

CURRICULUM VITAE

Marwan Hadri Azmi

Wireless Communication Centre (WCC)
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EMPLOYMENTS

- **Deputy Director of Research and Innovation, Wireless Communication Center, Higher Institution Centres of Excellence, Universiti Teknologi Malaysia, Malaysia.** (July 2019-Present)
- **Senior Lecturer, Faculty of Electrical Engineering, Universiti Teknologi Malaysia, Malaysia.** (July 2012-Present)
- **Lecturer, Faculty of Electrical Engineering, Universiti Teknologi Malaysia, Malaysia.** (Nov. 2005-June 2012)

EDUCATIONAL BACKGROUNDS

- **McGill University, Canada** (Nov. 2012 – Oct. 2014)
Postdoctoral research (Mentor: Professor Harry Leib)
- **University of New South Wales (UNSW), Sydney, Australia.** (Mar. 2007-Feb. 2012)
Ph.D. in Electrical Engineering (Advisor: Professor Jinhong Yuan)
- **Imperial College of Science, Technology and Medicine, London, UK.** (Sept. 2004-Oct. 2005)
Master of Science in Communication and Signal Processing
- **Universiti Teknologi Malaysia (UTM), Malaysia.** (Jan. 1999-Oct. 2002)
Bachelor of Engineering - Electrical and Telecommunications
Final CPA: 3.82/4.0 (Best student in the University)

RESEARCH INTERESTS

- **CODING** - Channel coding with side information. Coding for cooperative communications. Multi-rate/Rateless codes. Generalizing and extending the notion of parity in channel codes. General techniques for mapping information theoretic random coding schemes to random-graph codes, Joint channel and network coding.
- **LDPC CODES** - Multi-edge type LDPC codes, practical ways of approaching capacity, iterative decoding and problematic vertex configuration.
- **RELAY SYSTEMS** – Soft information relaying. Resource allocation and detection problems of the relay communication protocols.

- **WIRELESS TECHNOLOGIES** – 5G, LTE, WCDMA, OFDMA and MIMO Systems.
- **COGNITIVE RADIO** – Spectrum sensing.
- **PROPAGATION STUDIES** – Millimetre wave channel characterizations.
- **MULTIPLE ACCESS SCHEMES** – Uncoordinated random access for massive machine-type communication, Slotted ALOHA.

AWARDS, SCHOLARSHIPS, FELLOWSHIPS

- H2020-MSCA-RISE ATOM Project Secondment to University of York (June-August 2019)
- Best Paper Award (Track: Communication) - International Conference on Electrical, Electronic, Communication and Control Engineering (2018)
- IEEE ComSoc/VTS Malaysia Chapter Awards - Best Paper Award (2015)
- Postdoctoral Fellowship - RIM Inc. (Blackberry)-NSERC-McGill (2012-2014)
- Australian Research Council Communications Research Network (ACoRN) Domestic Travel Scholarship (2010)
- UNSW Faculty of Engineering – Electrical Engineering Funded Top-Up Award (2008)
- Ministry of Higher Education Malaysia PhD Scholarship (2007)
- UTM Scholarship – Master Program (2005)
- IEM (Institute of Engineer’s Malaysia) Gold Medal Award (2003)
- Chancellor (Best student) award during the UTM convocation (2003)

TEACHINGS

Universiti Teknologi Malaysia

- MKET 1423 – Wireless Communication System (Master Program – Semester 2019/20 -2)
- MKET 1413 – Advanced Digital Communications (Master Program – Semester 2019/20 -1)
- SKEE 1223 – Digital Electronics (Degree Program - Semester: 2011/12-2, 2018/19-2)
- SKEU 2003 – Electrical Technology (Degree Program - Semester: 2018/19-1)
- MKET 1453 - Special Topics in Telecommunication Engineering (Master Program – Semester 2017/18 -2)
- MKET 1313 - Communications & Computer Networks (Master Program – Semester 2017/18 -1, 2019/20-2)
- MKET 1333 – Optical Communication (Master Program – Semester 2015/16 -2)
- MKET 1323 – Broadband Multimedia Networks (Master Program – Semester 2015/16 -1)
- SEU 1003 – Basic of Electrical Engineering (Degree Program - Semester: 2006/07-1)
- SKEE 2253 – Electronic Circuit (Degree Program - Semester: 2005/06-2)
- SKEE 3253 – Electronic II (Degree Program - Semester: 2005/06-2)
- Undergraduate Laboratories
 SKEL4722 – Capstone Lab
 SEE 2742 – Basic Electronic Lab

SEE 2722 - Electrotechnic Lab
SEE 3722 & SEE 3712 – Basic Communication Lab
SEE 4712 & SET 4712 – Digital Communication Lab
SEL 4712 – Microprocessor Lab
SEE 4712 – Microwave Lab
SEW 3742 – Digit Communication Lab

Professional Short Courses

- Online Course on “5th Generation (5G) New Radio User Equipment Conformance ” to SIRIM QAS Sdn Bhd (2020)
- ITU-COE Training – Fifth Generation (5G) Radio Access Network Planning and Technology Coexistence (2020)
- Advanced Spectrum Frequency Management Course to Malaysian Armed Forces (2020)
- ITU-COE Training - 5G technology, opportunities and challenges. (2019)
- 5G Short Course for RHB Bank (2020)
- Microwave Communication (2015) - Short course to Politeknik Malaysia.
- Digital broadcasting technology (2012) - WCC-SKMM short courses

SUPERVISIONS

- **PhD**
 1. Ahmed Mohamed Al-Saman – Co-Supervisor (graduated 2017)
 2. Nor Raihan Binti Zulkefly – Co-Supervisor (graduated 2018)
 3. Abdallah M.S. Mataria – Co-Supervisor
 4. Ooi Sock Theng – Main Supervisor
 5. Akram Bin Muhammad Razei – Co Supervisor

RESEARCH GRANTS (Principle Investigator)

- Channel prediction for 5G communications, UTM Potential Academic Staff (PAS) Grant, Nov.2015-Oct. 2016, RM20,000.
- Physical layer techniques for cooperative spectrum sensing schemes in 5G wireless communication systems, HICOE-WCC research grant, June 2016 – Feb. 2019, RM119,910.
- Measurement and analysis of rain attenuation in E-Band 5G wireless backhaul link, UTM Tier 1 GUP Grant, July 2017-June 2019, RM40,000.
- Random multiple access scheme using graph-based for 5G, UTM-Flagship Grant, November 2017 – October 2019, RM50,000.
- Microwave Radio Backhaul for 5G M2M Application in Malaysia, HICOE-WCC research grant, September 2019 – March 2020, RM85,000.
- Non-Orthogonal Multiple Access for 5G massive machine-type communication IoT systems, FRGS grant, September 2019 – November 2021, RM69,200.

PUBLICATIONS (Scopus H Index = 9, Web of Science H Index = 8)

Journal (Article) papers:

1. I. Shayea, M. Ergen, M. H. Azmi, D. Nandi, A. A. El-Salah and A. Zahedi, "Performance Analysis of Mobile Broadband Networks With 5G Trends and Beyond: Rural Areas Scope in Malaysia," in *IEEE Access*, vol. 8, pp. 65211-65229, 2020. **(Q1 indexed journal)**
2. A. M. Al-Saman, M. Cheffena, M. Mohamed, M. H. Azmi and Y. Ai, "Statistical Analysis of Rain at Millimeter Waves in Tropical Area," in *IEEE Access*, vol. 8, pp. 51044-51061, 2020. **(Q1 indexed journal)**
3. I. Shayea, M. Ergen, M. Hadri Azmi, S. Aldirmaz Çolak, R. Nordin and Y. I. Daradkeh, "Key Challenges, Drivers and Solutions for Mobility Management in 5G Networks: A Survey," in *IEEE Access*, vol. 8, pp. 172534-172552, 2020. **(Q1 indexed journal)**
4. A. M. Al-Samman, M. Mohamed, Y. Ai, M. Cheffena, M. H. Azmi and T. A. Rahman, "Rain Attenuation Measurements and Analysis at 73 GHz E-Band Link in Tropical Region," in *IEEE Communications Letters*, vol. 24, no. 7, pp. 1368-1372, July 2020 **(Q2 indexed journal)**
5. Al-Samman, A.M.; Azmi, M.H.; Al-Gumaei, Y.A.; Al-Hadhrami, T.; Abd. Rahman, T.; Fazea, Y.; Al-Mqdashi, A. Millimeter Wave Propagation Measurements and Characteristics for 5G System. *Appl. Sci.*, 10, 335, 2020. **(Q2 indexed journal)**
6. Al-Saman, A.; Mohamed, M.; Cheffena, M.; H. Azmi, M.; A. Rahman, T. Performance of Full-Duplex Wireless Back-Haul Link under Rain Effects Using E-Band 73 GHz and 83 GHz in Tropical Area. *Appl. Sci.*, 10, 6138, 2020. **(Q2 indexed journal)**
7. I. Shayea, M. H. Azmi, T. A. Rahman, M. Ergen, C. T. Han, A. Arsad "Analysis of Technology Trends, Future Needs and Demands for Mobile Broadband Spectrum in Malaysia", *IEEE Access (Accepted-Early Access IEEEExplore Version)*, 2019. **(Q1 indexed journal)**
8. Al-Samman, A.M., Rahman, T.A., Al-Hadhrami, T., Daho, A., Hindia, M.N, Azmi, M.H., Dimiyati, K., Alazab, M., "Comparative study of indoor propagation model below and above 6 GHz for 5G wireless networks", *Electronics (Switzerland)*, 8(1),44, 2019. **(Q2 indexed journal)**
9. Shayea, I., Abd. Rahman, T., Azmi, M.H., Tien Han, C., Arsad, A., "Predicting required licensed spectrum for the future considering big data growth", *ETRI Journal*, 2019.
10. M. H. Azmi and H. Leib, "Multi-Channel Cooperative Spectrum Sensing that Integrates Channel Decoding with Fusion Based Decision," *IEEE Transactions on Aerospace and Electronic Systems*, Feb. 2018. **(Q1 indexed journal)**
11. I. Shayea, T. A. Rahman, M. H. Azmi, M. R. Islam, "Real Measurement Study for Rain Rate and Rain Attenuation Conducted Over 26 GHz Microwave 5G Link System in Malaysia", *IEEE Access*, 6, pp. 19044-19064, 2018. **(Q1 indexed journal)**
12. M. I. Mohd Ismail, R. A. Dziyauddin, N. A. Mohd Salleh, R. Ahmad, M. Hadri Azmi and H. Mad Kaidi, "Analysis and Procedures for Water Pipeline Leakage Using Three-Axis Accelerometer Sensors: ADXL335 and MMA7361," *IEEE Access*, vol. 6, pp. 71249-71261, 2018. **(Q1 indexed journal)**
13. Al-Samman, A.M., Rahman, T.A., Azmi, M.H., Al-Gailani, S.A., "Millimeter-wave propagation measurements and models at 28 GHz and 38 GHz in a dining room for 5G wireless networks",

Measurement: Journal of the International Measurement Confederation, Vol. 130, pp. 71-81, 2018. **(Q2 indexed journal)**

14. A.M. Al-samman, M. H. Azmi , T. A. Rahman,, "Time-varying ultra-wideband channel modeling and prediction", Symmetry, 10(11),631, 2018. **(Q2 indexed journal)**
15. A.M. Al-samman, T. A. Rahman, M. H. Azmi, "Indoor Corridor Wideband Radio Propagation Measurements and Channel Models for 5G Millimeter Wave Wireless Communications at 19 GHz, 28 GHz, and 38 GHz Bands", Wireless Communications and Mobile Computing, 2018.
16. Razee, A.M., Dziauddin, R.A., Azmi, M.H., Sadon, S.K., "Performance analysis of IIR and FIR filters for 5G wireless networks", International Journal of Integrated Engineering, 10(7), pp. 273-282, 2018.
17. Shaya, I., Abd. Rahman, T., Azmi, M. H., Arsad, A., "Rain attenuation of millimetre wave above 10 GHz for terrestrial links in tropical regions", Transactions on Emerging Telecommunications Technologies, 29(8),e3450, 2018.
18. A. M. Al-Samman, T. A. Rahman, M. H. Azmi, I. Khan, and C. T. Han, "Experimental UWB Indoor Channel Characterization in Stationary and Mobility Scheme," Measurement: Journal of the International Measurement Confederation, Vol. 111, pp. 333-339, Dec. 2017. **(Q2 indexed journal)**
19. A. M. Al-Samman, M. H. Azmi, T. A. Rahman, I. Khan, M. N. Hindia, and A. Fattouh, "Window-Based Channel Impulse Response Prediction for Time-Varying Ultra-Wideband Channels," PLOS ONE, Dec. 2016. **(Q1 indexed journal)**
20. A. M. Al-Samman, T. A. Rahman, M. H. Azmi, M. N. Hindia, I. Khan, and E. Hanafi, "Statistical Modeling and Characterization of Experimental mm-Wave Indoor Channels for Future 5G Wireless Communication Networks," PLOS ONE, vol. 11, no. 9, Sept. 2016. **(Q1 indexed journal)**
21. A. M. Al-Samman, T. A. Rahman, M. H. Azmi, and M. N. Hindia, "Large-Scale Path Loss Models and Time Dispersion in an Outdoor Line-of-Sight Environment for 5G Wireless Communications," AEU-International Journal of Electronics and Communications, vol. 70, issue 11, Nov. 2016. **(Q2 indexed journal)**
22. M. H. Azmi and H. Leib, "Coded Collaborative Spectrum Sensing with Joint Channel Decoding and Decision Fusion," IEEE Transactions on Wireless Communications, vol. 14, no. 4, pp. 2017-2031, April 2015. **(Q1 indexed journal)**
23. M. H. Azmi, J. Li, J. Yuan and R. Malaney, "LDPC codes for Soft Decode-and-Forward in Half-Duplex Relay Channels," IEEE Journal on Sel. Areas in Communications, vol. 31, no. 8, pp. 1402-1413, 2013. **(Q1 indexed journal)**
24. M. H. Azmi, J. Yuan, G. Lechner and L. K. Rasmussen, " Design of multi-edge type bilayer-expurgated LDPC codes for decode-and-forward in relay channels," IEEE Trans. on Communications, vol. 59, no. 11, pp. 2993 - 3006, 2011. **(Q1 indexed journal)**
25. J. Li, J. Yuan, R. Malaney, M. H. Azmi and M. Xiao, "Network Coded LDPC Code Design for a Multi-Source Relaying System," IEEE Transactions on Wireless Communications, vol. 10, no. 5, pp. 1538-1551, May 2011. **(Q1 indexed journal)**

Conference papers:

1. Al-Samman, A.M., Azmi, M.H., Rahman, T.A., "A survey of millimeter wave (mm-wave) communications for 5G: Channel measurement below and above 6 GHz", *Advances in Intelligent Systems and Computing*, 843, pp. 451-463, 2019.
2. M. Al-Samman, T. A. Rahman, M. H. Azmi, A. Sharaf, Y. Yamada and A. Alhammadi, "Path loss model in indoor environment at 40 GHz for 5G wireless network," 2018 IEEE 14th International Colloquium on Signal Processing & Its Applications (CSPA), Batu Feringghi, 2018, pp. 7-12.
3. Lah, A.A.A., Dziyauddin, R.A., Azmi, M.H., "Proposed Framework for Network Lateral Movement Detection Based on User Risk Scoring in SIEM", 2018 2nd International Conference on Telematics and Future Generation Networks, TAFGEN 2018, 8580484, pp. 149-154, 2018.
4. Razeq, A.M., Dziyauddin, R.A., Azmi, M.H., Sadon, S.K., "Comparative Performance Analysis of IIR and FIR Filters for 5G Networks", 2018 2nd International Conference on Telematics and Future Generation Networks, TAFGEN 2018, 8580470, pp. 143-148, 2018.
5. I. Shayea, T. A. Rahman, M. H. Azmi, C. T. Han and A. Arsad, "Indoor network signal coverage of mobile telecommunication networks in West Malaysia: Selangor and Johor Bahru," 2017 IEEE 13th Malaysia International Conference on Communications (MICC), Johor Bahru, 2017, pp. 288-293.
6. A. M. Al-Samman, T. A. Rahman, M. N. Hindia, M. H. Azmi, K. Dimiyati and K. A. Nordin, "Path Loss Model in Outdoor Environment at 32 GHz for 5G System," *IEEE Int. Symp. On Telecommun. Tech. (ISTT)*, Nov. 2016.
7. A. M. Al-Samman, T. A. Rahman, M. H. Azmi, N. R. Zulkefly, and A. M. S. Mataria, "Path Loss Model for Outdoor Environment at 17 GHz mm-Wave Band," *IEEE Int. Colloquium on Sig. Process. And its App. (CSPA)*, pp. 1-5, 2016.
8. N. R. Zulkefly, T. A. Rahman, C. T. Han, M. H. Azmi, C. Y. Leow, A. M. Al-Samman, and A. M. S. Mataria, "Channel Characterization for Indoor Environment at 17 GHz for 5G Communications," *IEEE Malaysia International Conference on Communications (MICC)*, Pages 241-245, Nov. 2015.
9. Marwan H. Azmi, Jun Li, Jinhong Yuan, and Robert Malaney, "Optimization for Pragmatic Half-Duplex Relay Network," *IEEE Global Communications (GlobeCom)*, 2011.
10. Marwan H. Azmi, Jun Li, Jinhong Yuan, and Robert Malaney, "Design of distributed multi-edge type LDPC codes for multiple access relay channels," *Australian Communications Theory Workshop (AusCTW)*, 2011.
11. Marwan H. Azmi, Jun Li, Jinhong Yuan, and Robert Malaney, "Soft Decode-and-Forward using LDPC coding in Half-Duplex Relay Channels", in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, 2011.
12. Marwan H. Azmi, Jun Li, Jinhong Yuan, and Robert Malaney, "Design of Distributed Multi-Edge Type LDPC Codes for Two-Way Relay Channels", *IEEE ICC 2011*.
13. J. Li, M. H. Azmi, J. Yuan, and R. Malaney, "Novel LDPC code structures for the nonergodic block-fading channels" in *Proceedings of the 6th Int. Symposium on turbo codes and iterative processing*, France, Sept. 2010.
14. J. Li, M. H. Azmi, J. Yuan, and R. Malaney, "Design of network-coding based multi-edge type LDPC codes for a multi-source relaying system" in *Proceedings of the 6th Int. Symposium on turbo codes and iterative processing*, France, Sept. 2010.

15. D. Duyck, M. H. Azmi, J. Yuan, M. Moeneclaey and J. Boutros, "Universal LDPC codes for Cooperative Communications", in Proceedings of the 6th Int. Symposium on turbo codes and iterative processing, France, Sept. 2010.
16. M. H. Azmi, and Jinhong Yuan, "Performance of bilayer-lengthened LDPC codes under joint decoding", in Proc. IEEE Information Theory Workshop, ITW 2008, Oct. 2009.
17. M. H. Azmi, and Jinhong Yuan, "Design of multi-edge type bilayer-expurgated LDPC codes", in Proc. IEEE Int. Symp. Inf. Theory (ISIT), July 2009.
18. M.H. Azmi, Jinhong Yuan, Jun Ning, and H. Q. Huynh, "Improved bilayer LDPC codes using irregular check node degree distribution", in Proc. IEEE Int. Symp. Inf. Theory (ISIT), July 2008.

ACADEMIC-INDUSTRY LINKAGES

- **Ericsson Malaysia (2016-2019)**
 1. UTM-Ericsson Innovation Centre for 5G (IC5G) - Value : RM475,210.35
 2. UTM-Ericsson Wireless Fiber Research Project - Value: RM308,118.42
 3. The Malaysia's First Cellular IOT Hackathon "Hack For Good Programme"- Value: RM94,200.00
 4. Connected Mangroves Program, Sabak Bernam, Selangor.
 5. 5G Accelerating Digital Malaysia Event.
- **Huawei Malaysia (2016-2017)**
 Consultancy Project: Perspective on Malaysia Mobile Broadband (MBB) Development 2020 (2016-2017) – Value: RM120,000.00
- **Higher Institutional Centre of Excellence - Ministry of Education Malaysia**
 Project: Research and development (RnD) of 5G antenna and propagation. Value: RM6,750,000.00
- **Politeknik Malaysia (2015)**
 4 days - Short courses on Microwave Technology – Value: RM5,800
- **Research In Motion (RIM) / Blackberry Limited and Natural Sciences and Engineering Research Council of Canada (NSERC) (2012-2014)**
 Postdoctoral Fellowship: Cooperative Spectrum Sensing and Information Relaying in Cognitive Wireless Communications (Value: CAD62,400)
- **Malaysian Communication and Multimedia Commission (MCMC) (2011-2014)**
 1. Project under MoA/MoU: Establishment of Research and Education Programme. Value: RM2,000,000.00.
 2. Industry Development Programme: Introduction to Broadcast Technology (Value: RM15,000)
- **Maxis Sdn. Bhd. (2003)**
 Consultancy Project: Drive Test Measurement for GSM network – Value (RM60,000)

TRAINING AND SKILLS

- **ITU ASP CoE Training on " Traffic engineering and advanced wireless network planning (2019)**
- **Internet-Of-Things (IoT) LORA Technology and Sensor Training (2019)**
- **Ericsson Mini Link 6363 (2018)**
- **5G Technology Updates & Hands-On Training on ATDI ICS Telecom (2016)**
Attended course on ATDI ICS Telecom software.
- **Keysight millimeter-wave channel sounder (2016)**
Attended course on Keysight's millimeter-wave channel sounder systems operating up to 40GHz.
- **Anritsu millimeter-wave narrowband measurement systems (2015)**
Attended course on Anritsu's signal generator and spectrum analyser operating up to 40GHz.
- **LTE (Long Term Evolution) technology (2012)**
Attended LTE course, organized by Rohde and Schwarz, covering both theory and practical perspectives.

PROFESIONAL MEMBERSHIPS AND SERVICES

- Member of Institute of Electrical and Electronics Engineer (IEEE).
- Board of Engineer Malaysia (BEM) Graduate Engineer.
- Member of HICoE Program Assessment Working Committee, Ministry of Higher Education, 2020.
- Member of Business Case Working Group under the 5G Task Force - Malaysian Communication and Multimedia Commission (MCMC), 2019.
- Reviewer of Malaysian Code of Responsible Conduct in Research (MCRCR), Prime Minister Science Advisor, Prime Minister's Office, 2016.
- Member of Malaysian Technical Standard Forum Bhd. (MTSFB) 5G Sub-working group under International Mobile Telecommunication Working Group, 2015.
- Member of Marketing Taskforce UTM Kuala Lumpur 2015-2018.
- Reviewer for IEEE Transactions on Communications, IEEE Transactions on Wireless Communications, IEEE Communication Letter, EURASIP Journal on Wireless Communications & Networking, IEEE International Symposium on Information Theory (ISIT), IEEE Globecom, IEEE International Communications Conference (ICC), IEEE International Symposium on Turbo Codes & Iterative Information Processing, and IEEE Vehicular Technology Conference (VTC).

REFERENCES

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2. Professor Dr. Tharek b. Abd. Rahman, Senior Research Fellow, Wireless Communication Centre, Faculty of Electrical Engineering, University Technology of Malaysia, 81310 Skudai, Johor, Malaysia. Phone: +60(7) 5535305. Email: tharek@fke.utm.my
3. Professor Dr. Harry Leib, Department of Electrical and Computer Engineering, McGill University, 3480 University Street, Montreal, Quebec, Canada H3A 0E9. Phone: +1-514-398-8938. Email: harry.leib@mcgill.ca
4. Professor Dr. Jinhong Yuan (PhD adviser), School of Electrical Engineering and Telecommunications, University of New South Wales, Sydney, 2052 NSW, Australia. Phone: +61(2) 9385 4244. Email: j.yuan@unsw.edu.au