, FreeRTOS, OpenWRT, OS X
Networking	IEEE 802.11 (a,b,g,n,ac), IPsec VPN, TCP/IP
Servers & Environments	Apache, Nginx, Node.js, CakePHP, Drupal
Databases & Protocols	MySQL, FreeRADIUS, CAN, SNMP, SIP, SOAP, HTTP, RTP
Numerical Analysis	Matlab, Mathematica, Maple, IGOR Pro
Virtualization	Virtual Box, VmWare Player
Simulators	NS-2/3, OPNET, NI Multisim, SPICE, PSpice
Tools	Software Defined Radios (SDR), Gnu-Radio, JIRA, SVN, Eclipse, Vim, Cacti, I

LANGUAGE SKILLS

- English (Full professional proficiency)
- Armenian (Native or bilingual proficiency)
- Russian (Professional working proficiency)
- Arabic (Limited working proficiency)

CITIZENSHIP

- Canadian citizen