Journal Papers

by

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The ultimate summary of my research is found in my 2000+ research contributions at IEEE Xplore along with sample chapters of 19 IEEE Press - Wiley monographs:

http://ieeexplore.ieee.org/search/searchresult.jsp?action=search&sortType=&rowsPerPage=&searchField=Search_All&matchBoolean=true&query However, here I only list my IEEE/IET journal papers, whilst omitting the conference papers and book chapters. I have 65 000+ GS citations, I10 Index of 1008 and an H-index of 108.



Figure 1: Number of Citations vs. Year

References

- C. Xu, Y. Xiong, N. Ishikawa, R. Rajashekar, S. Sugiura, Z. Wang, S. X. Ng, L. L. Yang, and L. Hanzo, "Space-, time-and frequency-domain index modulation for next-generation wireless: A unified single-/multi-carrier and single-/multi-rf mimo framework," *IEEE Transactions on Wireless Communications*, pp. 1–1, 2021.
- [2] Y. Liu, L. Xiang, L. L. Yang, and L. Hanzo, "Space-time coded generalized spatial modulation for sparse code division multiple access," *IEEE Transactions on Wireless Communications*, pp. 1–1, 2021.
- [3] M. Jahanbakht, W. Xiang, L. Hanzo, and M. R. Azghadi, "Internet of underwater things and big marine data analyticsa comprehensive survey," *IEEE Communications Surveys Tutorials*, pp. 1–1, 2021.
- [4] Y. Liu, L. Xiang, R. G. Maunder, L. L. Yang, and L. Hanzo, "Hybrid iterative detection and decoding of near-instantaneously adaptive turbo-coded sparse code multiple access," *IEEE Transactions on Vehicular Technology*, pp. 1–1, 2021.
- [5] X. Zhang, Z. Babar, P. Petropoulos, H. Haas, and L. Hanzo, "The evolution of optical ofdm," *IEEE Communications Surveys Tutorials*, pp. 1–1, 2021.

- [6] Z. Peng, X. Chen, W. Xu, C. Pan, L. C. Wang, and L. Hanzo, "Analysis and optimization of massive access to the iot relying on multi-pair two-way massive mimo relay systems," *IEEE Transactions on Communications*, pp. 1–1, 2021.
- [7] Y. Yang and L. Hanzo, "Permutation-based tcp and udp transmissions to improve goodput and latency in the internet-of-things," *IEEE Internet of Things Journal*, pp. 1–1, 2021.
- [8] M. Kulhandjian, H. Kulhandjian, C. Damours, and L. Hanzo, "Low-density spreading codes for noma systems and a gaussian separability-based design," *IEEE Access*, vol. 9, pp. 33 963–33 993, 2021.
- [9] L. Xiang, Y. Liu, C. Xu, R. G. Maunder, L. L. Yang, and L. Hanzo, "Iterative receiver design for polar-coded scma systems," *IEEE Transactions on Communications*, pp. 1–1, 2021.
- [10] D. Liu, J. Zhao, C. Yang, and L. Hanzo, "Accelerating deep reinforcement learning with the aid of partial model: Energy-efficient predictive video streaming," *IEEE Transactions on Wireless Communications*, pp. 1–1, 2021.
- [11] C. Xing, S. Wang, S. Chen, S. Ma, H. V. Poor, and L. Hanzo, "Matrix-monotonic optimization part ii: Multi-variable optimization," *IEEE Transactions on Signal Processing*, vol. 69, pp. 179–194, 2021.
- [12] K. Xu, M. M. Zhao, Y. Cai, and L. Hanzo, "Low-complexity joint power allocation and trajectory design for uav-enabled secure communications with power splitting," *IEEE Transactions on Communications*, vol. 69, no. 3, pp. 1896–1911, 2021.
- [13] Y. Liu, Y. Yang, L. L. Yang, and L. Hanzo, "Physical layer security of spatially modulated sparse-code multiple access in aeronautical ad-hoc networking," *IEEE Transactions on Vehicular Technology*, vol. 70, no. 3, pp. 2436–2447, 2021.
- [14] J. Zhang, S. Chen, F. Wang, S. X. Ng, R. G. Maunder, and L. Hanzo, "Priority-aware secure precoding based on multi-objective symbol error ratio optimization," *IEEE Transactions on Communications*, vol. 69, no. 3, pp. 1912–1929, 2021.
- [15] X. Li, X. Zhang, Y. Zhou, and L. Hanzo, "Optimal massive-mimo-aided clustered base-station coordination," *IEEE Transactions on Vehicular Technology*, vol. 70, no. 3, pp. 2699–2712, 2021.
- [16] T. M. Hoang, T. Q. Duong, H. D. Tuan, S. Lambotharan, and L. Hanzo, "Physical layer security: Detection of active eavesdropping attacks by support vector machines," *IEEE Access*, vol. 9, pp. 31 595–31 607, 2021.
- [17] Z. Sheng, H. D. Tuan, T. Q. Duong, and L. Hanzo, "Uav-aided two-way multi-user relaying," *IEEE Transactions on Communi*cations, vol. 69, no. 1, pp. 246–260, 2021.
- [18] T. Bai, H. Zhang, J. Wang, C. Xu, M. Elkashlan, A. Nallanathan, and L. Hanzo, "Fifty years of noise modeling and mitigation in power-line communications," *IEEE Communications Surveys Tutorials*, vol. 23, no. 1, pp. 41–69, 2021.
- [19] L. Wang, K. Wang, C. Pan, W. Xu, N. Aslam, and L. Hanzo, "Multi-agent deep reinforcement learning-based trajectory planning for multi-uav assisted mobile edge computing," *IEEE Transactions on Cognitive Communications and Networking*, vol. 7, no. 1, pp. 73–84, 2021.
- [20] C. Feng, W. Shen, X. Gao, J. An, and L. Hanzo, "Dynamic hybrid precoding relying on twin- resolution phase shifters in millimeter- wave communication systems," *IEEE Transactions on Wireless Communications*, vol. 20, no. 2, pp. 812–826, 2021.
- [21] L. D. Nguyen, H. D. Tuan, T. Q. Duong, H. V. Poor, and L. Hanzo, "Energy-efficient multi-cell massive mimo subject to minimum user-rate constraints," *IEEE Transactions on Communications*, vol. 69, no. 2, pp. 914–928, 2021.
- [22] C. Xing, S. Wang, S. Chen, S. Ma, H. V. Poor, and L. Hanzo, "Matrix-monotonic optimization part i: Single-variable optimization," *IEEE Transactions on Signal Processing*, vol. 69, pp. 738–754, 2021.
- [23] S. Srivastava, P. Singh, A. K. Jagannatham, A. Karandikar, and L. Hanzo, "Bayesian learning-based doubly-selective sparse channel estimation for millimeter wave hybrid mimo-fbmc-oqam systems," *IEEE Transactions on Communications*, vol. 69, no. 1, pp. 529–543, 2021.
- [24] S. Gopi, S. Kalyani, and L. Hanzo, "Intelligent reflecting surface assisted beam index-modulation for millimeter wave communication," *IEEE Transactions on Wireless Communications*, vol. 20, no. 2, pp. 983–996, 2021.
- [25] N. P. Le, L. C. Tran, X. Huang, E. Dutkiewicz, C. Ritz, S. L. Phung, A. Bouzerdoum, D. Franklin, and L. Hanzo, "Energyharvesting aided unmanned aerial vehicles for reliable ground user localization and communications under lognormal-nakagamim fading channels," *IEEE Transactions on Vehicular Technology*, vol. 70, no. 2, pp. 1632–1647, 2021.
- [26] Y. Yang, M. Ma, S. Aissa, and L. Hanzo, "Physical-layer secret key generation via cqi-mapped spatial modulation in multi-hop wiretap ad-hoc networks," *IEEE Transactions on Information Forensics and Security*, vol. 16, pp. 1322–1334, 2021.

- [27] X. Liu, M. Chen, Y. Liu, Y. Chen, S. Cui, and L. Hanzo, "Artificial intelligence aided next-generation networks relying on uavs," *IEEE Wireless Communications*, vol. 28, no. 1, pp. 120–127, 2021.
- [28] S. Srivastava, P. Sharma, S. Dwivedi, A. K. Jagannatham, and L. Hanzo, "Fast block lms based estimation of angularly sparse channels for single-carrier wideband millimeter wave hybrid mimo systems," *IEEE Transactions on Vehicular Technology*, vol. 70, no. 1, pp. 666–681, 2021.
- [29] T. Bai, C. Pan, J. Wang, Y. Deng, M. Elkashlan, A. Nallanathan, and L. Hanzo, "Dynamic aerial base station placement for minimum-delay communications," *IEEE Internet of Things Journal*, vol. 8, no. 3, pp. 1623–1635, 2021.
- [30] K. K. Nguyen, N. A. Vien, L. D. Nguyen, M. T. Le, L. Hanzo, and T. Q. Duong, "Real-time energy harvesting aided scheduling in uav-assisted d2d networks relying on deep reinforcement learning," *IEEE Access*, vol. 9, pp. 3638–3648, 2021.
- [31] Z. Zhou, N. Ge, Z. Wang, and L. Hanzo, "Joint transmit precoding and reconfigurable intelligent surface phase adjustment: A decomposition-aided channel estimation approach," *IEEE Transactions on Communications*, vol. 69, no. 2, pp. 1228–1243, 2021.
- [32] A. Chawla, A. S. Sarode, A. K. Jagannatham, and L. Hanzo, "Distributed parameter detection in massive mimo wireless sensor networks relying on imperfect csi," *IEEE Transactions on Wireless Communications*, vol. 20, no. 1, pp. 506–519, 2021.
- [33] Y. Li, F. Wang, M. El-Hajjar, and L. Hanzo, "Analog radio-over-fiber-aided optical-domain mimo signal processing for highperformance low-cost radio access networks," *IEEE Communications Magazine*, vol. 59, no. 1, pp. 126–132, 2021.
- [34] A. T. Le, L. C. Tran, X. Huang, Y. J. Guo, and L. Hanzo, "Analog least mean square adaptive filtering for self-interference cancellation in full duplex radios," *IEEE Wireless Communications*, vol. 28, no. 1, pp. 12–18, 2021.
- [35] Y. Chen, Y. Xiong, D. Chen, T. Jiang, S. X. Ng, and L. Hanzo, "Hybrid precoding for wideband millimeter wave mimo systems in the face of beam squint," *IEEE Transactions on Wireless Communications*, vol. 20, no. 3, pp. 1847–1860, 2021.
- [36] A. Subhash, M. Srinivasan, S. Kalyani, and L. Hanzo, "Transmit power policy and ergodic multicast rate analysis of cognitive radio networks in generalized fading," *IEEE Transactions on Communications*, vol. 68, no. 6, pp. 3311–3325, 2020.
- [37] A. Agarwal, A. K. Jagannatham, and L. Hanzo, "Finite blocklength non-orthogonal cooperative communication relying on swiptenabled energy harvesting relays," *IEEE Transactions on Communications*, vol. 68, no. 6, pp. 3326–3341, 2020.
- [38] S. Li, M. Derakhshani, S. Lambotharan, and L. Hanzo, "Outage probability analysis for the multi-carrier noma downlink relying on statistical csi," *IEEE Transactions on Communications*, vol. 68, no. 6, pp. 3572–3587, 2020.
- [39] S. Gong, Z. Yang, C. Xing, J. An, and L. Hanzo, "Beamforming optimization for intelligent reflecting surface aided swipt iot networks relying on discrete phase shifts," *IEEE Internet of Things Journal*, pp. 1–1, 2020.
- [40] A. S. Cacciapuoti, M. Caleffi, R. Van Meter, and L. Hanzo, "When entanglement meets classical communications: Quantum teleportation for the quantum internet," *IEEE Transactions on Communications*, vol. 68, no. 6, pp. 3808–3833, 2020.
- [41] Z. Kong, J. Song, C. Wang, H. Chen, and L. Hanzo, "Hybrid analog-digital precoder design for securing cognitive millimeter wave networks," *IEEE Transactions on Information Forensics and Security*, pp. 1–1, 2020.
- [42] S. Chen, Z. Yao, X. Jiang, J. Yang, and L. Hanzo, "Multi-agent deep reinforcement learning based cooperative edge caching for ultra-dense next-generation networks," *IEEE Transactions on Communications*, pp. 1–1, 2020.
- [43] J. Wang, Z. Zhang, C. Zhong, and L. Hanzo, "Incremental massive random access exploiting the nested reed-muller sequences," *IEEE Transactions on Wireless Communications*, pp. 1–1, 2020.
- [44] S. Chen, B. Yang, J. Yang, and L. Hanzo, "Dynamic resource allocation for scalable video multirate multicast over wireless networks," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 9, pp. 10227–10241, 2020.
- [45] H. Yu, H. D. Tuan, T. Q. Duong, Y. Fang, and L. Hanzo, "Improper gaussian signaling for integrated data and energy networking," *IEEE Transactions on Communications*, vol. 68, no. 6, pp. 3922–3934, 2020.
- [46] K. Wang, Y. Zhou, J. Li, L. Shi, W. Chen, and L. Hanzo, "Energy-efficient task offloading in massive mimo-aided multi-pair fog-computing networks," *IEEE Transactions on Communications*, pp. 1–1, 2020.
- [47] B. Wang, Y. Sun, T. Q. Duong, L. D. Nguyen, and L. Hanzo, "Risk-aware identification of highly suspected covid-19 cases in social iot: A joint graph theory and reinforcement learning approach," *IEEE Access*, vol. 8, pp. 115 655–115 661, 2020.

- [48] C. Zhao, Y. Cai, A. Liu, M. Zhao, and L. Hanzo, "Mobile edge computing meets mmwave communications: Joint beamforming and resource allocation for system delay minimization," *IEEE Transactions on Wireless Communications*, vol. 19, no. 4, pp. 2382–2396, 2020.
- [49] Y. Liu, L. L. Yang, and L. Hanzo, "Sparse space-time-frequency-domain spreading for large-scale non-orthogonal multiple access," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 10, pp. 12 327–12 332, 2020.
- [50] C. Xing, D. Liu, S. Gong, W. Xu, S. Chen, and L. Hanzo, "Training optimization for hybrid mimo communication systems," *IEEE Transactions on Wireless Communications*, vol. 19, no. 8, pp. 5473–5487, 2020.
- [51] M. Bashar, K. Cumanan, A. G. Burr, H. Q. Ngo, L. Hanzo, and P. Xiao, "On the performance of cell-free massive mimo relying on adaptive noma/oma mode-switching," *IEEE Transactions on Communications*, vol. 68, no. 2, pp. 792–810, 2020.
- [52] Y. Wang, X. Chen, Y. Cai, and L. Hanzo, "Stochastic hybrid combining design for quantized massive mimo systems," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 12, pp. 16 224–16 229, 2020.
- [53] Y. Chen, M. Wen, L. Wang, W. Liu, and L. Hanzo, "Sinr-outage minimization of robust beamforming for the non-orthogonal wireless downlink," *IEEE Transactions on Communications*, vol. 68, no. 11, pp. 7247–7257, 2020.
- [54] Z. Sun, L. Song, Q. Huang, L. Yin, G. Long, J. Lu, and L. Hanzo, "Toward practical quantum secure direct communication: A quantum-memory-free protocol and code design," *IEEE Transactions on Communications*, vol. 68, no. 9, pp. 5778–5792, 2020.
- [55] W. Yuan, N. Wu, A. Zhang, X. Huang, Y. Li, and L. Hanzo, "Iterative receiver design for ftn signaling aided sparse code multiple access," *IEEE Transactions on Wireless Communications*, vol. 19, no. 2, pp. 915–928, 2020.
- [56] X. Ding, Y. Zou, X. Chen, X. Wang, and L. Hanzo, "Secrecy outage and diversity analysis of multiple cooperating sourcedestination pairs," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 7, pp. 7648–7662, 2020.
- [57] X. Wang, P. Wang, M. Ding, Z. Lin, F. Lin, B. Vucetic, and L. Hanzo, "Performance analysis of terahertz unmanned aerial vehicular networks," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 12, pp. 16330–16335, 2020.
- [58] J. Zhang, G. Li, A. Marshall, A. Hu, and L. Hanzo, "A new frontier for iot security emerging from three decades of key generation relying on wireless channels," *IEEE Access*, vol. 8, pp. 138 406–138 446, 2020.
- [59] Y. Xiong, D. Chandra, S. X. Ng, and L. Hanzo, "Sampling overhead analysis of quantum error mitigation: Uncoded vs. coded systems," *IEEE Access*, vol. 8, pp. 228 967–228 991, 2020.
- [60] L. Xiang, Y. Liu, T. Van Luong, R. G. Maunder, L. L. Yang, and L. Hanzo, "Deep-learning-aided joint channel estimation and data detection for spatial modulation," *IEEE Access*, vol. 8, pp. 191910–191919, 2020.
- [61] K. Satyanarayana, M. El-Hajjar, A. A. M. Mourad, P. Pietraski, and L. Hanzo, "Soft-decoding for multi-set space-time shiftkeying mmwave systems: A deep learning approach," *IEEE Access*, vol. 8, pp. 49 584–49 595, 2020.
- [62] L. Xiang, R. G. Maunder, and L. Hanzo, "Concurrent ofdm demodulation and turbo decoding for ultra reliable low latency communication," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 2, pp. 1281–1290, 2020.
- [63] H. Zhang and L. Hanzo, "Federated learning assisted multi-uav networks," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 11, pp. 14104–14109, 2020.
- [64] X. Liu, Y. Liu, Y. Chen, and L. Hanzo, "Enhancing the fuel-economy of v2i-assisted autonomous driving: A reinforcement learning approach," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 8, pp. 8329–8342, 2020.
- [65] W. Hao, G. Sun, J. Zhang, P. Xiao, and L. Hanzo, "Secure millimeter wave cloud radio access networks relying on microwave multicast fronthaul," *IEEE Transactions on Communications*, vol. 68, no. 5, pp. 3079–3095, 2020.
- [66] S. Shao, Y. Zhang, R. G. Maunder, and L. Hanzo, "3d exit charts for analyzing the 5g 3gpp new radio ldpc decoder," *IEEE Access*, vol. 8, pp. 188 797–188 812, 2020.
- [67] J. An, L. Wang, C. Xu, L. Gan, and L. Hanzo, "Optimal pilot power based channel estimation improves the throughput of intelligent reflective surface assisted systems," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 12, pp. 16202–16206, 2020.
- [68] D. Pan, K. Li, D. Ruan, S. X. Ng, and L. Hanzo, "Single-photon-memory two-step quantum secure direct communication relying on einstein-podolsky-rosen pairs," *IEEE Access*, vol. 8, pp. 121 146–121 161, 2020.

- [69] Z. Sha, Z. Wang, S. Chen, and L. Hanzo, "Graph theory based beam scheduling for inter-cell interference avoidance in mmwave cellular networks," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 4, pp. 3929–3942, 2020.
- [70] J. Yang, J. Xie, S. Chen, Z. Wang, H. Hu, and L. Hanzo, "Proportional-fair multi-user scalable layered wireless video streaming powered by energy harvesting," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 4, pp. 4460–4471, 2020.
- [71] H. Fang, X. Wang, and L. Hanzo, "Adaptive trust management for soft authentication and progressive authorization relying on physical layer attributes," *IEEE Transactions on Communications*, vol. 68, no. 4, pp. 2607–2620, 2020.
- [72] L. H. Shen, K. T. Feng, and L. Hanzo, "Coordinated multiple access point multiuser beamforming training protocol for millimeter wave wlans," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 11, pp. 13875–13889, 2020.
- [73] Y. Lin, Z. Zhang, Y. Huang, J. Li, F. Shu, and L. Hanzo, "Heterogeneous user-centric cluster migration improves the connectivityhandover trade-off in vehicular networks," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 12, pp. 16027–16043, 2020.
- [74] A. A. Nasir, H. D. Tuan, T. Q. Duong, and L. Hanzo, "Transmitter-side wireless information- and power-transfer in massive mimo systems," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 2, pp. 2322–2326, 2020.
- [75] G. Zhou, L. Zhao, K. Liang, G. Zheng, and L. Hanzo, "Utility analysis of radio access network slicing," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 1, pp. 1163–1167, 2020.
- [76] S. Li, W. Yuan, J. Yuan, B. Bai, D. Wing Kwan Ng, and L. Hanzo, "Time-domain vs. frequency-domain equalization for ftn signaling," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 8, pp. 9174–9179, 2020.
- [77] Z. B. Kaykac Egilmez, L. Xiang, R. G. Maunder, and L. Hanzo, "The development, operation and performance of the 5g polar codes," *IEEE Communications Surveys Tutorials*, vol. 22, no. 1, pp. 96–122, 2020.
- [78] C. Pan, H. Ren, K. Wang, W. Xu, M. Elkashlan, A. Nallanathan, and L. Hanzo, "Multicell mimo communications relying on intelligent reflecting surfaces," *IEEE Transactions on Wireless Communications*, vol. 19, no. 8, pp. 5218–5233, 2020.
- [79] Y. Liu, S. Bi, Z. Shi, and L. Hanzo, "When machine learning meets big data: A wireless communication perspective," *IEEE Vehicular Technology Magazine*, vol. 15, no. 1, pp. 63–72, 2020.
- [80] S. Katla, L. Xiang, Y. Zhang, M. El-Hajjar, A. A. M. Mourad, and L. Hanzo, "Deep learning assisted detection for index modulation aided mmwave systems," *IEEE Access*, vol. 8, pp. 202738–202754, 2020.
- [81] T. Hou, Y. Liu, Z. Song, X. Sun, Y. Chen, and L. Hanzo, "Reconfigurable intelligent surface aided noma networks," *IEEE Journal on Selected Areas in Communications*, vol. 38, no. 11, pp. 2575–2588, 2020.
- [82] L. Wang, G. Peters, Y. C. Liang, and L. Hanzo, "Intelligent user-centric networks: Learning-based downlink comp region breathing," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 5, pp. 5583–5597, 2020.
- [83] Q. Shi, N. Wu, H. Wang, X. Ma, and L. Hanzo, "Factor graph based message passing algorithms for joint phase-noise estimation and decoding in ofdm-im," *IEEE Transactions on Communications*, vol. 68, no. 5, pp. 2906–2921, 2020.
- [84] L. Xiang, Y. Liu, Z. B. K. Egilmez, R. G. Maunder, L. L. Yang, and L. Hanzo, "Soft list decoding of polar codes," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 11, pp. 13 921–13 926, 2020.
- [85] J. Cui, Z. Ding, Y. Deng, A. Nallanathan, and L. Hanzo, "Adaptive uav-trajectory optimization under quality of service constraints: A model-free solution," *IEEE Access*, vol. 8, pp. 112 253–112 265, 2020.
- [86] X. Zhang, S. Chen, and L. Hanzo, "On the discrete-input continuous-output memoryless channel capacity of layered aco-ofdm," *Journal of Lightwave Technology*, vol. 38, no. 18, pp. 4955–4968, 2020.
- [87] J. Wang, C. Jiang, H. Zhang, Y. Ren, K. C. Chen, and L. Hanzo, "Thirty years of machine learning: The road to pareto-optimal wireless networks," *IEEE Communications Surveys Tutorials*, vol. 22, no. 3, pp. 1472–1514, 2020.
- [88] Y. Zhang, R. Zhang, J. Zhang, T. Bai, A. F. Al Rawi, M. Moonen, and L. Hanzo, "Far-end crosstalk mitigation for future wireline networks beyond g.mgfast: A survey and an outlook," *IEEE Access*, vol. 8, pp. 9998–10039, 2020.
- [89] L. Dai, B. Wang, M. Wang, X. Yang, J. Tan, S. Bi, S. Xu, F. Yang, Z. Chen, M. D. Renzo, C. B. Chae, and L. Hanzo, "Reconfigurable intelligent surface-based wireless communications: Antenna design, prototyping, and experimental results," *IEEE Access*, vol. 8, pp. 45 913–45 923, 2020.

- [90] S. Gong, C. Xing, V. K. N. Lau, S. Chen, and L. Hanzo, "Majorization-minimization aided hybrid transceivers for mimo interference channels," *IEEE Transactions on Signal Processing*, vol. 68, pp. 4903–4918, 2020.
- [91] Y. Ma, N. Wu, W. Yuan, D. W. K. Ng, and L. Hanzo, "Joint channel estimation and equalization for index-modulated spectrally efficient frequency division multiplexing systems," *IEEE Transactions on Communications*, vol. 68, no. 10, pp. 6230–6244, 2020.
- [92] Y. Zhang, J. Zhang, C. Xu, M. El-Hajjar, and L. Hanzo, "Optimal-power superposition modulation for scalable video broadcasting," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 12, pp. 16230–16234, 2020.
- [93] M. Noor-A-Rahim, Z. Liu, Y. L. Guan, and L. Hanzo, "Finite-length performance analysis of ldpc coded continuous phase modulation," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 10, pp. 12 277–12 280, 2020.
- [94] Z. Babar, Z. B. Kaykac Egilmez, L. Xiang, D. Chandra, R. G. Maunder, S. X. Ng, and L. Hanzo, "Polar codes and their quantumdomain counterparts," *IEEE Communications Surveys Tutorials*, vol. 22, no. 1, pp. 123–155, 2020.
- [95] H. Yu, H. D. Tuan, A. A. Nasir, T. Q. Duong, and L. Hanzo, "Improper gaussian signaling for computationally tractable energy and information beamforming," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 11, pp. 13 990–13 995, 2020.
- [96] L. Xiang, S. Zhong, R. G. Maunder, and L. Hanzo, "Reduced-complexity low-latency logarithmic successive cancellation stack polar decoding for 5g new radio and its software implementation," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 11, pp. 12 449–12 458, 2020.
- [97] K. Wang, J. Li, Y. Yang, W. Chen, and L. Hanzo, "Content-centric heterogeneous fog networks relying on energy efficiency optimization," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 11, pp. 13579–13592, 2020.
- [98] L. Qiao, J. Zhang, Z. Gao, S. Chen, and L. Hanzo, "Compressive sensing based massive access for iot relying on media modulation aided machine type communications," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 9, pp. 10391–10396, 2020.
- [99] H. Yang, K. Zheng, L. Zhao, and L. Hanzo, "Twin-timescale radio resource management for ultra-reliable and low-latency vehicular networks," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 1, pp. 1023–1036, 2020.
- [100] X. Chen, Y. Cai, L. Li, M. Zhao, B. Champagne, and L. Hanzo, "Energy-efficient resource allocation for latency-sensitive mobile edge computing," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 2, pp. 2246–2262, 2020.
- [101] R. Cane, D. Chandra, S. X. Ng, and L. Hanzo, "Gate-error-resilient quantum steane codes," *IEEE Access*, vol. 8, pp. 179346– 179362, 2020.
- [102] G. Zhou, L. Zhao, Y. Wang, G. Zheng, and L. Hanzo, "Energy efficiency and delay optimization for edge caching aided video streaming," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 11, pp. 14116–14121, 2020.
- [103] M. M. Zhao, Y. Cai, M. J. Zhao, Y. Xu, and L. Hanzo, "Robust joint hybrid analog-digital transceiver design for full-duplex mmwave multicell systems," *IEEE Transactions on Communications*, vol. 68, no. 8, pp. 4788–4802, 2020.
- [104] R. Cane, D. Chandra, S. X. Ng, and L. Hanzo, "Mitigation of decoherence-induced quantum-bit errors and quantum-gate errors using steanes code," *IEEE Access*, vol. 8, pp. 83 693–83 709, 2020.
- [105] X. Chen, Y. Cai, Q. Shi, M. Zhao, B. Champagne, and L. Hanzo, "Efficient resource allocation for relay-assisted computation offloading in mobile-edge computing," *IEEE Internet of Things Journal*, vol. 7, no. 3, pp. 2452–2468, 2020.
- [106] W. Yuan, N. Wu, Q. Guo, D. W. K. Ng, J. Yuan, and L. Hanzo, "Iterative joint channel estimation, user activity tracking, and data detection for ftn-noma systems supporting random access," *IEEE Transactions on Communications*, vol. 68, no. 5, pp. 2963–2977, 2020.
- [107] L. Xiao, P. Xiao, Z. Liu, W. Yu, H. Haas, and L. Hanzo, "A compressive sensing assisted massive sm-vblast system: Error probability and capacity analysis," *IEEE Transactions on Wireless Communications*, vol. 19, no. 3, pp. 1990–2005, 2020.
- [108] R. Duan, J. Wang, H. Zhang, Y. Ren, and L. Hanzo, "Joint multicast beamforming and relay design for maritime communication systems," *IEEE Transactions on Green Communications and Networking*, vol. 4, no. 1, pp. 139–151, 2020.
- [109] S. Gong, S. Ma, C. Xing, Y. Li, and L. Hanzo, "Multi-antenna aided secrecy beamforming optimization for wirelessly powered hetnets," *IEEE Transactions on Wireless Communications*, vol. 19, no. 8, pp. 5261–5277, 2020.
- [110] B. G. Guzmn, C. Chen, V. P. G. Jimnez, H. Haas, and L. Hanzo, "Reflection-based relaying techniques in visible light communications: Will it work?" *IEEE Access*, vol. 8, pp. 80 922–80 935, 2020.

- [111] S. Ma, W. Shen, J. An, and L. Hanzo, "Antenna array diagnosis for millimeter-wave mimo systems," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 4, pp. 4585–4589, 2020.
- [112] P. Singh, S. Srivastava, A. K. Jagannatham, and L. Hanzo, "Second-order statistics-based semi-blind techniques for channel estimation in millimeter-wave mimo analog and hybrid beamforming," *IEEE Transactions on Communications*, vol. 68, no. 11, pp. 6886–6901, 2020.
- [113] L. Xiao, P. Xiao, H. Ruan, N. Ishikawa, L. Lu, Y. Xiao, and L. Hanzo, "Differentially-encoded rectangular spatial modulation approaches the performance of its coherent counterpart," *IEEE Transactions on Communications*, vol. 68, no. 12, pp. 7593–7607, 2020.
- [114] Y. Cai, K. Xu, A. Liu, M. Zhao, B. Champagne, and L. Hanzo, "Two-timescale hybrid analog-digital beamforming for mmwave full-duplex mimo multiple-relay aided systems," *IEEE Journal on Selected Areas in Communications*, vol. 38, no. 9, pp. 2086– 2103, 2020.
- [115] Y. Liu, L. L. Yang, and L. Hanzo, "Joint user-activity and data detection for grant-free spatial-modulated multi-carrier nonorthogonal multiple access," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 10, pp. 11673–11684, 2020.
- [116] Y. Zhang, C. Xu, I. A. Hemadeh, M. El-Hajjar, and L. Hanzo, "Near-instantaneously adaptive multi-set space-time shift keying for uav-aided video surveillance," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 11, pp. 12843–12856, 2020.
- [117] A. A. Nasir, H. D. Tuan, T. Q. Duong, H. V. Poor, and L. Hanzo, "Hybrid beamforming for multi-user millimeter-wave networks," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 3, pp. 2943–2956, 2020.
- [118] H. Zhang, C. Jiang, J. Wang, L. Wang, Y. Ren, and L. Hanzo, "Multicast beamforming optimization in cloud-based heterogeneous terrestrial and satellite networks," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 2, pp. 1766–1776, 2020.
- [119] G. Xia, Y. Lin, T. Liu, F. Shu, and L. Hanzo, "Transmit antenna selection and beamformer design for secure spatial modulation with rough csi of eve," *IEEE Transactions on Wireless Communications*, vol. 19, no. 7, pp. 4643–4656, 2020.
- [120] D. Liu, C. Sun, C. Yang, and L. Hanzo, "Optimizing wireless systems using unsupervised and reinforced-unsupervised deep learning," *IEEE Network*, vol. 34, no. 4, pp. 270–277, 2020.
- [121] F. Liu, C. Masouros, A. P. Petropulu, H. Griffiths, and L. Hanzo, "Joint radar and communication design: Applications, state-ofthe-art, and the road ahead," *IEEE Transactions on Communications*, vol. 68, no. 6, pp. 3834–3862, 2020.
- [122] Z. Wei, L. Yang, D. W. K. Ng, J. Yuan, and L. Hanzo, "On the performance gain of noma over oma in uplink communication systems," *IEEE Transactions on Communications*, vol. 68, no. 1, pp. 536–568, 2020.
- [123] Y. Zhang, J. Zhang, Y. Huo, C. Xu, M. El-Hajjar, and L. Hanzo, "Scalable panoramic wireless video streaming relying on optimal-rate fec-coded adaptive qam," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 10, pp. 11 206–11 219, 2020.
- [124] A. Mishra, A. K. Jagannatham, and L. Hanzo, "Sparse bayesian learning-aided joint sparse channel estimation and ml sequence detection in space-time trellis coded mimo-ofdm systems," *IEEE Transactions on Communications*, vol. 68, no. 2, pp. 1132–1145, 2020.
- [125] Y. Cai, F. Cui, Q. Shi, Y. Wu, B. Champagne, and L. Hanzo, "Secure hybrid a/d beamforming for hardware-efficient large-scale multiple-antenna swipt systems," *IEEE Transactions on Communications*, vol. 68, no. 10, pp. 6141–6156, 2020.
- [126] J. Cui, Y. Liu, Z. Ding, P. Fan, A. Nallanathan, and L. Hanzo, "Next-generation mm-wave small-cell networks: Multiple access, caching, and resource management," *IEEE Vehicular Technology Magazine*, vol. 15, no. 1, pp. 46–53, 2020.
- [127] L. Dai, R. Jiao, F. Adachi, H. V. Poor, and L. Hanzo, "Deep learning for wireless communications: An emerging interdisciplinary paradigm," *IEEE Wireless Communications*, vol. 27, no. 4, pp. 133–139, 2020.
- [128] Y. Liu, L. Yang, P. Xiao, H. Haas, and L. Hanzo, "Spatial modulated multicarrier sparse code-division multiple access," *IEEE Transactions on Wireless Communications*, vol. 19, no. 1, pp. 610–623, 2020.
- [129] A. S. Khan, X. Zhang, S. Lambotharan, G. Zheng, B. AsSadhan, and L. Hanzo, "Machine learning aided blockchain assisted framework for wireless networks," *IEEE Network*, vol. 34, no. 5, pp. 262–268, 2020.
- [130] T. Bai, C. Pan, Y. Deng, M. Elkashlan, A. Nallanathan, and L. Hanzo, "Latency minimization for intelligent reflecting surface aided mobile edge computing," *IEEE Journal on Selected Areas in Communications*, vol. 38, no. 11, pp. 2666–2682, 2020.

- [131] P. Singh, H. B. Mishra, A. K. Jagannatham, K. Vasudevan, and L. Hanzo, "Uplink sum-rate and power scaling laws for multi-user massive mimo-fbmc systems," *IEEE Transactions on Communications*, vol. 68, no. 1, pp. 161–176, 2020.
- [132] R. Jantti, R. Duan, J. Lietzen, H. Khalifa, and L. Hanzo, "Quantum-enhanced microwave backscattering communications," *IEEE Communications Magazine*, vol. 58, no. 1, pp. 80–85, 2020.
- [133] C. Pan, H. Ren, K. Wang, M. Elkashlan, A. Nallanathan, J. Wang, and L. Hanzo, "Intelligent reflecting surface aided mimo broadcasting for simultaneous wireless information and power transfer," *IEEE Journal on Selected Areas in Communications*, vol. 38, no. 8, pp. 1719–1734, 2020.
- [134] S. Srivastava, M. S. Kumar, A. Mishra, S. Chopra, A. K. Jagannatham, and L. Hanzo, "Sparse doubly-selective channel estimation techniques for ostbc mimo-ofdm systems: A hierarchical bayesian kalman filter based approach," *IEEE Transactions on Communications*, vol. 68, no. 8, pp. 4844–4858, 2020.
- [135] J. Yang, D. Li, X. Jiang, S. Chen, and L. Hanzo, "Enhancing the resilience of low earth orbit remote sensing satellite networks," *IEEE Network*, vol. 34, no. 4, pp. 304–311, 2020.
- [136] S. X. Ng, A. Conti, G. L. Long, P. Muller, A. Sayeed, J. Yuan, and L. Hanzo, "Guest editorial advances in quantum communications, computing, cryptography, and sensing," *IEEE Journal on Selected Areas in Communications*, vol. 38, no. 3, pp. 405–412, 2020.
- [137] C. Xu, N. Ishikawa, R. Rajashekar, S. Sugiura, R. G. Maunder, Z. Wang, L. L. Yang, and L. Hanzo, "Sixty years of coherent versus non-coherent tradeoffs and the road from 5g to wireless futures," *IEEE Access*, vol. 7, pp. 178 246–178 299, 2019.
- [138] K. Satyanarayana, M. El-Hajjar, A. A. M. Mourad, and L. Hanzo, "Deep learning aided fingerprint-based beam alignment for mmwave vehicular communication," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 11, pp. 10858–10871, 2019.
- [139] L. Xiang, Z. B. Kaykac Egilmez, R. G. Maunder, and L. Hanzo, "Crc-aided logarithmic stack decoding of polar codes for ultra reliable low latency communication in 3gpp new radio," *IEEE Access*, vol. 7, pp. 28559–28573, 2019.
- [140] Y. Chen, L. Wang, R. Ma, B. Jiao, and L. Hanzo, "Cooperative full duplex content sensing and delivery improves the offloading probability of d2d caching," *IEEE Access*, vol. 7, pp. 29 076–29 084, 2019.
- [141] T. Bai, C. Xu, R. Zhang, A. F. Al Rawi, and L. Hanzo, "Performance of harq-assisted ofdm systems contaminated by impulsive noise: Finite-length ldpc code analysis," *IEEE Access*, vol. 7, pp. 14112–14123, 2019.
- [142] J. Zhang, M. Ding, D. Lpez-Prez, A. Marshall, and L. Hanzo, "Design of an efficient ofdma-based multi-user key generation protocol," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 9, pp. 8842–8852, 2019.
- [143] Y. Li, K. Satyanarayana, M. El-Hajjar, and L. Hanzo, "Analogue radio over fiber aided mimo design for the learning assisted adaptive c-ran downlink," *IEEE Access*, vol. 7, pp. 21 359–21 371, 2019.
- [144] S. Wu, H. Yao, C. Jiang, X. Chen, L. Kuang, and L. Hanzo, "Downlink channel estimation for massive mimo systems relying on vector approximate message passing," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 5, pp. 5145–5148, 2019.
- [145] R. Rajashekar, C. Xu, N. Ishikawa, L. Yang, and L. Hanzo, "Subcarrier subset selection-aided transmit precoding achieves fulldiversity in index modulation," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 11, pp. 11031–11041, 2019.
- [146] K. Satyanarayana, M. El-Hajjar, P. Kuo, A. Mourad, and L. Hanzo, "Hybrid beamforming design for full-duplex millimeter wave communication," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 2, pp. 1394–1404, 2019.
- [147] Y. Chen, D. Chen, T. Jiang, and L. Hanzo, "Millimeter-wave massive mimo systems relying on generalized sub-array-connected hybrid precoding," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 9, pp. 8940–8950, 2019.
- [148] S. Feng, T. Bai, and L. Hanzo, "Joint power allocation for the multi-user noma-downlink in a power-line-fed vlc network," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 5, pp. 5185–5190, 2019.
- [149] Z. Babar, X. Zhang, P. Botsinis, D. Alanis, D. Chandra, S. X. Ng, and L. Hanzo, "Near-capacity multilayered code design for laco-ofdm-aided optical wireless systems," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 4, pp. 4051–4054, 2019.
- [150] X. Ding, Y. Zou, G. Zhang, X. Chen, X. Wang, and L. Hanzo, "The securityreliability tradeoff of multiuser scheduling-aided energy harvesting cognitive radio networks," *IEEE Transactions on Communications*, vol. 67, no. 6, pp. 3890–3904, 2019.
- [151] X. Zhang, Z. Babar, R. Zhang, S. Chen, and L. Hanzo, "Multi-class coded layered asymmetrically clipped optical ofdm," *IEEE Transactions on Communications*, vol. 67, no. 1, pp. 578–589, 2019.

- [152] X. Huang, J. A. Zhang, R. P. Liu, Y. J. Guo, and L. Hanzo, "Airplane-aided integrated networking for 6g wireless: Will it work?" *IEEE Vehicular Technology Magazine*, vol. 14, no. 3, pp. 84–91, 2019.
- [153] Z. Kong, S. Yang, D. Wang, and L. Hanzo, "Robust beamforming and jamming for enhancing the physical layer security of full duplex radios," *IEEE Transactions on Information Forensics and Security*, vol. 14, no. 12, pp. 3151–3159, 2019.
- [154] X. Li, H. Yao, J. Wang, X. Xu, C. Jiang, and L. Hanzo, "A near-optimal uav-aided radio coverage strategy for dense urban areas," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 9, pp. 9098–9109, 2019.
- [155] Y. Chen, D. Chen, T. Jiang, and L. Hanzo, "Channel-covariance and angle-of-departure aided hybrid precoding for wideband multiuser millimeter wave mimo systems," *IEEE Transactions on Communications*, vol. 67, no. 12, pp. 8315–8328, 2019.
- [156] W. Shen, X. Bu, X. Gao, C. Xing, and L. Hanzo, "Beamspace precoding and beam selection for wideband millimeter-wave mimo relying on lens antenna arrays," *IEEE Transactions on Signal Processing*, vol. 67, no. 24, pp. 6301–6313, 2019.
- [157] R. Rajashekar, L. Yang, K. V. S. Hari, and L. Hanzo, "Transmit antenna subset selection in generalized spatial modulation systems," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 2, pp. 1979–1983, 2019.
- [158] W. Ye, W. Chen, X. Guo, C. Sun, and L. Hanzo, "Quantum search-aided multi-user detection for sparse code multiple access," *IEEE Access*, vol. 7, pp. 52 804–52 817, 2019.
- [159] F. Cui, Y. Cai, M. Zhao, M. Lei, and L. Hanzo, "Peak-to-average power ratio reduction based on penalty-cccp for filter bank multicarrier systems," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 11, pp. 11 353–11 357, 2019.
- [160] Y. Zhang, I. A. Hemadeh, M. El-Hajjar, and L. Hanzo, "Multi-set space-time shift keying assisted adaptive inter-layer fec for wireless video streaming," *IEEE Access*, vol. 7, pp. 3592–3609, 2019.
- [161] S. Gupta, M. Srinivasan, Y. Lin, R. Zhang, S. Kalyani, and L. Hanzo, "Performance analysis of device-to-device communication underlaying dense networks (densenets)," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 9, pp. 9257–9266, 2019.
- [162] Y. Lin, R. Zhang, L. Yang, C. Li, and L. Hanzo, "User-centric clustering for designing ultradense networks: Architecture, objective functions, and design guidelines," *IEEE Vehicular Technology Magazine*, vol. 14, no. 3, pp. 107–114, 2019.
- [163] K. Satyanarayana, M. El-Hajjar, A. A. M. Mourad, and L. Hanzo, "Multi-user hybrid beamforming relying on learning-aided link-adaptation for mmwave systems," *IEEE Access*, vol. 7, pp. 23 197–23 209, 2019.
- [164] X. Zhang, J. Wang, C. Jiang, C. Yan, Y. Ren, and L. Hanzo, "Robust beamforming for multibeam satellite communication in the face of phase perturbations," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 3, pp. 3043–3047, 2019.
- [165] S. Shao, P. Hailes, T. Y. Wang, J. Y. Wu, R. G. Maunder, B. M. Al-Hashimi, and L. Hanzo, "Survey of turbo, ldpc, and polar decoder asic implementations," *IEEE Communications Surveys Tutorials*, vol. 21, no. 3, pp. 2309–2333, 2019.
- [166] K. Liang, G. Liu, L. Zhao, X. Chu, S. Wang, and L. Hanzo, "Performance analysis of cellular radio access networks relying on control- and user-plane separation," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 7, pp. 7241–7245, 2019.
- [167] X. Liu, C. Gong, D. Zou, Z. Babar, Z. Xu, and L. Hanzo, "Signal characterization and achievable transmission rate of vlc under receiver nonlinearity," *IEEE Access*, vol. 7, pp. 137 030–137 039, 2019.
- [168] H. Guo, Z. Yang, Y. Zou, M. Qian, J. Zhu, and L. Hanzo, "Joint optimization of power splitting and beamforming in energy harvesting cooperative networks," *IEEE Transactions on Communications*, vol. 67, no. 12, pp. 8247–8257, 2019.
- [169] S. Gopi, S. Kalyani, and L. Hanzo, "Coherent and non-coherent multilayer index modulation," *IEEE Access*, vol. 7, pp. 79677– 79693, 2019.
- [170] A. Ahmed, P. Botsinis, S. Won, L. Yang, and L. Hanzo, "Primitive polynomials for iterative recursive soft sequential acquisition of concatenated sequences," *IEEE Access*, vol. 7, pp. 13 882–13 900, 2019.
- [171] J. Wang, Z. Zhang, and L. Hanzo, "Joint active user detection and channel estimation in massive access systems exploiting reedmuller sequences," *IEEE Journal of Selected Topics in Signal Processing*, vol. 13, no. 3, pp. 739–752, 2019.
- [172] W. Yuan, N. Wu, Q. Guo, X. Huang, Y. Li, and L. Hanzo, "Toa-based passive localization constructed over factor graphs: A unified framework," *IEEE Transactions on Communications*, vol. 67, no. 10, pp. 6952–6965, 2019.
- [173] R. Rajashekar, M. Di Renzo, L. Yang, K. V. S. Hari, and L. Hanzo, "A finite input alphabet perspective on the rate-energy tradeoff in swipt over parallel gaussian channels," *IEEE Journal on Selected Areas in Communications*, vol. 37, no. 1, pp. 48–60, 2019.

- [174] N. Hosseinidehaj, Z. Babar, R. Malaney, S. X. Ng, and L. Hanzo, "Satellite-based continuous-variable quantum communications: State-of-the-art and a predictive outlook," *IEEE Communications Surveys Tutorials*, vol. 21, no. 1, pp. 881–919, 2019.
- [175] W. Yuan, N. Wu, B. Etzlinger, Y. Li, C. Yan, and L. Hanzo, "Expectationmaximization-based passive localization relying on asynchronous receivers: Centralized versus distributed implementations," *IEEE Transactions on Communications*, vol. 67, no. 1, pp. 668–681, 2019.
- [176] S. Gong, S. Wang, S. Chen, C. Xing, and L. Hanzo, "Robust energy efficiency optimization for amplify-and-forward mimo relaying systems," *IEEE Transactions on Wireless Communications*, vol. 18, no. 9, pp. 4326–4343, 2019.
- [177] Y. Zhao, Y. Xiao, P. Yang, B. Dong, and L. Hanzo, "Joint iterative channel estimation and frequency-domain turbo equalization for single-carrier spatial modulation," *IEEE Transactions on Communications*, vol. 67, no. 9, pp. 6327–6342, 2019.
- [178] G. Zhao, S. Chen, L. Qi, L. Zhao, and L. Hanzo, "Mobile-traffic-aware offloading for energy- and spectral-efficient large-scale d2d-enabled cellular networks," *IEEE Transactions on Wireless Communications*, vol. 18, no. 6, pp. 3251–3264, 2019.
- [179] P. Botsinis, D. Alanis, Z. Babar, H. V. Nguyen, D. Chandra, S. X. Ng, and L. Hanzo, "Quantum search algorithms for wireless communications," *IEEE Communications Surveys Tutorials*, vol. 21, no. 2, pp. 1209–1242, 2019.
- [180] J. Zhang, S. Chen, Y. Lin, J. Zheng, B. Ai, and L. Hanzo, "Cell-free massive mimo: A new next-generation paradigm," *IEEE Access*, vol. 7, pp. 99 878–99 888, 2019.
- [181] S. Feng, R. Zhang, W. Xu, and L. Hanzo, "Multiple access design for ultra-dense vlc networks: Orthogonal vs non-orthogonal," *IEEE Transactions on Communications*, vol. 67, no. 3, pp. 2218–2232, 2019.
- [182] D. Chandra, Z. Babar, S. X. Ng, and L. Hanzo, "Near-hashing-bound multiple-rate quantum turbo short-block codes," *IEEE Access*, vol. 7, pp. 52712–52730, 2019.
- [183] C. Xu, J. Zhang, T. Bai, P. Botsinis, R. G. Maunder, R. Zhang, and L. Hanzo, "Adaptive coherent/non-coherent single/multipleantenna aided channel coded ground-to-air aeronautical communication," *IEEE Transactions on Communications*, vol. 67, no. 2, pp. 1099–1116, 2019.
- [184] C. Xu, P. Zhang, R. Rajashekar, N. Ishikawa, S. Sugiura, L. Wang, and L. Hanzo, "Finite-cardinality single-rf differential spacetime modulation for improving the diversity-throughput tradeoff," *IEEE Transactions on Communications*, vol. 67, no. 1, pp. 318–335, 2019.
- [185] C. Pan, H. Ren, M. Elkashlan, A. Nallanathan, and L. Hanzo, "Weighted sum-rate maximization for the ultra-dense user-centric tdd c-ran downlink relying on imperfect csi," *IEEE Transactions on Wireless Communications*, vol. 18, no. 2, pp. 1182–1198, 2019.
- [186] Z. Babar, D. Chandra, H. V. Nguyen, P. Botsinis, D. Alanis, S. X. Ng, and L. Hanzo, "Duality of quantum and classical error correction codes: Design principles and examples," *IEEE Communications Surveys Tutorials*, vol. 21, no. 1, pp. 970–1010, 2019.
- [187] H. Fang, X. Wang, and L. Hanzo, "Learning-aided physical layer authentication as an intelligent process," *IEEE Transactions on Communications*, vol. 67, no. 3, pp. 2260–2273, 2019.
- [188] C. Pan, H. Ren, M. Elkashlan, A. Nallanathan, and L. Hanzo, "Robust beamforming design for ultra-dense user-centric c-ran in the face of realistic pilot contamination and limited feedback," *IEEE Transactions on Wireless Communications*, vol. 18, no. 2, pp. 780–795, 2019.
- [189] J. Zhang, S. Rajendran, Z. Sun, R. Woods, and L. Hanzo, "Physical layer security for the internet of things: Authentication and key generation," *IEEE Wireless Communications*, vol. 26, no. 5, pp. 92–98, 2019.
- [190] T. Bai, J. Wang, Y. Ren, and L. Hanzo, "Energy-efficient computation offloading for secure uav-edge-computing systems," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 6, pp. 6074–6087, 2019.
- [191] N. Ishikawa, R. Rajashekar, C. Xu, M. El-Hajjar, S. Sugiura, L. Yang, and L. Hanzo, "Differential-detection aided large-scale generalized spatial modulation is capable of operating in high-mobility millimeter-wave channels," *IEEE Journal of Selected Topics in Signal Processing*, vol. 13, no. 6, pp. 1360–1374, 2019.
- [192] L. T. Tan, R. Q. Hu, and L. Hanzo, "Heterogeneous networks relying on full-duplex relays and mobility-aware probabilistic caching," *IEEE Transactions on Communications*, vol. 67, no. 7, pp. 5037–5052, 2019.
- [193] B. Dutta, R. Budhiraja, R. D. Koilpillai, and L. Hanzo, "Analysis of quantized mrc-mrt precoder for fdd massive mimo two-way af relaying," *IEEE Transactions on Communications*, vol. 67, no. 2, pp. 988–1003, 2019.

- [194] Y. Li, S. Ghafoor, K. Satyanarayana, M. El-Hajjar, and L. Hanzo, "Analogue wireless beamforming exploiting the fibernonlinearity of radio over fiber-based c-rans," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 3, pp. 2802–2813, 2019.
- [195] C. Xu, T. Bai, J. Zhang, R. G. Maunder, S. Sugiura, Z. Wang, and L. Hanzo, "Constant-envelope space-time shift keying," *IEEE Journal of Selected Topics in Signal Processing*, vol. 13, no. 6, pp. 1387–1402, 2019.
- [196] Y. Cai, Y. Xu, Q. Shi, B. Champagne, and L. Hanzo, "Robust joint hybrid transceiver design for millimeter wave full-duplex mimo relay systems," *IEEE Transactions on Wireless Communications*, vol. 18, no. 2, pp. 1199–1215, 2019.
- [197] S. Lu, I. A. Hemadeh, M. El-Hajjar, and L. Hanzo, "Compressed sensing-aided multi-dimensional index modulation," *IEEE Transactions on Communications*, vol. 67, no. 6, pp. 4074–4087, 2019.
- [198] X. Zhou, J. Li, F. Shu, Q. Wu, Y. Wu, W. Chen, and L. Hanzo, "Secure swipt for directional modulation-aided af relaying networks," *IEEE Journal on Selected Areas in Communications*, vol. 37, no. 2, pp. 253–268, 2019.
- [199] L. Xiao, P. Xiao, Y. Xiao, H. Haas, A. Mohamed, and L. Hanzo, "Compressive sensing assisted generalized quadrature spatial modulation for massive mimo systems," *IEEE Transactions on Communications*, vol. 67, no. 7, pp. 4795–4810, 2019.
- [200] J. Zhang, T. Chen, S. Zhong, J. Wang, W. Zhang, X. Zuo, R. G. Maunder, and L. Hanzo, "Aeronautical ad hoc networking for the internet-above-the-clouds," *Proceedings of the IEEE*, vol. 107, no. 5, pp. 868–911, 2019.
- [201] J. Yang, B. Yang, S. Chen, Y. Zhang, Y. Zhang, and L. Hanzo, "Dynamic resource allocation for streaming scalable videos in sdn-aided dense small-cell networks," *IEEE Transactions on Communications*, vol. 67, no. 3, pp. 2114–2129, 2019.
- [202] K. Satyanarayana, M. El-Hajjar, A. A. M. Mourad, and L. Hanzo, "Multi-user full duplex transceiver design for mmwave systems using learning-aided channel prediction," *IEEE Access*, vol. 7, pp. 66068–66083, 2019.
- [203] Y. Huo, X. Wang, P. Zhang, J. Jiang, and L. Hanzo, "Unequal error protection aided region of interest aware wireless panoramic video," *IEEE Access*, vol. 7, pp. 80262–80276, 2019.
- [204] C. Xu, P. Zhang, R. Rajashekar, N. Ishikawa, S. Sugiura, Z. Wang, and L. Hanzo, "near-perfect finite-cardinality generalized space-time shift keying," *IEEE Journal on Selected Areas in Communications*, vol. 37, no. 9, pp. 2146–2164, 2019.
- [205] H. Sun, F. Zhou, R. Q. Hu, and L. Hanzo, "Robust beamforming design in a noma cognitive radio network relying on swipt," *IEEE Journal on Selected Areas in Communications*, vol. 37, no. 1, pp. 142–155, 2019.
- [206] A. Kudeshia, A. K. Jagannatham, and L. Hanzo, "Total variation based joint detection and state estimation for wireless communication in smart grids," *IEEE Access*, vol. 7, pp. 31 598–31 614, 2019.
- [207] L. T. Tan, R. Q. Hu, and L. Hanzo, "Twin-timescale artificial intelligence aided mobility-aware edge caching and computing in vehicular networks," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 4, pp. 3086–3099, 2019.
- [208] M. Moradikia, H. Bastami, A. Kuhestani, H. Behroozi, and L. Hanzo, "Cooperative secure transmission relying on optimal power allocation in the presence of untrusted relays, a passive eavesdropper and hardware impairments," *IEEE Access*, vol. 7, pp. 116942–116964, 2019.
- [209] X. Liu, Y. Liu, Y. Chen, and L. Hanzo, "Trajectory design and power control for multi-uav assisted wireless networks: A machine learning approach," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 8, pp. 7957–7969, 2019.
- [210] X. Gao, L. Dai, S. Zhou, A. M. Sayeed, and L. Hanzo, "Wideband beamspace channel estimation for millimeter-wave mimo systems relying on lens antenna arrays," *IEEE Transactions on Signal Processing*, vol. 67, no. 18, pp. 4809–4824, 2019.
- [211] J. Wang, S. Guan, C. Jiang, D. Alanis, Y. Ren, and L. Hanzo, "Network association in machine-learning aided cognitive radar and communication co-design," *IEEE Journal on Selected Areas in Communications*, vol. 37, no. 10, pp. 2322–2336, 2019.
- [212] D. Chandra, Z. Babar, H. V. Nguyen, D. Alanis, P. Botsinis, S. X. Ng, and L. Hanzo, "Quantum topological error correction codes are capable of improving the performance of clifford gates," *IEEE Access*, vol. 7, pp. 121 501–121 529, 2019.
- [213] H. Zhang, C. Jiang, L. Yang, E. Basar, and L. Hanzo, "Linear precoded index modulation," *IEEE Transactions on Communica*tions, vol. 67, no. 1, pp. 350–363, 2019.
- [214] J. Zhang, S. Chen, X. Guo, J. Shi, and L. Hanzo, "Boosting fronthaul capacity: Global optimization of power sharing for centralized radio access network," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 2, pp. 1916–1929, 2019.

- [215] L. Xiang, M. F. Brejza, R. G. Maunder, B. M. Al-Hashimi, and L. Hanzo, "Arbitrarily parallel turbo decoding for ultra-reliable low latency communication in 3gpp Ite," *IEEE Journal on Selected Areas in Communications*, vol. 37, no. 4, pp. 826–838, 2019.
- [216] C. Xu, T. Bai, J. Zhang, R. Rajashekar, R. G. Maunder, Z. Wang, and L. Hanzo, "Adaptive coherent/non-coherent spatial modulation aided unmanned aircraft systems," *IEEE Wireless Communications*, vol. 26, no. 4, pp. 170–177, 2019.
- [217] S. Lu, M. El-Hajjar, and L. Hanzo, "Two-dimensional index modulation for the large-scale multi-user mimo uplink," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 8, pp. 7904–7918, 2019.
- [218] X. Miao, S. Yang, C. Wang, S. Wang, and L. Hanzo, "On the energy efficiency of interference alignment in the *k* -user interference channel," *IEEE Access*, vol. 7, pp. 97 253–97 263, 2019.
- [219] R. Duan, J. Wang, C. Jiang, Y. Ren, and L. Hanzo, "The transmit-energy vs computation-delay trade-off in gateway-selection for heterogenous cloud aided multi-uav systems," *IEEE Transactions on Communications*, vol. 67, no. 4, pp. 3026–3039, 2019.
- [220] X. Zhang, S. Wu, S. Yu, J. Liu, and L. Hanzo, "Achievable rate analysis of the generalized spatial modulation uplink in multi-cell multi-user systems in the face of pilot contamination," *IEEE Transactions on Vehicular Technology*, vol. 68, no. 9, pp. 8435–8448, 2019.
- [221] T. Bai, H. Zhang, J. Zhang, C. Xu, A. F. A. Rawi, and L. Hanzo, "Impulsive noise mitigation in digital subscriber lines: The state-of-the-art and research opportunities," *IEEE Communications Magazine*, vol. 57, no. 5, pp. 145–151, 2019.
- [222] R. Rajashekar, C. Xu, N. Ishikawa, L. L. Yang, and L. Hanzo, "Multicarrier division duplex aided millimeter wave communications," *IEEE Access*, vol. 7, pp. 100719–100732, 2019.
- [223] D. P. Mandic, P. M. Djuric, A. Cichocki, C. Cheong-Took, S. Sanei, and L. Hanzo, "Quo vadis icassp: Echoes of 2019 icassp in brighton, united kingdom: Signal processing meets the needs of modern humankind [conference highlights]," *IEEE Signal Processing Magazine*, vol. 36, no. 5, pp. 127–134, 2019.
- [224] I. F. Akyildiz, M. Pierobon, S. Balasubramaniam, J. Zhang, T. Chen, S. Zhong, J. Wang, W. Zhang, X. Zuo, R. G. Maunder, L. Hanzo, J. Chen, J. Liu, V. D. Calhoun, and A. B. Magoun, "Scanning the issue," *Proceedings of the IEEE*, vol. 107, no. 5, pp. 866–867, 2019.
- [225] I. Kang, H. Kim, and L. H. Hanzo, "Exit-chart aided design of row-permutation assisted twin-interleaver bicm-id," *IEEE Trans*actions on Broadcasting, vol. 64, no. 1, pp. 85–95, March 2018.
- [226] L. Xiao, Y. Xiao, C. Xu, X. Lei, P. Yang, S. Li, and L. Hanzo, "Compressed-sensing assisted spatial multiplexing aided spatial modulation," *IEEE Transactions on Wireless Communications*, vol. 17, no. 2, pp. 794–807, Feb 2018.
- [227] V. M. Baeza, A. G. Armada, W. Zhang, M. El-Hajjar, and L. Hanzo, "A noncoherent multiuser large-scale simo system relying on m-ary dpsk and bicm-id," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 2, pp. 1809–1814, Feb 2018.
- [228] N. Ishikawa, S. Sugiura, and L. Hanzo, "50 years of permutation, spatial and index modulation: From classic rf to visible light communications and data storage," *IEEE Communications Surveys Tutorials*, vol. 20, no. 3, pp. 1905–1938, thirdquarter 2018.
- [229] C. Pan, M. Elkashlan, J. Wang, J. Yuan, and L. Hanzo, "User-centric c-ran architecture for ultra-dense 5g networks: Challenges and methodologies," *IEEE Communications Magazine*, vol. 56, no. 6, pp. 14–20, June 2018.
- [230] M. A. Mohd Izhar, Z. Babar, H. V. Nguyen, P. Botsinis, D. Alanis, D. Chandra, S. X. Ng, and L. Hanzo, "Quantum turbo decoding for quantum channels exhibiting memory," *IEEE Access*, vol. 6, pp. 12369–12381, 2018.
- [231] J. Zhang, S. Chen, R. G. Maunder, R. Zhang, and L. Hanzo, "Adaptive coding and modulation for large-scale antenna arraybased aeronautical communications in the presence of co-channel interference," *IEEE Transactions on Wireless Communications*, vol. 17, no. 2, pp. 1343–1357, Feb 2018.
- [232] J. Zhang, A. Marshall, and L. Hanzo, "Channel-envelope differencing eliminates secret key correlation: Lora-based key generation in low power wide area networks," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 12, pp. 12462–12466, Dec 2018.
- [233] C. Wei, X. Zhou, L. Wang, P. Tian, and L. Hanzo, "Soft iterative quantum receivers approaching the helstrom limit using realistic quantum devices," *IEEE Access*, vol. 6, pp. 10197–10207, 2018.
- [234] Y. Liu, L. Yang, and L. Hanzo, "Spatial modulation aided sparse code-division multiple access," *IEEE Transactions on Wireless Communications*, vol. 17, no. 3, pp. 1474–1487, March 2018.

- [235] F. Wang, C. Liu, Q. Wang, J. Zhang, R. Zhang, L. Yang, and L. Hanzo, "Optical jamming enhances the secrecy performance of the generalized space-shift-keying-aided visible-light downlink," *IEEE Transactions on Communications*, vol. 66, no. 9, pp. 4087–4102, Sep. 2018.
- [236] Y. Zhang, R. Zhang, A. F. Al Rawi, and L. Hanzo, "Approximate perturbation aided lattice encoding (apple) for g.fast and beyond," *IEEE Access*, vol. 6, pp. 53 438–53 451, 2018.
- [237] L. Xiao, P. Xiao, Y. Xiao, C. Wu, H. V. Nguyen, I. A. Hemadeh, and L. Hanzo, "Transmit antenna combination optimization for generalized spatial modulation systems," *IEEE Access*, vol. 6, pp. 41 866–41 882, 2018.
- [238] Z. Babar, M. A. Mohd Izhar, H. V. Nguyen, P. Botsinis, D. Alanis, D. Chandra, S. X. Ng, R. G. Maunder, and L. Hanzo, "Unarycoded dimming control improves on-off keying visible light communication," *IEEE Transactions on Communications*, vol. 66, no. 1, pp. 255–264, Jan 2018.
- [239] X. Lin, S. Wu, C. Jiang, L. Kuang, J. Yan, and L. Hanzo, "Estimation of broadband multiuser millimeter wave massive mimoofdm channels by exploiting their sparse structure," *IEEE Transactions on Wireless Communications*, vol. 17, no. 6, pp. 3959– 3973, June 2018.
- [240] R. Rajashekar, K. V. S. HARI, and L. Hanzo, "Transmit antenna subset selection in spatial modulation relying on a realistic error-infested feedback channel," *IEEE Access*, vol. 6, pp. 5879–5890, 2018.
- [241] J. Wang, C. Jiang, Z. Han, Y. Ren, and L. Hanzo, "Internet of vehicles: Sensing-aided transportation information collection and diffusion," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 5, pp. 3813–3825, May 2018.
- [242] A. Behnad, X. Wang, L. Hanzo, and T. J. Willink, "Connectivity-based centroid localization using distributed dense reference nodes," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 7, pp. 6685–6689, July 2018.
- [243] S. Lu, I. A. Hemadeh, M. El-Hajjar, and L. Hanzo, "Compressed-sensing-aided space-time frequency index modulation," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 7, pp. 6259–6271, July 2018.
- [244] L. Wang, M. Guan, Y. Ai, Y. Chen, B. Jiao, and L. Hanzo, "Beamforming-aided noma expedites collaborative multiuser computational offloading," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 10, pp. 10027–10032, Oct 2018.
- [245] M. A. M. Izhar, Z. Babar, S. X. Ng, and L. Hanzo, "Entanglement-assisted classical communication over quantum channels for binary markov sources," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 5, pp. 3866–3873, May 2018.
- [246] P. Botsinis, I. Hemadeh, D. Alanis, Z. Babar, H. V. Nguyen, D. Chandra, S. X. Ng, M. El-Hajjar, and L. Hanzo, "Joint-alphabet space time shift keying in mm-wave non-orthogonal multiple access," *IEEE Access*, vol. 6, pp. 22602–22621, 2018.
- [247] R. Zhang, Y. Cui, H. Claussen, H. Haas, and L. Hanzo, "Anticipatory association for indoor visible light communications: Light, follow me!" *IEEE Transactions on Wireless Communications*, vol. 17, no. 4, pp. 2499–2510, April 2018.
- [248] A. Ahmed, P. Botsinis, S. Won, L. Yang, and L. Hanzo, "Exit chart aided convergence analysis of recursive soft *m*-sequence initial acquisition in nakagami-m fading channels," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 5, pp. 4655–4660, May 2018.
- [249] N. Ishikawa, R. Rajashekar, C. Xu, S. Sugiura, and L. Hanzo, "Differential space-time coding dispensing with channel estimation approaches the performance of its coherent counterpart in the open-loop massive mimo-ofdm downlink," *IEEE Transactions on Communications*, vol. 66, no. 12, pp. 6190–6204, Dec 2018.
- [250] M. A. M. Izhar, A. J. Aljohani, S. X. Ng, and L. Hanzo, "Distributed joint source coding and trellis coded modulation for symbol-based markov sources," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 5, pp. 4031–4041, May 2018.
- [251] L. Xiao, P. Xiao, Y. Xiao, I. Hemadeh, A. Mohamed, and L. Hanzo, "Bayesian compressive sensing assisted spacetime block coded quadrature spatial modulation," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 10, pp. 10044–10048, Oct 2018.
- [252] E. Sharma, R. Budhiraja, K. Vasudevan, and L. Hanzo, "Full-duplex massive mimo multi-pair two-way af relaying: Energy efficiency optimization," *IEEE Transactions on Communications*, vol. 66, no. 8, pp. 3322–3340, Aug 2018.
- [253] J. Mirza, G. Zheng, K. Wong, S. Lambotharan, and L. Hanzo, "On the performance of multiuser mimo systems relying on full-duplex csi acquisition," *IEEE Transactions on Communications*, vol. 66, no. 10, pp. 4563–4577, Oct 2018.
- [254] Y. Liu, H. Xing, C. Pan, A. Nallanathan, M. Elkashlan, and L. Hanzo, "Multiple-antenna-assisted non-orthogonal multiple access," *IEEE Wireless Communications*, vol. 25, no. 2, pp. 17–23, April 2018.

- [255] P. Hailes, L. Xu, R. G. Maunder, B. M. Al-Hashimi, and L. Hanzo, "Hardware-efficient node processing unit architectures for flexible ldpc decoder implementations," *IEEE Transactions on Circuits and Systems II: Express Briefs*, vol. 65, no. 12, pp. 1919– 1923, Dec 2018.
- [256] B. Genovs Guzmn, V. P. Gil Jimnez, M. C. Aguayo-Torres, H. Haas, and L. Hanzo, "Downlink performance of optical ofdm in outdoor visible light communication," *IEEE Access*, vol. 6, pp. 76854–76866, 2018.
- [257] J. Zhang, L. Dai, X. Li, Y. Liu, and L. Hanzo, "On low-resolution adcs in practical 5g millimeter-wave massive mimo systems," *IEEE Communications Magazine*, vol. 56, no. 7, pp. 205–211, July 2018.
- [258] P. Yang, Y. Xiao, Y. L. Guan, M. Di Renzo, S. Li, and L. Hanzo, "Multidomain index modulation for vehicular and railway communications: A survey of novel techniques," *IEEE Vehicular Technology Magazine*, vol. 13, no. 3, pp. 124–134, Sep. 2018.
- [259] M. A. M. Izhar, A. J. Aljohani, S. X. Ng, and L. Hanzo, "Joint decoding and estimation of spatio-temporally correlated binary sources," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 7, pp. 6690–6694, July 2018.
- [260] Y. Ai, L. Wang, Z. Han, P. Zhang, and L. Hanzo, "Social networking and caching aided collaborative computing for the internet of things," *IEEE Communications Magazine*, vol. 56, no. 12, pp. 149–155, December 2018.
- [261] P. Botsinis, D. Alanis, C. Xu, Z. Babar, D. Chandra, S. X. Ng, and L. Hanzo, "Air-to-ground noma systems for the internet-abovethe-clouds," *IEEE Access*, vol. 6, pp. 47442–47460, 2018.
- [262] J. Zhang, S. Chen, R. G. Maunder, R. Zhang, and L. Hanzo, "Regularized zero-forcing precoding-aided adaptive coding and modulation for large-scale antenna array-based air-to-air communications," *IEEE Journal on Selected Areas in Communications*, vol. 36, no. 9, pp. 2087–2103, Sep. 2018.
- [263] D. Alanis, P. Botsinis, Z. Babar, H. V. Nguyen, D. Chandra, S. X. Ng, and L. Hanzo, "Quantum-aided multi-objective routing optimization using back-tracing-aided dynamic programming," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 8, pp. 7856–7860, Aug 2018.
- [264] Y. Li, M. El-Hajjar, and L. Hanzo, "Joint space-time block-coding and beamforming for the multiuser radio over plastic fiber downlink," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 3, pp. 2781–2786, March 2018.
- [265] L. Wan, Z. Guo, Y. Wu, W. Bi, J. Yuan, M. Elkashlan, and L. Hanzo, "4g5g spectrum sharing: Efficient 5g deployment to serve enhanced mobile broadband and internet of things applications," *IEEE Vehicular Technology Magazine*, vol. 13, no. 4, pp. 28–39, Dec 2018.
- [266] I. A. Hemadeh, S. Lu, M. El-Hajjar, and L. Hanzo, "Compressed sensing-aided index modulation improves space-time shift keying assisted millimeter-wave communications," *IEEE Access*, vol. 6, pp. 64742–64756, 2018.
- [267] R. Rajashekar, K. V. S. Hari, and L. Hanzo, "Transmit antenna subset selection for single and multiuser spatial modulation systems operating in frequency selective channels," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 7, pp. 6156–6169, July 2018.
- [268] S. Feng, R. Zhang, X. Li, Q. Wang, and L. Hanzo, "Dynamic throughput maximization for the user-centric visible light downlink in the face of practical considerations," *IEEE Transactions on Wireless Communications*, vol. 17, no. 8, pp. 5001–5015, Aug 2018.
- [269] W. Liu, S. Xue, J. Li, and L. Hanzo, "Topological interference management for wireless networks," *IEEE Access*, vol. 6, pp. 76942–76955, 2018.
- [270] L. Xiao, Y. Xiao, L. You, P. Yang, S. Li, and L. Hanzo, "Single-rf and twin-rf spatial modulation for an arbitrary number of transmit antennas," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 7, pp. 6311–6324, July 2018.
- [271] H. Ren, N. Liu, C. Pan, M. Elkashlan, A. Nallanathan, X. You, and L. Hanzo, "Low-latency c-ran: An next-generation wireless approach," *IEEE Vehicular Technology Magazine*, vol. 13, no. 2, pp. 48–56, June 2018.
- [272] X. Li, R. Zhang, and L. Hanzo, "Optimization of visible-light optical wireless systems: Network-centric versus user-centric designs," *IEEE Communications Surveys Tutorials*, vol. 20, no. 3, pp. 1878–1904, thirdquarter 2018.
- [273] Y. Lin, R. Zhang, L. Yang, and L. Hanzo, "Modularity-based user-centric clustering and resource allocation for ultra dense networks," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 12, pp. 12457–12461, Dec 2018.
- [274] Z. Wei, X. Zhu, S. Sun, J. Wang, and L. Hanzo, "Energy-efficient full-duplex cooperative nonorthogonal multiple access," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 10, pp. 10123–10128, Oct 2018.

- [275] F. Wang, C. Liu, Q. Wang, J. Zhang, R. Zhang, L. Yang, and L. Hanzo, "Secrecy analysis of generalized space-shift keying aided visible light communication," *IEEE Access*, vol. 6, pp. 18 310–18 324, 2018.
- [276] I. A. Hemadeh, K. Satyanarayana, M. El-Hajjar, and L. Hanzo, "Millimeter-wave communications: Physical channel models, design considerations, antenna constructions, and link-budget," *IEEE Communications Surveys Tutorials*, vol. 20, no. 2, pp. 870–913, Secondquarter 2018.
- [277] Y. Lin, R. Zhang, C. Li, L. Yang, and L. Hanzo, "Graph-based joint user-centric overlapped clustering and resource allocation in ultradense networks," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 5, pp. 4440–4453, May 2018.
- [278] L. Dai, B. Wang, Z. Ding, Z. Wang, S. Chen, and L. Hanzo, "A survey of non-orthogonal multiple access for 5g," *IEEE Communications Surveys Tutorials*, vol. 20, no. 3, pp. 2294–2323, thirdquarter 2018.
- [279] R. Rajashekar, M. Di Renzo, K. V. S. Hari, and L. Hanzo, "A beamforming-aided full-diversity scheme for low-altitude air-toground communication systems operating with limited feedback," *IEEE Transactions on Communications*, vol. 66, no. 12, pp. 6602–6613, Dec 2018.
- [280] J. Zhang, S. Chen, R. Zhang, A. F. Al Rawi, and L. Hanzo, "Differential evolution algorithm aided turbo channel estimation and multi-user detection for g.fast systems in the presence of fext," *IEEE Access*, vol. 6, pp. 33 111–33 128, 2018.
- [281] D. Alanis, P. Botsinis, Z. Babar, H. V. Nguyen, D. Chandra, S. X. Ng, and L. Hanzo, "A quantum-search-aided dynamic programming framework for pareto optimal routing in wireless multihop networks," *IEEE Transactions on Communications*, vol. 66, no. 8, pp. 3485–3500, Aug 2018.
- [282] H. Ren, N. Liu, C. Pan, M. Elkashlan, A. Nallanathan, X. You, and L. Hanzo, "Power- and rate-adaptation improves the effective capacity of c-ran for nakagami- *m* fading channels," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 11, pp. 10841– 10855, Nov 2018.
- [283] I. A. Hemadeh, M. El-Hajjar, and L. Hanzo, "Hierarchical multi-functional layered spatial modulation," *IEEE Access*, vol. 6, pp. 9492–9533, 2018.
- [284] Y. Li, I. A. Hemadeh, M. El-Hajjar, and L. Hanzo, "Radio over fiber downlink design for spatial modulation and multi-set space-time shift-keying," *IEEE Access*, vol. 6, pp. 21 812–21 827, 2018.
- [285] J. Wang, C. Jiang, H. Zhang, X. Zhang, V. C. M. Leung, and L. Hanzo, "Learning-aided network association for hybrid indoor lifi-wifi systems," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 4, pp. 3561–3574, April 2018.
- [286] N. Varshney, A. K. Jagannatham, and L. Hanzo, "Asymptotic ser analysis and optimal power sharing for dual-phase and multiphase multiple-relay cooperative systems," *IEEE Access*, vol. 6, pp. 50404–50423, 2018.
- [287] G. Ding, Y. Jiao, J. Wang, Y. Zou, Q. Wu, Y. Yao, and L. Hanzo, "Spectrum inference in cognitive radio networks: Algorithms and applications," *IEEE Communications Surveys Tutorials*, vol. 20, no. 1, pp. 150–182, Firstquarter 2018.
- [288] C. Xu, R. Rajashekar, N. Ishikawa, S. Sugiura, and L. Hanzo, "Single-rf index shift keying aided differential spacetime block coding," *IEEE Transactions on Signal Processing*, vol. 66, no. 3, pp. 773–788, Feb 2018.
- [289] D. Chandra, Z. Babar, H. V. Nguyen, D. Alanis, P. Botsinis, S. X. Ng, and L. Hanzo, "Quantum topological error correction codes: The classical-to-quantum isomorphism perspective," *IEEE Access*, vol. 6, pp. 13729–13757, 2018.
- [290] L. Li, Z. Ma, P. Z. Fan, and L. Hanzo, "High-dimensional codebook design for the scma down link," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 10, pp. 10118–10122, Oct 2018.
- [291] W. Shen, L. Dai, Y. Li, Z. Wang, and L. Hanzo, "Channel feedback codebook design for millimeter-wave massive mimo systems relying on lens antenna array," *IEEE Wireless Communications Letters*, vol. 7, no. 5, pp. 736–739, Oct 2018.
- [292] K. Satyanarayana, M. El-Hajjar, P. Kuo, A. Mourad, and L. Hanzo, "Dual-function hybrid beamforming and transmit diversity aided millimeter wave architecture," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 3, pp. 2798–2803, March 2018.
- [293] S. Gupta, R. Zhang, and L. Hanzo, "Energy harvesting aided device-to-device communication in the over-sailing heterogeneous two-tier downlink," *IEEE Access*, vol. 6, pp. 245–261, 2018.
- [294] J. Yang, P. Si, Z. Wang, X. Jiang, and L. Hanzo, "Dynamic resource allocation and layer selection for scalable video streaming in femtocell networks: A twin-time-scale approach," *IEEE Transactions on Communications*, vol. 66, no. 8, pp. 3455–3470, Aug 2018.

- [295] W. Liu, Z. Wang, J. Cao, S. Chen, and L. Hanzo, "Partially-activated conjugate beamforming for los massive mimo communications," *IEEE Access*, vol. 6, pp. 56504–56513, 2018.
- [296] A. Prez-Pascual, A. Hamilton, R. G. Maunder, and L. Hanzo, "Conceiving extrinsic information transfer charts for stochastic low-density parity-check decoders," *IEEE Access*, vol. 6, pp. 55741–55753, 2018.
- [297] M. I. Kadir, H. Zhang, S. Chen, and L. Hanzo, "Entropy coding aided adaptive subcarrier-index modulated ofdm," *IEEE Access*, vol. 6, pp. 7739–7752, 2018.
- [298] H. V. Nguyen, S. X. Ng, W. Liang, P. Xiao, and L. Hanzo, "A network-coding aided road-map of large-scale near-capacity cooperative communications," *IEEE Access*, vol. 6, pp. 21 592–21 620, 2018.
- [299] C. Pan, H. Ren, M. Elkashlan, A. Nallanathan, and L. Hanzo, "The non-coherent ultra-dense c-ran is capable of outperforming its coherent counterpart at a limited fronthaul capacity," *IEEE Journal on Selected Areas in Communications*, vol. 36, no. 11, pp. 2549–2560, Nov 2018.
- [300] G. Zhao, S. Chen, L. Zhao, and L. Hanzo, "Energy-spectral-efficiency analysis and optimization of heterogeneous cellular networks: A large-scale user-behavior perspective," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 5, pp. 4098–4112, May 2018.
- [301] W. Yuan, N. Wu, C. Yan, Y. Li, X. Huang, and L. Hanzo, "A low-complexity energy-minimization-based scma detector and its convergence analysis," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 12, pp. 12 398–12 403, Dec 2018.
- [302] F. Liu, C. Masouros, A. Li, H. Sun, and L. Hanzo, "Mu-mimo communications with mimo radar: From co-existence to joint transmission," *IEEE Transactions on Wireless Communications*, vol. 17, no. 4, pp. 2755–2770, April 2018.
- [303] H. Zhang, N. Liu, K. Long, J. Cheng, V. C. M. Leung, and L. Hanzo, "Energy efficient subchannel and power allocation for software-defined heterogeneous vlc and rf networks," *IEEE Journal on Selected Areas in Communications*, vol. 36, no. 3, pp. 658–670, March 2018.
- [304] A. Patel, M. Z. A. Khan, S. N. Merchant, U. B. Desai, and L. Hanzo, "How many cognitive channels should the primary user share?" *IEEE Wireless Communications*, vol. 25, no. 5, pp. 78–85, October 2018.
- [305] Y. Lin, R. Zhang, L. Yang, and L. Hanzo, "Secure user-centric clustering for energy efficient ultra-dense networks: Design and optimization," *IEEE Journal on Selected Areas in Communications*, vol. 36, no. 7, pp. 1609–1621, July 2018.
- [306] J. Wang, C. Jiang, K. Zhang, T. Q. S. Quek, Y. Ren, and L. Hanzo, "Vehicular sensing networks in a smart city: Principles, technologies and applications," *IEEE Wireless Communications*, vol. 25, no. 1, pp. 122–132, February 2018.
- [307] Z. Gao, L. Dai, S. Han, C. I, Z. Wang, and L. Hanzo, "Compressive sensing techniques for next-generation wireless communications," *IEEE Wireless Communications*, vol. 25, no. 3, pp. 144–153, JUNE 2018.
- [308] R. Guo, Y. Cai, M. Zhao, Q. Shi, B. Champagne, and L. Hanzo, "Joint design of beam selection and precoding matrices for mmwave mu-mimo systems relying on lens antenna arrays," *IEEE Journal of Selected Topics in Signal Processing*, vol. 12, no. 2, pp. 313–325, May 2018.
- [309] K. Satyanarayana, M. El-Hajjar, P. Kuo, A. A. M. Mourad, and L. Hanzo, "Adaptive transceiver design for c-ran in mmwave communications," *IEEE Access*, vol. 6, pp. 16770–16782, 2018.
- [310] Q. Wang, R. Zhang, L. Yang, and L. Hanzo, "Non-orthogonal multiple access: A unified perspective," *IEEE Wireless Communi*cations, vol. 25, no. 2, pp. 10–16, April 2018.
- [311] F. D. Calabrese, L. Wang, E. Ghadimi, G. Peters, L. Hanzo, and P. Soldati, "Learning radio resource management in rans: Framework, opportunities, and challenges," *IEEE Communications Magazine*, vol. 56, no. 9, pp. 138–145, Sep. 2018.
- [312] F. Zhou, Z. Chu, H. Sun, R. Q. Hu, and L. Hanzo, "Artificial noise aided secure cognitive beamforming for cooperative miso-noma using swipt," *IEEE Journal on Selected Areas in Communications*, vol. 36, no. 4, pp. 918–931, April 2018.
- [313] K. Satyanarayana, T. Ivanescu, M. El-Hajjar, P. . Kuo, A. Mourad, and L. Hanzo, "Hybrid beamforming design for dual-polarised millimetre wave mimo systems," *Electronics Letters*, vol. 54, no. 22, pp. 1257–1258, 2018.
- [314] J. Hu, K. Yang, G. Wen, and L. Hanzo, "Integrated data and energy communication network: A comprehensive survey," *IEEE Communications Surveys Tutorials*, vol. 20, no. 4, pp. 3169–3219, Fourthquarter 2018.

- [315] H. Yetgin, K. T. K. Cheung, M. El-Hajjar, and L. H. Hanzo, "A survey of network lifetime maximization techniques in wireless sensor networks," *IEEE Communications Surveys Tutorials*, vol. 19, no. 2, pp. 828–854, Secondquarter 2017.
- [316] I. A. Hemadeh, P. Botsinis, M. El-Hajjar, S. Won, and L. Hanzo, "Reduced-rf-chain aided soft-decision multi-set steered spacetime shift-keying for millimeter-wave communications," *IEEE Access*, vol. 5, pp. 7223–7243, 2017.
- [317] R. Rajashekar, M. D. Renzo, K. V. S. Hari, and L. Hanzo, "A generalized transmit and receive diversity condition for feedbackassisted mimo systems: Theory and applications in full-duplex spatial modulation," *IEEE Transactions on Signal Processing*, vol. 65, no. 24, pp. 6505–6519, Dec 2017.
- [318] Y. Huo, P. T. Kovcs, T. J. Naughton, and L. Hanzo, "Wireless holographic image communications relying on unequal error protected bitplanes," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 8, pp. 7136–7148, Aug 2017.
- [319] D. Chandra, Z. Babar, H. V. Nguyen, D. Alanis, P. Botsinis, S. X. Ng, and L. Hanzo, "Quantum coding bounds and a closed-form approximation of the minimum distance versus quantum coding rate," *IEEE Access*, vol. 5, pp. 11557–11581, 2017.
- [320] P. Botsinis, D. Alanis, Z. Babar, S. X. Ng, and L. Hanzo, "Coherent versus non-coherent quantum-assisted solutions in wireless systems," *IEEE Wireless Communications*, vol. 24, no. 6, pp. 144–153, Dec 2017.
- [321] C. Xu, S. Sugiura, S. X. Ng, P. Zhang, L. Wang, and L. Hanzo, "Two decades of mimo design tradeoffs and reduced-complexity mimo detection in near-capacity systems," *IEEE Access*, vol. 5, pp. 18564–18632, 2017.
- [322] Y. Chen, L. Wang, Y. Ai, B. Jiao, and L. Hanzo, "Performance analysis of noma-sm in vehicle-to-vehicle massive mimo channels," *IEEE Journal on Selected Areas in Communications*, vol. 35, no. 12, pp. 2653–2666, Dec 2017.
- [323] X. Zhang, Q. Wang, R. Zhang, S. Chen, and L. Hanzo, "Performance analysis of layered aco-ofdm," *IEEE Access*, vol. 5, pp. 18366–18381, 2017.
- [324] C. Masouros and L. Hanzo, "A scalable performance complexity tradeoff for constellation randomization in spatial modulation," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 3, pp. 2834–2838, March 2017.
- [325] Z. Fei, B. Li, S. Yang, C. Xing, H. Chen, and L. Hanzo, "A survey of multi-objective optimization in wireless sensor networks: Metrics, algorithms, and open problems," *IEEE Communications Surveys Tutorials*, vol. 19, no. 1, pp. 550–586, Firstquarter 2017.
- [326] T. Mao, Z. Wang, Q. Wang, S. Chen, and L. Hanzo, "Dual-mode index modulation aided ofdm," *IEEE Access*, vol. 5, pp. 50–60, 2017.
- [327] Y. Liu, Z. Qin, M. Elkashlan, Y. Gao, and L. Hanzo, "Enhancing the physical layer security of non-orthogonal multiple access in large-scale networks," *IEEE Transactions on Wireless Communications*, vol. 16, no. 3, pp. 1656–1672, March 2017.
- [328] R. Zhang, A. F. A. Rawi, L. D. Humphrey, and L. Hanzo, "Expanded constellation mapping for enhanced far-end-cross-talk cancellation in g.fast," *IEEE Communications Letters*, vol. 21, no. 1, pp. 56–59, Jan 2017.
- [329] L. He, J. Wang, J. Song, and L. Hanzo, "On the multi-user multi-cell massive spatial modulation uplink: How many antennas for each user?" *IEEE Transactions on Wireless Communications*, vol. 16, no. 3, pp. 1437–1451, March 2017.
- [330] X. Li, Y. Huo, R. Zhang, and L. Hanzo, "User-centric visible light communications for energy-efficient scalable video streaming," *IEEE Transactions on Green Communications and Networking*, vol. 1, no. 1, pp. 59–73, March 2017.
- [331] T. Bai, C. Xu, R. Zhang, A. F. A. Rawi, and L. Hanzo, "Joint impulsive noise estimation and data detection conceived for ldpc-coded dmt-based dsl systems," *IEEE Access*, vol. 5, pp. 23133–23145, 2017.
- [332] Y. Chen, M. Ding, J. Li, Z. Lin, G. Mao, and L. Hanzo, "Probabilistic small-cell caching: Performance analysis and optimization," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 5, pp. 4341–4354, May 2017.
- [333] W. Liang, S. X. Ng, and L. Hanzo, "Cooperative overlay spectrum access in cognitive radio networks," *IEEE Communications Surveys Tutorials*, vol. 19, no. 3, pp. 1924–1944, thirdquarter 2017.
- [334] A. K. Dutta, K. V. S. Hari, C. R. Murthy, N. B. Mehta, and L. Hanzo, "Minimum error probability mimo-aided relaying: Multihop, parallel, and cognitive designs," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 6, pp. 5435–5440, June 2017.
- [335] Y. Liu, Z. Qin, M. Elkashlan, Z. Ding, A. Nallanathan, and L. Hanzo, "Nonorthogonal multiple access for 5g and beyond," *Proceedings of the IEEE*, vol. 105, no. 12, pp. 2347–2381, Dec 2017.

- [336] X. Ding, T. Song, Y. Zou, X. Chen, and L. Hanzo, "Security-reliability tradeoff analysis of artificial noise aided two-way opportunistic relay selection," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 5, pp. 3930–3941, May 2017.
- [337] J. Wang, C. Jiang, Z. Han, Y. Ren, R. G. Maunder, and L. Hanzo, "Taking drones to the next level: Cooperative distributed unmanned-aerial-vehicular networks for small and mini drones," *IEEE Vehicular Technology Magazine*, vol. 12, no. 3, pp. 73–82, Sept 2017.
- [338] P. Botsinis, Y. Huo, D. Alanis, Z. Babar, S. X. Ng, and L. Hanzo, "Quantum search-aided multi-user detection of idma-assisted multi-layered video streaming," *IEEE Access*, vol. 5, pp. 23233–23255, 2017.
- [339] L. Li, Z. Ma, L. Wang, P. Z. Fan, and L. Hanzo, "Cutoff rate of sparse code multiple access in downlink broadcast channels," *IEEE Transactions on Communications*, vol. 65, no. 8, pp. 3328–3342, Aug 2017.
- [340] R. Rajashekar and L. Hanzo, "User selection algorithms for block diagonalization aided multiuser downlink mm-wave communication," *IEEE Access*, vol. 5, pp. 5760–5772, 2017.
- [341] A. U. Rehman, L. Yang, and L. Hanzo, "Delay and throughput analysis of cognitive go-back-n harq in the face of imperfect sensing," *IEEE Access*, vol. 5, pp. 7454–7473, 2017.
- [342] N. Ishikawa, R. Rajashekar, S. Sugiura, and L. Hanzo, "Generalized-spatial-modulation-based reduced-rf-chain millimeter-wave communications," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 1, pp. 879–883, Jan 2017.
- [343] Y. Yang, W. Chen, O. Li, K. Ke, and L. Hanzo, "Trellis- and network-coded modulation for decode-and-forward two-way relaying over time-varying channels," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 6, pp. 4845–4858, June 2017.
- [344] C. Jiang, H. Zhang, Y. Ren, Z. Han, K. Chen, and L. Hanzo, "Machine learning paradigms for next-generation wireless networks," *IEEE Wireless Communications*, vol. 24, no. 2, pp. 98–105, April 2017.
- [345] I. A. Hemadeh, M. El-Hajjar, S. Won, and L. Hanzo, "Multiuser steered multiset space-time shift keying for millimeter-wave communications," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 6, pp. 5491–5495, June 2017.
- [346] C. Jiang, L. Kuang, Z. Han, Y. Ren, and L. Hanzo, "Information credibility modeling in cooperative networks: Equilibrium and mechanism design," *IEEE Journal on Selected Areas in Communications*, vol. 35, no. 2, pp. 432–448, Feb 2017.
- [347] H. V. Nguyen, P. V. Trinh, A. T. Pham, Z. Babar, D. Alanis, P. Botsinis, D. Chandra, S. X. Ng, and L. Hanzo, "Network coding aided cooperative quantum key distribution over free-space optical channels," *IEEE Access*, vol. 5, pp. 12301–12317, 2017.
- [348] W. Liu, Z. Wang, C. Sun, S. Chen, and L. Hanzo, "Structured non-uniformly spaced rectangular antenna array design for fd-mimo systems," *IEEE Transactions on Wireless Communications*, vol. 16, no. 5, pp. 3252–3266, May 2017.
- [349] Z. Babar, C. Zhu, H. V. Nguyen, P. Botsinis, D. Alanis, D. Chandra, S. X. Ng, and L. Hanzo, "Reduced-complexity iterative receiver for improving the ieee 802.15.7 convolutional-coded color shift keying mode," *IEEE Communications Letters*, vol. 21, no. 9, pp. 2005–2008, Sept 2017.
- [350] Y. Zhou, Z. Fei, S. Yang, J. Kuang, S. Chen, and L. Hanzo, "Joint angle estimation and signal reconstruction for coherently distributed sources in massive mimo systems based on 2-d unitary esprit," *IEEE Access*, vol. 5, pp. 9632–9646, 2017.
- [351] S. Gupta, R. Zhang, and L. Hanzo, "Energy harvesting aided device-to-device communication underlaying the cellular downlink," *IEEE Access*, vol. 5, pp. 7405–7413, 2017.
- [352] A. Patel, M. Z. A. Khan, S. N. Merchant, U. B. Desai, and L. Hanzo, "The achievable rate of interweave cognitive radio in the face of sensing errors," *IEEE Access*, vol. 5, pp. 8579–8605, 2017.
- [353] H. Ren, N. Liu, C. Pan, and L. Hanzo, "Joint fronthaul link selection and transmit precoding for energy efficiency maximization of multiuser mimo-aided distributed antenna systems," *IEEE Transactions on Communications*, vol. 65, no. 12, pp. 5180–5196, Dec 2017.
- [354] T. Bai, H. Zhang, R. Zhang, L. Yang, A. F. A. Rawi, J. Zhang, and L. Hanzo, "Discrete multi-tone digital subscriber loop performance in the face of impulsive noise," *IEEE Access*, vol. 5, pp. 10478–10495, 2017.
- [355] G. Zhao, S. Chen, L. Zhao, and L. Hanzo, "Joint energy-spectral-efficiency optimization of comp and bs deployment in dense large-scale cellular networks," *IEEE Transactions on Wireless Communications*, vol. 16, no. 7, pp. 4832–4847, July 2017.
- [356] J. Hu, L. Yang, and L. Hanzo, "Energy-efficient cross-layer design of wireless mesh networks for content sharing in online social networks," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 9, pp. 8495–8509, Sept 2017.

- [357] M. F. Brejza, R. G. Maunder, B. M. Al-Hashimi, and L. Hanzo, "Flexible iterative receiver architecture for wireless sensor networks: a joint source and channel coding design example," *IET Wireless Sensor Systems*, vol. 7, no. 2, pp. 27–34, 2017.
- [358] I. A. Hemadeh, M. El-Hajjar, S. Won, and L. Hanzo, "Multi-set space-time shift keying and space- frequency space-time shift keying for millimeter-wave communications," *IEEE Access*, vol. 5, pp. 8324–8342, 2017.
- [359] Q. Li, S. Feng, X. Ge, G. Mao, and L. Hanzo, "On the performance of full-duplex multi-relay channels with df relays," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 10, pp. 9550–9554, Oct 2017.
- [360] X. Guo, J. Zhang, S. Chen, X. Mu, and L. Hanzo, "Two-stage time-domain pilot contamination elimination in large-scale multipleantenna aided and tdd based ofdm systems," *IEEE Access*, vol. 5, pp. 8629–8641, 2017.
- [361] R. Rajashekar, N. Ishikawa, S. Sugiura, K. V. S. Hari, and L. Hanzo, "Full-diversity dispersion matrices from algebraic field extensions for differential spatial modulation," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 1, pp. 385–394, Jan 2017.
- [362] J. Yang, B. Champagne, Y. Zou, and L. Hanzo, "Centralized energy-efficient multiuser multiantenna relaying in next-generation radio access networks," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 9, pp. 7913–7924, Sept 2017.
- [363] P. Hailes, L. Xu, R. G. Maunder, B. M. Al-Hashimi, and L. Hanzo, "A flexible fpga-based quasi-cyclic ldpc decoder," *IEEE Access*, vol. 5, pp. 20965–20984, 2017.
- [364] Z. Wang, W. Liu, C. Qian, S. Chen, and L. Hanzo, "Two-dimensional precoding for 3-d massive mimo," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 6, pp. 5485–5490, June 2017.
- [365] L. He, J. Wang, J. Song, and L. Hanzo, "Bandwidth efficiency maximization for single-cell massive spatial modulation mimo: An adaptive power allocation perspective," *IEEE Access*, vol. 5, pp. 1482–1495, 2017.
- [366] J. Yang, W. Cai, Y. Ran, H. Xi, and L. Hanzo, "Online measurement-based adaptive scalable video transmission in energy harvesting aided wireless systems," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 7, pp. 6231–6245, July 2017.
- [367] R. Rajashekar and L. Hanzo, "Iterative matrix decomposition aided block diagonalization for mm-wave multiuser mimo systems," *IEEE Transactions on Wireless Communications*, vol. 16, no. 3, pp. 1372–1384, March 2017.
- [368] M. F. Brejza, R. G. Maunder, B. M. Al-Hashimi, and L. Hanzo, "A high-throughput fpga architecture for joint source and channel decoding," *IEEE Access*, vol. 5, pp. 2921–2944, 2017.
- [369] Z. Babar, H. V. Nguyen, P. Botsinis, D. Alanis, D. Chandra, S. X. Ng, and L. Hanzo, "Unity-rate codes maximize the normalized throughput of onoff keying visible light communication," *IEEE Photonics Technology Letters*, vol. 29, no. 3, pp. 291–294, Feb 2017.
- [370] H. V. Nguyen, Z. Babar, D. Alanis, P. Botsinis, D. Chandra, M. A. M. Izhar, S. X. Ng, and L. Hanzo, "Towards the quantum internet: Generalised quantum network coding for large-scale quantum communication networks," *IEEE Access*, vol. 5, pp. 17288–17308, 2017.
- [371] L. Zhang, Y. Cai, M. Zhao, B. Champagne, and L. Hanzo, "Nonlinear mimo transceivers improve wireless-powered and selfinterference-aided relaying," *IEEE Transactions on Wireless Communications*, vol. 16, no. 10, pp. 6953–6966, Oct 2017.
- [372] T. Abro, S. Yang, L. D. H. Sampaio, P. J. E. Jeszensky, and L. Hanzo, "Achieving maximum effective capacity in ofdma networks operating under statistical delay guarantee," *IEEE Access*, vol. 5, pp. 14 333–14 346, 2017.
- [373] H. Zhang, L. Yang, and L. Hanzo, "Piecewise companding transform assisted optical-ofdm systems for indoor visible light communications," *IEEE Access*, vol. 5, pp. 295–311, 2017.
- [374] P. Botsinis, D. Alanis, S. Feng, Z. Babar, H. V. Nguyen, D. Chandra, S. X. Ng, R. Zhang, and L. Hanzo, "Quantum-assisted indoor localization for uplink mm-wave and downlink visible light communication systems," *IEEE Access*, vol. 5, pp. 23327–23351, 2017.
- [375] B. Li, W. Xu, H. Zhang, C. Zhao, and L. Hanzo, "Papr reduction for hybrid aco-ofdm aided im/dd optical wireless vehicular communications," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 10, pp. 9561–9566, Oct 2017.
- [376] R. Rajashekar, C. Xu, N. Ishikawa, S. Sugiura, K. V. S. Hari, and L. Hanzo, "Algebraic differential spatial modulation is capable of approaching the performance of its coherent counterpart," *IEEE Transactions on Communications*, vol. 65, no. 10, pp. 4260– 4273, Oct 2017.

- [377] T. A. Tsiftsis, G. Ding, Y. Zou, G. K. Karagiannidis, Z. Han, and L. Hanzo, "Guest editorial spectrum sharing and aggregation for future wireless networks, part iii," *IEEE Journal on Selected Areas in Communications*, vol. 35, no. 1, pp. 1–5, Jan 2017.
- [378] T. Wang, M. F. Brejza, W. Zhang, R. G. Maunder, and L. Hanzo, "Reordered elias gamma error correction codes for the nearcapacity transmission of multimedia information," *IEEE Access*, vol. 4, pp. 5948–5970, 2016.
- [379] J. Feng, W. Liang, S. X. Ng, and L. Hanzo, "Distributed reciprocal-selection-based win-win cooperative medium access and its stability analysis," *IEEE Access*, vol. 4, pp. 7703–7715, 2016.
- [380] D. Alanis, J. Hu, P. Botsinis, Z. Babar, S. X. Ng, and L. Hanzo, "Quantum-assisted joint multi-objective routing and load balancing for socially-aware networks," *IEEE Access*, vol. 4, pp. 9993–10 028, 2016.
- [381] S. Feng, X. Li, R. Zhang, M. Jiang, and L. Hanzo, "Hybrid positioning aided amorphous-cell assisted user-centric visible light downlink techniques," *IEEE Access*, vol. 4, pp. 2705–2713, 2016.
- [382] Z. Babar, H. V. Nguyen, P. Botsinis, D. Alanis, D. Chandra, S. X. Ng, R. G. Maunder, and L. Hanzo, "Fully-parallel quantum turbo decoder," *IEEE Access*, vol. 4, pp. 6073–6085, 2016.
- [383] P. S. Koundinya, K. V. S. Hari, and L. Hanzo, "Joint design of the spatial and of the classic symbol alphabet improves single-rf spatial modulation," *IEEE Access*, vol. 4, pp. 10246–10257, 2016.
- [384] Y. Huo, C. Zhou, J. Jiang, and L. Hanzo, "Historical information aware unequal error protection of scalable hevc/h.265 streaming over free space optical channels," *IEEE Access*, vol. 4, pp. 5659–5672, 2016.
- [385] T. Abro, L. D. H. Sampaio, S. Yang, K. T. K. Cheung, P. J. E. Jeszensky, and L. Hanzo, "Energy efficient ofdma networks maintaining statistical qos guarantees for delay-sensitive traffic," *IEEE Access*, vol. 4, pp. 774–791, 2016.
- [386] A. Li, R. G. Maunder, B. M. Al-Hashimi, and L. Hanzo, "Implementation of a fully-parallel turbo decoder on a general-purpose graphics processing unit," *IEEE Access*, vol. 4, pp. 5624–5639, 2016.
- [387] G. Zhao, S. Chen, L. Zhao, and L. Hanzo, "A tele-traffic-aware optimal base-station deployment strategy for energy-efficient large-scale cellular networks," *IEEE Access*, vol. 4, pp. 2083–2095, 2016.
- [388] A. U. Rehman, C. Dong, L. L. Yang, and L. Hanzo, "Performance of cognitive stop-and-wait hybrid automatic repeat request in the face of imperfect sensing," *IEEE Access*, vol. 4, pp. 5489–5508, 2016.
- [389] A. Li, P. Hailes, R. G. Maunder, B. M. Al-Hashimi, and L. Hanzo, "1.5 gbit/s fpga implementation of a fully-parallel turbo decoder designed for mission-critical machine-type communication applications," *IEEE Access*, vol. 4, pp. 5452–5473, 2016.
- [390] R. Al-Dujaily, A. Li, R. G. Maunder, T. Mak, B. M. Al-Hashimi, and L. Hanzo, "A scalable turbo decoding algorithm for high-throughput network-on-chip implementation," *IEEE Access*, vol. 4, pp. 9880–9894, 2016.
- [391] I. A. Hemadeh, M. El-Hajjar, S. Won, and L. Hanzo, "Multi-set space-time shift-keying with reduced detection complexity," *IEEE Access*, vol. 4, pp. 4234–4246, 2016.
- [392] —, "Layered multi-group steered space-time shift-keying for millimeter-wave communications," *IEEE Access*, vol. 4, pp. 3708–3718, 2016.
- [393] X. Zuo, I. Perez-Andrade, R. G. Maunder, B. M. Al-Hashimi, and L. Hanzo, "Improving the tolerance of stochastic ldpc decoders to overclocking-induced timing errors: A tutorial and a design example," *IEEE Access*, vol. 4, pp. 1607–1629, 2016.
- [394] A. Li, L. Xiang, T. Chen, R. G. Maunder, B. M. Al-Hashimi, and L. Hanzo, "Vlsi implementation of fully parallel lte turbo decoders," *IEEE Access*, vol. 4, pp. 323–346, 2016.
- [395] N. Ishikawa, S. Sugiura, and L. Hanzo, "Subcarrier-index modulation aided ofdm will it work?" *IEEE Access*, vol. 4, pp. 2580–2593, 2016.
- [396] H. V. Nguyen, Z. Babar, D. Alanis, P. Botsinis, D. Chandra, S. X. Ng, and L. Hanzo, "Exit-chart aided quantum code design improves the normalised throughput of realistic quantum devices," *IEEE Access*, vol. 4, pp. 10194–10209, 2016.
- [397] M. F. Brejza, T. Wang, W. Zhang, D. Al-Khalili, R. G. Maunder, B. M. Al-Hashimi, and L. Hanzo, "Exponential golomb and rice error correction codes for generalized near-capacity joint source and channel coding," *IEEE Access*, vol. 4, pp. 7154–7175, 2016.
- [398] H. Zhang, L. L. Yang, and L. Hanzo, "Compressed impairment sensing-assisted and interleaved-double-fft-aided modulation improves broadband power line communications subjected to asynchronous impulsive noise," *IEEE Access*, vol. 4, pp. 81–96, 2016.

- [399] A. U. Rehman, C. Dong, V. A. Thomas, L. L. Yang, and L. Hanzo, "Throughput and delay analysis of cognitive go-back-n hybrid automatic repeat request using discrete-time markov modelling," *IEEE Access*, vol. 4, pp. 9659–9680, 2016.
- [400] I. Perez-Andrade, S. Zhong, R. G. Maunder, B. M. Al-Hashimi, and L. Hanzo, "Stochastic computing improves the timing-error tolerance and latency of turbo decoders: Design guidelines and tradeoffs," *IEEE Access*, vol. 4, pp. 1008–1038, 2016.
- [401] C. Zhu, Y. Huo, J. Jiang, H. Sun, C. Dong, R. Zhang, and L. Hanzo, "Hierarchical colour-shift-keying aided layered video streaming for the visible light downlink," *IEEE Access*, vol. 4, pp. 3127–3152, 2016.
- [402] A. J. Aljohani, S. X. Ng, and L. Hanzo, "Distributed source coding and its applications in relaying-based transmission," *IEEE Access*, vol. 4, pp. 1940–1970, 2016.
- [403] W. Zhang, Z. Song, M. F. Brejza, T. Wang, R. G. Maunder, and L. Hanzo, "Learning-aided unary error correction codes for non-stationary and unknown sources," *IEEE Access*, vol. 4, pp. 2408–2428, 2016.
- [404] P. Botsinis, D. Alanis, Z. Babar, H. V. Nguyen, D. Chandra, S. X. Ng, and L. Hanzo, "Quantum-aided multi-user transmission in non-orthogonal multiple access systems," *IEEE Access*, vol. 4, pp. 7402–7424, 2016.
- [405] P. Botsinis, D. Alanis, Z. Babar, S. X. Ng, and L. Hanzo, "Joint quantum-assisted channel estimation and data detection," *IEEE Access*, vol. 4, pp. 7658–7681, 2016.
- [406] J. Yang, Q. Li, Y. Cai, Y. Zou, L. Hanzo, and B. Champagne, "Joint secure af relaying and artificial noise optimization: A penalized difference-of-convex programming framework," *IEEE Access*, vol. 4, pp. 10076–10095, 2016.
- [407] S. K. Pulliyakode, S. Kalyani, L. Hanzo, and K. Giridhar, "Predicting the affordable rate in interference-limited cellular systems using higher-order markov models," *IEEE Access*, vol. 4, pp. 4730–4748, 2016.
- [408] H. Zhang, L. L. Yang, and L. Hanzo, "Compressed sensing improves the performance of subcarrier index-modulation-assisted ofdm," *IEEE Access*, vol. 4, pp. 7859–7873, 2016.
- [409] A. U. Rehman, V. A. Thomas, L. L. Yang, and L. Hanzo, "Performance of cognitive selective-repeat hybrid automatic repeat request," *IEEE Access*, vol. 4, pp. 9828–9846, 2016.
- [410] Y. Yang, W. Chen, O. Li, Q. Liu, and L. Hanzo, "Truncated-arq aided adaptive network coding for cooperative two-way relaying networks: Cross-layer design and analysis," *IEEE Access*, vol. 4, pp. 9361–9376, 2016.
- [411] Y. Yang, W. Chen, O. Li, and L. Hanzo, "Joint rate and power adaptation for amplify-and-forward two-way relaying relying on analog network coding," *IEEE Access*, vol. 4, pp. 2465–2478, 2016.
- [412] F. Jin, X. Li, R. Zhang, C. Dong, and L. Hanzo, "Resource allocation under delay-guarantee constraints for visible-light communication," *IEEE Access*, vol. 4, pp. 7301–7312, 2016.
- [413] V. A. Thomas, M. El-Hajjar, and L. Hanzo, "Millimeter-wave radio over fiber optical upconversion techniques relying on link nonlinearity," *IEEE Communications Surveys Tutorials*, vol. 18, no. 1, pp. 29–53, Firstquarter 2016.
- [414] P. Hailes, L. Xu, R. G. Maunder, B. M. Al-Hashimi, and L. Hanzo, "A survey of fpga-based ldpc decoders," *IEEE Communications Surveys Tutorials*, vol. 18, no. 2, pp. 1098–1122, Secondquarter 2016.
- [415] Z. Kong, S. Yang, F. Wu, S. Peng, L. Zhong, and L. Hanzo, "Iterative distributed minimum total mse approach for secure communications in mimo interference channels," *IEEE Transactions on Information Forensics and Security*, vol. 11, no. 3, pp. 594–608, March 2016.
- [416] M. F. Brejza, L. Li, R. G. Maunder, B. M. Al-Hashimi, C. Berrou, and L. Hanzo, "20 years of turbo coding and energy-aware design guidelines for energy-constrained wireless applications," *IEEE Communications Surveys Tutorials*, vol. 18, no. 1, pp. 8–28, Firstquarter 2016.
- [417] P. Yang, Y. Xiao, Y. L. Guan, K. V. S. Hari, A. Chockalingam, S. Sugiura, H. Haas, M. D. Renzo, C. Masouros, Z. Liu, L. Xiao, S. Li, and L. Hanzo, "Single-carrier sm-mimo: A promising design for broadband large-scale antenna systems," *IEEE Communications Surveys Tutorials*, vol. 18, no. 3, pp. 1687–1716, thirdquarter 2016.
- [418] J. Wang, C. Jiang, Z. Han, Y. Ren, and L. Hanzo, "Network association strategies for an energy harvesting aided super-wifi network relying on measured solar activity," *IEEE Journal on Selected Areas in Communications*, vol. 34, no. 12, pp. 3785–3797, Dec 2016.

- [419] C. Jiang, H. Zhang, Z. Han, Y. Ren, V. C. M. Leung, and L. Hanzo, "Information-sharing outage-probability analysis of vehicular networks," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 12, pp. 9479–9492, Dec 2016.
- [420] C. Masouros and L. Hanzo, "Constructive interference as an information carrier by dual-layered mimo transmission," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 12, pp. 10163–10167, Dec 2016.
- [421] Q. Liu, J. Wu, P. Xia, S. Zhao, W. Chen, Y. Yang, and L. Hanzo, "Charging unplugged: Will distributed laser charging for mobile wireless power transfer work?" *IEEE Vehicular Technology Magazine*, vol. 11, no. 4, pp. 36–45, Dec 2016.
- [422] C. Gong, X. Zhang, Z. Xu, and L. Hanzo, "Optical wireless scattering channel estimation for photon-counting and photomultiplier tube receivers," *IEEE Transactions on Communications*, vol. 64, no. 11, pp. 4749–4763, Nov 2016.
- [423] X. Guo, S. Chen, J. Zhang, X. Mu, and L. Hanzo, "Optimal pilot design for pilot contamination elimination/reduction in largescale multiple-antenna aided ofdm systems," *IEEE Transactions on Wireless Communications*, vol. 15, no. 11, pp. 7229–7243, Nov 2016.
- [424] B. Li, R. Zhang, W. Xu, C. Zhao, and L. Hanzo, "Joint dimming control and transceiver design for mimo-aided visible light communication," *IEEE Communications Letters*, vol. 20, no. 11, pp. 2193–2196, Nov 2016.
- [425] Y. Ma, S. Chen, C. Xing, X. Bu, and L. Hanzo, "Decomposition optimization algorithms for distributed radar systems," *IEEE Transactions on Signal Processing*, vol. 64, no. 24, pp. 6443–6458, Dec 2016.
- [426] S. Gupta, S. Kumar, R. Zhang, S. Kalyani, K. Giridhar, and L. Hanzo, "Resource allocation for d2d links in the ffr and sfr aided cellular downlink," *IEEE Transactions on Communications*, vol. 64, no. 10, pp. 4434–4448, Oct 2016.
- [427] C. Masouros and L. Hanzo, "Constellation randomization achieves transmit diversity for single-rf spatial modulation," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 10, pp. 8101–8111, Oct 2016.
- [428] C. Xu, S. X. Ng, and L. Hanzo, "Multiple-symbol differential sphere detection and decision-feedback differential detection conceived for differential qam," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 10, pp. 8345–8360, Oct 2016.
- [429] Z. Gao, L. Dai, Z. Wang, S. Chen, and L. Hanzo, "Compressive-sensing-based multiuser detector for the large-scale sm-mimo uplink," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 10, pp. 8725–8730, Oct 2016.
- [430] C. Dong, L. Li, B. Zhang, L. L. Yang, and L. Hanzo, "Energy dissipation versus delay tradeoffs in a buffer-aided two-hop link," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 10, pp. 8060–8071, Oct 2016.
- [431] R. Zhang, L. L. Yang, and L. Hanzo, "Performance analysis of non-linear generalized pre-coding aided spatial modulation," *IEEE Transactions on Wireless Communications*, vol. 15, no. 10, pp. 6731–6741, Oct 2016.
- [432] Z. Babar, H. V. Nguyen, P. Botsinis, D. Alanis, D. Chandra, S. X. Ng, and L. Hanzo, "Serially concatenated unity-rate codes improve quantum codes without coding-rate reduction," *IEEE Communications Letters*, vol. 20, no. 10, pp. 1916–1919, Oct 2016.
- [433] A. Aljohani, Z. Babar, S. X. Ng, and L. Hanzo, "Distributed source and channel coding using reduced-complexity syndromebased ttcm," *IEEE Communications Letters*, vol. 20, no. 10, pp. 2095–2098, Oct 2016.
- [434] Y. Zou, J. Zhu, X. Li, and L. Hanzo, "Relay selection for wireless communications against eavesdropping: a security-reliability trade-off perspective," *IEEE Network*, vol. 30, no. 5, pp. 74–79, September 2016.
- [435] L. Li, C. Dong, L. Wang, and L. Hanzo, "Spectral-efficient bidirectional decode-and-forward relaying for full-duplex communication," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 9, pp. 7010–7020, Sept 2016.
- [436] A. Patel, M. Z. A. Khan, S. N. Merchant, U. B. Desai, and L. Hanzo, "Achievable rates of underlay-based cognitive radio operating under rate limitation," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 9, pp. 7149–7159, Sept 2016.
- [437] Y. Zou, J. Zhu, X. Wang, and L. Hanzo, "A survey on wireless security: Technical challenges, recent advances, and future trends," *Proceedings of the IEEE*, vol. 104, no. 9, pp. 1727–1765, Sept 2016.
- [438] J. Hu, L. L. Yang, K. Yang, and L. Hanzo, "Socially aware integrated centralized infrastructure and opportunistic networking: a powerful content dissemination catalyst," *IEEE Communications Magazine*, vol. 54, no. 8, pp. 84–91, August 2016.
- [439] R. Rajashekar and L. Hanzo, "Hybrid beamforming in mm-wave mimo systems having a finite input alphabet," *IEEE Transactions on Communications*, vol. 64, no. 8, pp. 3337–3349, Aug 2016.

- [440] L. Wang, Y. Cai, Y. Zou, W. Yang, and L. Hanzo, "Joint relay and jammer selection improves the physical layer security in the face of csi feedback delays," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 8, pp. 6259–6274, Aug 2016.
- [441] J. Jiang, P. Zhang, R. Zhang, S. Chen, and L. Hanzo, "Aperture selection for aco-ofdm in free-space optical turbulence channel," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 8, pp. 6089–6100, Aug 2016.
- [442] S. Gupta, R. Zhang, and L. Hanzo, "Throughput maximization for a buffer-aided successive relaying network employing energy harvesting," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 8, pp. 6758–6765, Aug 2016.
- [443] J. Li, H. Chen, Y. Chen, Z. Lin, B. Vucetic, and L. Hanzo, "Pricing and resource allocation via game theory for a small-cell video caching system," *IEEE Journal on Selected Areas in Communications*, vol. 34, no. 8, pp. 2115–2129, Aug 2016.
- [444] P. Yang, Y. Xiao, L. Yin, Q. Tang, S. Li, and L. Hanzo, "Hybrid bit-to-symbol mapping for spatial modulation," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 7, pp. 5804–5810, July 2016.
- [445] J. Zhu, Y. Zou, B. Champagne, W. P. Zhu, and L. Hanzo, "Security-reliability tradeoff analysis of multirelay-aided decode-andforward cooperation systems," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 7, pp. 5825–5831, July 2016.
- [446] K. Naidu, M. Z. A. Khan, and L. Hanzo, "An efficient direct solution of cave-filling problems," *IEEE Transactions on Communi*cations, vol. 64, no. 7, pp. 3064–3077, July 2016.
- [447] S. Yang, C. Zhou, T. Lv, and L. Hanzo, "Large-scale mimo is capable of eliminating power-thirsty channel coding for wireless transmission of hevc/h.265 video," *IEEE Wireless Communications*, vol. 23, no. 3, pp. 57–63, June 2016.
- [448] X. Wang, P. Hao, and L. Hanzo, "Physical-layer authentication for wireless security enhancement: current challenges and future developments," *IEEE Communications Magazine*, vol. 54, no. 6, pp. 152–158, June 2016.
- [449] Z. Zhang, K. Long, A. V. Vasilakos, and L. Hanzo, "Full-duplex wireless communications: Challenges, solutions, and future research directions," *Proceedings of the IEEE*, vol. 104, no. 7, pp. 1369–1409, July 2016.
- [450] C. Xu, L. Wang, S. X. Ng, and L. Hanzo, "Soft-decision multiple-symbol differential sphere detection and decision-feedback differential detection for differential qam dispensing with channel estimation in the face of rapidly fading channels," *IEEE Transactions on Wireless Communications*, vol. 15, no. 6, pp. 4408–4425, June 2016.
- [451] D. Liu, L. Wang, Y. Chen, M. Elkashlan, K. K. Wong, R. Schober, and L. Hanzo, "User association in 5g networks: A survey and an outlook," *IEEE Communications Surveys Tutorials*, vol. 18, no. 2, pp. 1018–1044, Secondquarter 2016.
- [452] B. Zhang, C. Dong, J. Lei, M. El-Hajjar, L. L. Yang, and L. Hanzo, "Buffer-aided relaying for the multi-user uplink: outage analysis and power allocation," *IET Communications*, vol. 10, no. 8, pp. 936–944, 2016.
- [453] P. Yang, Y. Xiao, Y. L. Guan, S. Li, and L. Hanzo, "Transmit antenna selection for multiple-input multiple-output spatial modulation systems," *IEEE Transactions on Communications*, vol. 64, no. 5, pp. 2035–2048, May 2016.
- [454] X. Zhu, Z. Wang, C. Qian, L. Dai, J. Chen, S. Chen, and L. Hanzo, "Soft pilot reuse and multicell block diagonalization precoding for massive mimo systems," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 5, pp. 3285–3298, May 2016.
- [455] C. Masouros and L. Hanzo, "Dual-layered mimo transmission for increased bandwidth efficiency," *IEEE Transactions on Vehic-ular Technology*, vol. 65, no. 5, pp. 3139–3149, May 2016.
- [456] R. Zhang, H. Claussen, H. Haas, and L. Hanzo, "Energy efficient visible light communications relying on amorphous cells," *IEEE Journal on Selected Areas in Communications*, vol. 34, no. 4, pp. 894–906, April 2016.
- [457] J. Hu, L. L. Yang, and L. Hanzo, "Delay analysis of social group multicast-aided content dissemination in cellular system," *IEEE Transactions on Communications*, vol. 64, no. 4, pp. 1660–1673, April 2016.
- [458] V. A. Thomas, S. Kumar, S. Kalyani, M. El-Hajjar, K. Giridhar, and L. Hanzo, "Error vector magnitude analysis of fading simo channels relying on mrc reception," *IEEE Transactions on Communications*, vol. 64, no. 4, pp. 1786–1797, April 2016.
- [459] M. S. Veedu, C. R. Murthy, and L. Hanzo, "Single-rf spatial modulation relying on finite-rate phase-only feedback: Design and analysis," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 4, pp. 2016–2025, April 2016.
- [460] S. Yang, X. Xu, D. Alanis, S. X. Ng, and L. Hanzo, "Is the low-complexity mobile-relay-aided ffr-das capable of outperforming the high-complexity comp?" *IEEE Transactions on Vehicular Technology*, vol. 65, no. 4, pp. 2154–2169, April 2016.

- [461] V. A. Thomas, M. El-Hajjar, and L. Hanzo, "Optical single sideband signal generation relying on a single-drive mach-zehnder modulator for radio over fibre communications," *IET Communications*, vol. 10, no. 5, pp. 534–539, 2016.
- [462] H. Zhang, L. L. Yang, and L. Hanzo, "Performance analysis of orthogonal frequency division multiplexing systems in dispersive indoor power line channels inflicting asynchronous impulsive noise," *IET Communications*, vol. 10, no. 5, pp. 453–461, 2016.
- [463] B. Zhang, C. Dong, M. El-Hajjar, and L. Hanzo, "Outage analysis and optimization in single- and multiuser wireless energy harvesting networks," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 3, pp. 1464–1476, March 2016.
- [464] J. Yang, B. Champagne, Y. Zou, and L. Hanzo, "Joint optimization of transceiver matrices for mimo-aided multiuser af relay networks: Improving the qos in the presence of csi errors," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 3, pp. 1434–1451, March 2016.
- [465] P. Yang, Y. Xiao, S. Li, and L. Hanzo, "A low-complexity power allocation algorithm for multiple-input multiple-output spatial modulation systems," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 3, pp. 1819–1825, March 2016.
- [466] W. Liang, H. V. Nguyen, S. X. Ng, and L. Hanzo, "Adaptive-ttcm-aided near-instantaneously adaptive dynamic network coding for cooperative cognitive radio networks," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 3, pp. 1314–1325, March 2016.
- [467] C. Zhu, Y. Huo, B. Zhang, R. Zhang, M. El-Hajjar, and L. Hanzo, "Adaptive-truncated-harq-aided layered video streaming relying on interlayer fec coding," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 3, pp. 1506–1521, March 2016.
- [468] P. Yang, Y. L. Guan, Y. Xiao, M. D. Renzo, S. Li, and L. Hanzo, "Transmit precoded spatial modulation: Maximizing the minimum euclidean distance versus minimizing the bit error ratio," *IEEE Transactions on Wireless Communications*, vol. 15, no. 3, pp. 2054–2068, March 2016.
- [469] J. Yang, Y. Ran, S. Chen, W. Li, and L. Hanzo, "Online source rate control for adaptive video streaming over hspa and lte-style variable bit rate downlink channels," *IEEE Transactions on Vehicular Technology*, vol. 65, no. 2, pp. 643–657, Feb 2016.
- [470] H. Sun, S. X. Ng, and L. Hanzo, "Discrete-input continuous-output memoryless channel capacity of cooperative hierarchical modulation," *IET Communications*, vol. 10, no. 1, pp. 65–71, 2016.
- [471] K. T. K. Cheung, S. Yang, and L. Hanzo, "Distributed energy spectral efficiency optimization for partial/full interference alignment in multi-user multi-relay multi-cell mimo systems," *IEEE Transactions on Signal Processing*, vol. 64, no. 4, pp. 882–896, Feb 2016.
- [472] A. M. Akhtar, X. Wang, and L. Hanzo, "Synergistic spectrum sharing in 5g hetnets: A harmonized sdn-enabled approach," *IEEE Communications Magazine*, vol. 54, no. 1, pp. 40–47, January 2016.
- [473] X. Li, F. Jin, R. Zhang, J. Wang, Z. Xu, and L. Hanzo, "Users first: User-centric cluster formation for interference-mitigation in visible-light networks," *IEEE Transactions on Wireless Communications*, vol. 15, no. 1, pp. 39–53, Jan 2016.
- [474] Z. Babar, P. Botsinis, D. Alanis, S. X. Ng, and L. Hanzo, "Construction of quantum ldpc codes from classical row-circulant qc-ldpcs," *IEEE Communications Letters*, vol. 20, no. 1, pp. 9–12, Jan 2016.
- [475] T. Lv, H. Gao, X. Li, S. Yang, and L. Hanzo, "Space-time hierarchical-graph based cooperative localization in wireless sensor networks," *IEEE Transactions on Signal Processing*, vol. 64, no. 2, pp. 322–334, Jan 2016.
- [476] T. A. Tsiftsis, G. Ding, Y. Zou, G. K. Karagiannidis, Z. Han, and L. Hanzo, "Guest editorial spectrum sharing and aggregation for future wireless networks, part ii," *IEEE Journal on Selected Areas in Communications*, vol. 34, no. 11, pp. 2809–2813, Nov 2016.
- [477] —, "Guest editorial spectrum sharing and aggregation for future wireless networks, part i," *IEEE Journal on Selected Areas in Communications*, vol. 34, no. 10, pp. 2533–2536, Oct 2016.
- [478] K. Zheng, L. Zhao, J. Mei, B. Shao, W. Xiang, and L. Hanzo, "Survey of large-scale mimo systems," *IEEE Communications Surveys Tutorials*, vol. 17, no. 3, pp. 1738–1760, thirdquarter 2015.
- [479] P. Botsinis, D. Alanis, Z. Babar, S. X. Ng, and L. Hanzo, "Iterative quantum-assisted multi-user detection for multi-carrier interleave division multiple access systems," *IEEE Transactions on Communications*, vol. 63, no. 10, pp. 3713–3727, Oct 2015.
- [480] L. Kong, W. Xu, L. Hanzo, H. Zhang, and C. Zhao, "Performance of a free-space-optical relay-assisted hybrid rf/fso system in generalized m -distributed channels," *IEEE Photonics Journal*, vol. 7, no. 5, pp. 1–19, Oct 2015.

- [481] D. Alanis, P. Botsinis, Z. Babar, S. X. Ng, and L. Hanzo, "Non-dominated quantum iterative routing optimization for wireless multihop networks," *IEEE Access*, vol. 3, pp. 1704–1728, 2015.
- [482] J. Zhang, L. L. Yang, L. Hanzo, and H. Gharavi, "Advances in cooperative single-carrier fdma communications: Beyond Iteadvanced," *IEEE Communications Surveys Tutorials*, vol. 17, no. 2, pp. 730–756, Secondquarter 2015.
- [483] S. Sugiura and L. Hanzo, "Single-rf spatial modulation requires single-carrier transmission: Frequency-domain turbo equalization for dispersive channels," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 10, pp. 4870–4875, Oct 2015.
- [484] H. Chen, R. G. Maunder, Y. Ma, R. Tafazolli, and L. Hanzo, "Hybrid-arq-aided short fountain codes designed for block-fading channels," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 12, pp. 5701–5712, Dec 2015.
- [485] S. Yang and L. Hanzo, "Fifty years of mimo detection: The road to large-scale mimos," *IEEE Communications Surveys Tutorials*, vol. 17, no. 4, pp. 1941–1988, Fourthquarter 2015.
- [486] R. Zhang, L. L. Yang, and L. Hanzo, "Error probability and capacity analysis of generalised pre-coding aided spatial modulation," *IEEE Transactions on Wireless Communications*, vol. 14, no. 1, pp. 364–375, Jan 2015.
- [487] S. X. Ng, Y. Li, B. Vucetic, and L. Hanzo, "Distributed irregular codes relying on decode-and-forward relays as code components," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 10, pp. 4579–4588, Oct 2015.
- [488] P. Yang, Y. Xiao, B. Zhang, S. Li, M. El-Hajjar, and L. Hanzo, "Power allocation-aided spatial modulation for limited-feedback mimo systems," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 5, pp. 2198–2204, May 2015.
- [489] H. A. Ngo, R. G. Maunder, and L. Hanzo, "Fully parallel turbo equalization for wireless communications," *IEEE Access*, vol. 3, pp. 2652–2664, 2015.
- [490] W. Zhang, Y. Jia, X. Meng, M. F. Brejza, R. G. Maunder, and L. Hanzo, "Adaptive iterative decoding for expediting the convergence of unary error correction codes," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 2, pp. 621–635, Feb 2015.
- [491] J. Hu, L. L. Yang, and L. Hanzo, "Distributed multistage cooperative-social-multicast-aided content dissemination in random mobile networks," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 7, pp. 3075–3089, July 2015.
- [492] V. A. Thomas, M. El-Hajjar, and L. Hanzo, "Simultaneous optical phase and intensity modulation transmits independent signals in radio over fiber communication," *IEEE Communications Letters*, vol. 19, no. 4, pp. 557–560, April 2015.
- [493] Y. Huo, C. Hellge, T. Wiegand, and L. Hanzo, "A tutorial and review on inter-layer fec coded layered video streaming," *IEEE Communications Surveys Tutorials*, vol. 17, no. 2, pp. 1166–1207, Secondquarter 2015.
- [494] J. Zuo, C. Dong, S. X. Ng, L. L. Yang, and L. Hanzo, "Cross-layer aided energy-efficient routing design for ad hoc networks," *IEEE Communications Surveys Tutorials*, vol. 17, no. 3, pp. 1214–1238, thirdquarter 2015.
- [495] J. Tan, Q. Wang, C. Qian, Z. Wang, S. Chen, and L. Hanzo, "A reduced-complexity demapping algorithm for bicm-id systems," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 9, pp. 4350–4356, Sept 2015.
- [496] Y. Zou, B. Champagne, W. P. Zhu, and L. Hanzo, "Relay-selection improves the security-reliability trade-off in cognitive radio systems," *IEEE Transactions on Communications*, vol. 63, no. 1, pp. 215–228, Jan 2015.
- [497] P. Botsinis, D. Alanis, Z. Babar, S. X. Ng, and L. Hanzo, "Noncoherent quantum multiple symbol differential detection for wireless systems," *IEEE Access*, vol. 3, pp. 569–598, 2015.
- [498] V. A. Thomas, S. Ghafoor, M. El-Hajjar, and L. Hanzo, "The "rap" on rof: Radio over fiber using radio access point for high data rate wireless personal area networks," *IEEE Microwave Magazine*, vol. 16, no. 9, pp. 64–78, Oct 2015.
- [499] Z. Babar, P. Botsinis, D. Alanis, S. X. Ng, and L. Hanzo, "The road from classical to quantum codes: A hashing bound approaching design procedure," *IEEE Access*, vol. 3, pp. 146–176, 2015.
- [500] —, "Fifteen years of quantum ldpc coding and improved decoding strategies," IEEE Access, vol. 3, pp. 2492–2519, 2015.
- [501] P. Yang, M. D. Renzo, Y. Xiao, S. Li, and L. Hanzo, "Design guidelines for spatial modulation," *IEEE Communications Surveys Tutorials*, vol. 17, no. 1, pp. 6–26, Firstquarter 2015.
- [502] Z. Zhang, X. Chai, K. Long, A. V. Vasilakos, and L. Hanzo, "Full duplex techniques for 5g networks: self-interference cancellation, protocol design, and relay selection," *IEEE Communications Magazine*, vol. 53, no. 5, pp. 128–137, May 2015.

- [503] J. Jiang, Y. Huo, F. Jin, P. Zhang, Z. Wang, Z. Xu, H. Haas, and L. Hanzo, "Video streaming in the multiuser indoor visible light downlink," *IEEE Access*, vol. 3, pp. 2959–2986, 2015.
- [504] H. Zhang, S. Chen, L. Feng, Y. Xie, and L. Hanzo, "A universal approach to coverage probability and throughput analysis for cellular networks," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 9, pp. 4245–4256, Sept 2015.
- [505] V. A. Thomas, M. El-Hajjar, and L. Hanzo, "Single odsb radio-over-fiber signal supports stbc at each rap," *IEEE Communications Letters*, vol. 19, no. 8, pp. 1331–1334, Aug 2015.
- [506] H. Sun, S. X. Ng, and L. Hanzo, "Turbo trellis-coded hierarchical-modulation assisted decode-and-forward cooperation," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 9, pp. 3971–3981, Sept 2015.
- [507] H. A. Ngo, R. G. Maunder, and L. Hanzo, "Extrinsic information transfer charts for characterizing the iterative decoding convergence of fully parallel turbo decoders," *IEEE Access*, vol. 3, pp. 2100–2110, 2015.
- [508] X. Li, R. Zhang, and L. Hanzo, "Cooperative load balancing in hybrid visible light communications and wifi," *IEEE Transactions on Communications*, vol. 63, no. 4, pp. 1319–1329, April 2015.
- [509] J. Ding, Z. Xu, and L. Hanzo, "Accuracy of the point-source model of a multi-led array in high-speed visible light communication channel characterization," *IEEE Photonics Journal*, vol. 7, no. 4, pp. 1–14, Aug 2015.
- [510] A. K. Dutta, K. V. S. Hari, and L. Hanzo, "Minimum-error-probability cfo estimation for multiuser mimo-ofdm systems," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 7, pp. 2804–2818, July 2015.
- [511] H. Yetgin, K. T. K. Cheung, M. El-Hajjar, and L. Hanzo, "Cross-layer network lifetime maximization in interference-limited wsns," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 8, pp. 3795–3803, Aug 2015.
- [512] W. Zhang, M. F. Brejza, T. Wang, R. G. Maunder, and L. Hanzo, "Irregular trellis for the near-capacity unary error correction coding of symbol values from an infinite set," *IEEE Transactions on Communications*, vol. 63, no. 12, pp. 5073–5088, Dec 2015.
- [513] J. Chen, W. Zhang, R. G. Maunder, and L. Hanzo, "Bit-by-bit iterative decoding expedites the convergence of repeat accumulate decoders," *IEEE Transactions on Communications*, vol. 63, no. 6, pp. 1952–1962, June 2015.
- [514] V. A. Thomas, D. Liu, M. El-Hajjar, and L. Hanzo, "Experimental demonstration of plastic optical fibre-based digitised radio over fibre downlink," *Electronics Letters*, vol. 51, no. 21, pp. 1679–1681, 2015.
- [515] B. Zhang, J. Hu, Y. Huang, M. El-Hajjar, and L. Hanzo, "Outage analysis of superposition-modulation-aided network-coded cooperation in the presence of network coding noise," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 2, pp. 493–501, Feb 2015.
- [516] F. Jin, R. Zhang, and L. Hanzo, "Resource allocation under delay-guarantee constraints for heterogeneous visible-light and rf femtocell," *IEEE Transactions on Wireless Communications*, vol. 14, no. 2, pp. 1020–1034, Feb 2015.
- [517] C. Xu, X. Zuo, S. X. Ng, R. G. Maunder, and L. Hanzo, "Reduced-complexity soft-decision multiple-symbol differential sphere detection," *IEEE Transactions on Communications*, vol. 63, no. 9, pp. 3275–3289, Sept 2015.
- [518] J. Hu, L. L. Yang, H. V. Poor, and L. Hanzo, "Bridging the social and wireless networking divide: Information dissemination in integrated cellular and opportunistic networks," *IEEE Access*, vol. 3, pp. 1809–1848, 2015.
- [519] R. Zhang, R. G. Maunder, and L. Hanzo, "Wireless information and power transfer: from scientific hypothesis to engineering practice," *IEEE Communications Magazine*, vol. 53, no. 8, pp. 99–105, August 2015.
- [520] H. V. Nguyen, C. Xu, S. X. Ng, and L. Hanzo, "Near-capacity wireless system design principles," *IEEE Communications Surveys Tutorials*, vol. 17, no. 4, pp. 1806–1833, Fourthquarter 2015.
- [521] R. Zhang, J. Wang, Z. Wang, Z. Xu, C. Zhao, and L. Hanzo, "Visible light communications in heterogeneous networks: Paving the way for user-centric design," *IEEE Wireless Communications*, vol. 22, no. 2, pp. 8–16, April 2015.
- [522] A. Garcia-Rodriguez, C. Masouros, and L. Hanzo, "Pre-scaling optimization for space shift keying based on semidefinite relaxation," *IEEE Transactions on Communications*, vol. 63, no. 11, pp. 4231–4243, Nov 2015.
- [523] J. Li, Q. Yang, K. S. Kwak, and L. Hanzo, "The connectivity of selfish wireless networks," *IEEE Access*, vol. 3, pp. 2814–2827, 2015.

- [524] J. Li, Y. Chen, Z. Lin, W. Chen, B. Vucetic, and L. Hanzo, "Distributed caching for data dissemination in the downlink of heterogeneous networks," *IEEE Transactions on Communications*, vol. 63, no. 10, pp. 3553–3568, Oct 2015.
- [525] M. I. Kadir, S. Sugiura, S. Chen, and L. Hanzo, "Unified mimo-multicarrier designs: A space-time shift keying approach," *IEEE Communications Surveys Tutorials*, vol. 17, no. 2, pp. 550–579, Secondquarter 2015.
- [526] K. Zheng, X. Zhang, Q. Zheng, W. Xiang, and L. Hanzo, "Quality-of-experience assessment and its application to video services in lte networks," *IEEE Wireless Communications*, vol. 22, no. 1, pp. 70–78, February 2015.
- [527] J. Jiang, R. Zhang, and L. Hanzo, "Analysis and design of three-stage concatenated color-shift keying," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 11, pp. 5126–5136, Nov 2015.
- [528] C. Dong, L. L. Yang, and L. Hanzo, "Performance of buffer-aided adaptive modulation in multihop communications," *IEEE Transactions on Communications*, vol. 63, no. 10, pp. 3537–3552, Oct 2015.
- [529] Z. Zhang, X. Wang, K. Long, A. V. Vasilakos, and L. Hanzo, "Large-scale mimo-based wireless backhaul in 5g networks," *IEEE Wireless Communications*, vol. 22, no. 5, pp. 58–66, October 2015.
- [530] P. Yang, Y. Xiao, B. Zhang, M. El-Hajjar, S. Li, and L. Hanzo, "Phase rotation-based precoding for spatial modulation systems," *IET Communications*, vol. 9, no. 10, pp. 1315–1323, 2015.
- [531] H. Sun, S. X. Ng, C. Dong, and L. Hanzo, "Decode-and-forward cooperation-aided triple-layer turbo-trellis-coded hierarchical modulation," *IEEE Transactions on Communications*, vol. 63, no. 4, pp. 1136–1148, April 2015.
- [532] R. Zhang, L. L. Yang, and L. Hanzo, "Energy pattern aided simultaneous wireless information and power transfer," *IEEE Journal on Selected Areas in Communications*, vol. 33, no. 8, pp. 1492–1504, Aug 2015.
- [533] C. Dong, L. L. Yang, J. Zuo, S. X. Ng, and L. Hanzo, "Energy, delay, and outage analysis of a buffer-aided three-node network relying on opportunistic routing," *IEEE Transactions on Communications*, vol. 63, no. 3, pp. 667–682, March 2015.
- [534] H. Sun, C. Dong, S. X. Ng, and L. Hanzo, "Five decades of hierarchical modulation and its benefits in relay-aided networking," *IEEE Access*, vol. 3, pp. 2891–2921, 2015.
- [535] R. Rajashekar, K. V. S. Hari, and L. Hanzo, "Quantifying the transmit diversity order of euclidean distance based antenna selection in spatial modulation," *IEEE Signal Processing Letters*, vol. 22, no. 9, pp. 1434–1437, Sept 2015.
- [536] B. Li, J. Wang, R. Zhang, H. Shen, C. Zhao, and L. Hanzo, "Multiuser miso transceiver design for indoor downlink visible light communication under per-led optical power constraints," *IEEE Photonics Journal*, vol. 7, no. 4, pp. 1–15, Aug 2015.
- [537] H. Yetgin, K. T. K. Cheung, M. El-Hajjar, and L. Hanzo, "Network-lifetime maximization of wireless sensor networks," *IEEE Access*, vol. 3, pp. 2191–2226, 2015.
- [538] V. A. Thomas, M. El-Hajjar, and L. Hanzo, "Performance improvement and cost reduction techniques for radio over fiber communications," *IEEE Communications Surveys Tutorials*, vol. 17, no. 2, pp. 627–670, Secondquarter 2015.
- [539] S. Sugiura and L. Hanzo, "Frequency-domain-equalization-aided iterative detection of faster-than-nyquist signaling," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 5, pp. 2122–2128, May 2015.
- [540] P. Zhang, S. Chen, and L. Hanzo, "Two-tier channel estimation aided near-capacity mimo transceivers relying on norm-based joint transmit and receive antenna selection," *IEEE Transactions on Wireless Communications*, vol. 14, no. 1, pp. 122–137, Jan 2015.
- [541] S. Kumar, S. Kalyani, L. Hanzo, and K. Giridhar, "Coverage probability and achievable rate analysis of ffr-aided multi-user ofdm-based mimo and simo systems," *IEEE Transactions on Communications*, vol. 63, no. 10, pp. 3869–3881, Oct 2015.
- [542] Z. Babar, S. X. Ng, and L. Hanzo, "Exit-chart-aided near-capacity quantum turbo code design," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 3, pp. 866–875, March 2015.
- [543] L. Li, H. V. Poor, and L. Hanzo, "Non-coherent successive relaying and cooperation: Principles, designs, and applications," *IEEE Communications Surveys Tutorials*, vol. 17, no. 3, pp. 1708–1737, thirdquarter 2015.
- [544] Z. Wang, Q. Wang, S. Chen, and L. Hanzo, "An adaptive scaling and biasing scheme for ofdm-based visible light communication systems," *Opt. Express*, vol. 22, no. 10, pp. 12707–12715, May 2014. [Online]. Available: http://www.opticsexpress.org/abstract.cfm?URI=0e-22-10-12707

- [545] Y. Yang, B. Bai, W. Chen, and L. Hanzo, "A low-complexity cross-layer algorithm for coordinated downlink scheduling and robust beamforming under a limited feedback constraint," *IEEE Transactions on Vehicular Technology*, vol. 63, no. 1, pp. 107– 118, Jan 2014.
- [546] J. Zhang, Z. Tan, H. Wang, Q. Huang, and L. Hanzo, "The effective throughput of MISO systems over κ μ fading channels," *IEEE Transactions on Vehicular Technology*, vol. 63, no. 2, pp. 943–947, Feb 2014.
- [547] B. Zhang, M. El-Hajjar, and L. Hanzo, "Opportunistic relay selection for cooperative relaying in cochannel interference contaminated networks," *IEEE Transactions on Vehicular Technology*, vol. 63, no. 5, pp. 2455–2461, Jun 2014.
- [548] M. El-Hajjar and L. Hanzo, "Exit charts for system design and analysis," *IEEE Communications Surveys Tutorials*, vol. 16, no. 1, pp. 127–153, First 2014.
- [549] M. I. Kadir, S. Chen, K. Hari, K. Giridhar, and L. Hanzo, "Ofdm-aided differential space-time shift keying using iterative soft multiple-symbol differential sphere decoding," *IEEE Transactions on Vehicular Technology*, vol. 63, no. 8, pp. 4102–4108, Oct 2014.
- [550] Y. Huo, M. El-Hajjar, R. G. Maunder, and L. Hanzo, "Layered wireless video relying on minimum-distortion inter-layer fec coding," *IEEE Transactions on Multimedia*, vol. 16, no. 3, pp. 697–710, April 2014.
- [551] K. T. K. Cheung, S. Yang, and L. Hanzo, "Spectral and energy spectral efficiency optimization of joint transmit and receive beamforming based multi-relay mimo-ofdma cellular networks," *IEEE Transactions on Wireless Communications*, vol. 13, no. 11, pp. 6147–6165, Nov 2014.
- [552] J. Zuo, C. Dong, H. V. Nguyen, S. X. Ng, L. L. Yang, and L. Hanzo, "Cross-layer aided energy-efficient opportunistic routing in ad hoc networks," *IEEE Transactions on Communications*, vol. 62, no. 2, pp. 522–535, February 2014.
- [553] M. D. Renzo, H. Haas, A. Ghrayeb, S. Sugiura, and L. Hanzo, "Spatial modulation for generalized mimo: Challenges, opportunities, and implementation," *Proceedings of the IEEE*, vol. 102, no. 1, pp. 56–103, Jan 2014.
- [554] J. Zhang, S. Chen, X. Mu, and L. Hanzo, "Evolutionary-algorithm-assisted joint channel estimation and turbo multiuser detection/decoding for ofdm/sdma," *IEEE Transactions on Vehicular Technology*, vol. 63, no. 3, pp. 1204–1222, March 2014.
- [555] Y. Huo, T. Wang, R. G. Maunder, and L. Hanzo, "Motion-aware mesh-structured trellis for correlation modelling aided distributed multi-view video coding," *IEEE Transactions on Image Processing*, vol. 23, no. 1, pp. 319–331, Jan 2014.
- [556] H. A. Ngo and L. Hanzo, "Hybrid automatic-repeat-request systems for cooperative wireless communications," *IEEE Communications Surveys Tutorials*, vol. 16, no. 1, pp. 25–45, First 2014.
- [557] S. Won and L. Hanzo, "Synchronization issues in relay-aided cooperative mimo networks," *IEEE Wireless Communications*, vol. 21, no. 5, pp. 41–51, October 2014.
- [558] A. K. Dutta, K. V. S. Hari, and L. Hanzo, "Channel estimation relying on the minimum bit-errorratio criterion for bpsk and qpsk signals," *IET Communications*, vol. 8, no. 1, pp. 69–76, Jan 2014.
- [559] P. Yang, Y. Xiao, S. Li, and L. Hanzo, "Qrd-assisted adaptive modulation-aided mimo systems," *IEEE Transactions on Vehicular Technology*, vol. 63, no. 1, pp. 446–451, Jan 2014.
- [560] J. Zhang, F. Jin, Z. Tan, H. Wang, Q. Huang, and L. Hanzo, "Performance analysis of high-speed railway communication systems subjected to co-channel interference and channel estimation errors," *IET Communications*, vol. 8, no. 7, pp. 1151–1157, May 2014.
- [561] Q. Wang, Q. Xie, Z. Wang, S. Chen, and L. Hanzo, "A universal low-complexity symbol-to-bit soft demapper," *IEEE Transactions on Vehicular Technology*, vol. 63, no. 1, pp. 119–130, Jan 2014.
- [562] Y. Huo, M. El-Hajjar, and L. Hanzo, "Wireless video: An interlayer error-protection-aided multilayer approach," *IEEE Vehicular Technology Magazine*, vol. 9, no. 3, pp. 104–112, Sept 2014.
- [563] L. Wang, L. Li, C. Xu, D. Liang, S. X. Ng, and L. Hanzo, "Multiple-symbol joint signal processing for differentially encoded single- and multi-carrier communications: Principles, designs and applications," *IEEE Communications Surveys Tutorials*, vol. 16, no. 2, pp. 689–712, Second 2014.
- [564] W. Liang, S. X. Ng, J. Feng, and L. Hanzo, "Pragmatic distributed algorithm for spectral access in cooperative cognitive radio networks," *IEEE Transactions on Communications*, vol. 62, no. 4, pp. 1188–1200, April 2014.

- [565] Y. Huo, T. Wang, R. Maunder, and L. Hanzo, "Two-dimensional iterative source-channel decoding for distributed video coding," *IEEE Communications Letters*, vol. 18, no. 1, pp. 90–93, January 2014.
- [566] P. Zhang, S. Chen, and L. Hanzo, "Embedded iterative semi-blind channel estimation for three-stage-concatenated mimo-aided qam turbo transceivers," *IEEE Transactions on Vehicular Technology*, vol. 63, no. 1, pp. 439–446, Jan 2014.
- [567] J. Zhang, F. Jin, R. Zhang, G. Li, and L. Hanzo, "Analysis and design of distributed antenna-aided twin-layer femto- and macrocell networks relying on fractional frequency reuse," *IEEE Transactions on Vehicular Technology*, vol. 63, no. 2, pp. 763–774, Feb 2014.
- [568] P. Botsinis, S. X. Ng, and L. Hanzo, "Fixed-complexity quantum-assisted multi-user detection for cdma and sdma," *IEEE Transactions on Communications*, vol. 62, no. 3, pp. 990–1000, March 2014.
- [569] Y. Yang, W. Chen, O. Li, and L. Hanzo, "Variable-rate, variable-power network-coded-qam/psk for bi-directional relaying over fading channels," *IEEE Transactions on Communications*, vol. 62, no. 10, pp. 3631–3643, Oct 2014.
- [570] T. Wang, W. Zhang, R. G. Maunder, and L. Hanzo, "Near-capacity joint source and channel coding of symbol values from an infinite source set using elias gamma error correction codes," *IEEE Transactions on Communications*, vol. 62, no. 1, pp. 280–292, January 2014.
- [571] A. K. Dutta, K. V. S. Hari, and L. Hanzo, "Linear transceiver design for an amplify-and-forward relay based on the mber criterion," *IEEE Transactions on Communications*, vol. 62, no. 11, pp. 3765–3777, Nov 2014.
- [572] P. Botsinis, D. Alanis, S. X. Ng, and L. Hanzo, "Low-complexity soft-output quantum-assisted multiuser detection for directsequence spreading and slow subcarrier-hopping aided sdma-ofdm systems," *IEEE Access*, vol. 2, pp. 451–472, 2014.
- [573] Y. Zou, X. Wang, W. Shen, and L. Hanzo, "Security versus reliability analysis of opportunistic relaying," *IEEE Transactions on Vehicular Technology*, vol. 63, no. 6, pp. 2653–2661, July 2014.
- [574] H. Yetgin, K. T. K. Cheung, M. El-Hajjar, and L. Hanzo, "Cross-layer network lifetime optimisation considering transmit and signal processing power in wireless sensor networks," *IET Wireless Sensor Systems*, vol. 4, no. 4, pp. 176–182, 2014.
- [575] S. Benedetto and L. Hanzo, "Honoring our colleagues: Comsoc awards [the president's page]," *IEEE Communications Magazine*, vol. 52, no. 12, pp. 6–8, December 2014.
- [576] D. ALANIS, P. BOTSINIS, S. X. NG, and L. HANZO, "Quantum-assisted routing optimization for self-organizing networks," *IEEE Access*, vol. 2, pp. 614–632, 2014.
- [577] A. J. Aljohani, S. X. Ng, and L. Hanzo, "Ttcm-aided rate-adaptive distributed source coding for rayleigh fading channels," *IEEE Transactions on Vehicular Technology*, vol. 63, no. 3, pp. 1126–1134, March 2014.
- [578] W. Liu, C. Li, J. D. Li, and L. Hanzo, "Geometric-mean-decomposition-based optimal transceiver for a class of two-hop mimoaided amplify-and-forward relay channels," *IEEE Transactions on Vehicular Technology*, vol. 63, no. 2, pp. 948–952, Feb 2014.
- [579] R. Rajashekar, K. V. S. Hari, and L. Hanzo, "Reduced-complexity ml detection and capacity-optimized training for spatial modulation systems," *IEEE Transactions on Communications*, vol. 62, no. 1, pp. 112–125, January 2014.
- [580] J. Feng, R. Zhang, L. Hanzo, and S. X. Ng, "Cooperative medium access control based on spectrum leasing," *IEEE Transactions on Vehicular Technology*, vol. 63, no. 1, pp. 297–307, Jan 2014.
- [581] J. Zhang, B. Zhang, S. Chen, X. Mu, M. El-Hajjar, and L. Hanzo, "Pilot contamination elimination for large-scale multipleantenna aided ofdm systems," *IEEE Journal of Selected Topics in Signal Processing*, vol. 8, no. 5, pp. 759–772, Oct 2014.
- [582] P. Yang, Y. Xiao, B. Zhang, S. Li, M. El-Hajjar, and L. Hanzo, "Star-qam signaling constellations for spatial modulation," *IEEE Transactions on Vehicular Technology*, vol. 63, no. 8, pp. 3741–3749, Oct 2014.
- [583] X. Zhou, X. Zheng, R. Zhang, and L. Hanzo, "Chip-interleaved optical code division multiple access relying on a photon-counting iterative successive interference canceller for free-space optical channels," *Opt. Express*, vol. 21, no. 13, pp. 15926–15937, Jul 2013. [Online]. Available: http://www.opticsexpress.org/abstract.cfm?URI=oe-21-13-15926
- [584] Q. Wang, Z. Wang, S. Chen, and L. Hanzo, "Enhancing the decoding performance of optical wireless communication systems using receiver-side predistortion," *Opt. Express*, vol. 21, no. 25, pp. 30295–30305, Dec 2013. [Online]. Available: http://www.opticsexpress.org/abstract.cfm?URI=0e-21-25-30295

- [585] L. Li, X. Zhou, R. Zhang, D. Zhang, and L. Hanzo, "Performance and capacity analysis of poisson photon-counting based iter-pic ocdma systems," *Opt. Express*, vol. 21, no. 22, pp. 25954–25967, Nov 2013. [Online]. Available: http://www.opticsexpress.org/abstract.cfm?URI=oe-21-22-25954
- [586] S. Yang, T. Lv, and L. Hanzo, "Semidefinite programming relaxation based virtually antipodal detection for mimo systems using gray-coded high-order qam," *IEEE Transactions on Vehicular Technology*, vol. 62, no. 4, pp. 1667–1677, May 2013.
- [587] S. Yang, T. Lv, R. G. Maunder, and L. Hanzo, "From nominal to true a posteriori probabilities: An exact bayesian theorem based probabilistic data association approach for iterative mimo detection and decoding," *IEEE Transactions on Communications*, vol. 61, no. 7, pp. 2782–2793, July 2013.
- [588] D. Chen, L. L. Yang, and L. Hanzo, "Multi-hop diversity aided multi-hop communications: A cumulative distribution function aware approach," *IEEE Transactions on Communications*, vol. 61, no. 11, pp. 4486–4499, November 2013.
- [589] B. Choi and L. Hanzo, "Adaptive wht aided qam for fading channels subjected to impulsive noise," *IEEE Communications Letters*, vol. 17, no. 7, pp. 1317–1320, July 2013.
- [590] H. V. Nguyen, S. X. Ng, and L. Hanzo, "Irregular convolution and unity-rate coded network-coding for cooperative multi-user communications," *IEEE Transactions on Wireless Communications*, vol. 12, no. 3, pp. 1231–1243, March 2013.
- [591] M. I. Kadir, L. Li, S. Chen, and L. Hanzo, "Successive-relaying-aided decode-and-forward coherent versus noncoherent cooperative multicarrier space-time shift keying," *IEEE Transactions on Vehicular Technology*, vol. 62, no. 6, pp. 2544–2557, July 2013.
- [592] R. Zhang, L. L. Yang, and L. Hanzo, "Generalised pre-coding aided spatial modulation," *IEEE Transactions on Wireless Communications*, vol. 12, no. 11, pp. 5434–5443, November 2013.
- [593] A. Snchez-Esguevillas, B. Carro, G. Camarillo, Y. B. Lin, M. A. Garca-Martn, and L. Hanzo, "Ims: The new generation of internet-protocol-based multimedia services," *Proceedings of the IEEE*, vol. 101, no. 8, pp. 1860–1881, Aug 2013.
- [594] W. Chen, Z. Cao, and L. Hanzo, "Maximum euclidean distance network coded modulation for asymmetric decode-and-forward two-way relaying," *IET Communications*, vol. 7, no. 10, pp. 988–998, July 2013.
- [595] R. Zhang, L. Wang, G. Parr, O. G. Aliu, B. Awoseyila, N. Azarmi, S. Bhatti, E. Bodanese, H. Chen, M. Dianati, A. Dutta, M. Fitch, K. Giridhar, S. Hailes, K. V. S. Hari, M. A. Imran, A. K. Jagannatham, A. Karandikar, S. Kawade, M. Z. A. Khan, S. C. Kompalli, P. Langdon, B. Narayanan, A. Mauthe, J. McGeehan, N. Mehta, K. Millet, K. Moessner, R. Rajashekar, B. Ramkumar, V. Ribeiro, K. Vasudevan, L. Hanzo, and J. Bigham, "Advances in base- and mobile-station aided cooperative wireless communications: An overview," *IEEE Vehicular Technology Magazine*, vol. 8, no. 1, pp. 57–69, March 2013.
- [596] P. Yang, B. Zhang, Y. Xiao, B. Dong, S. Li, M. El-Hajjar, and L. Hanzo, "Detect-and-forward relaying aided cooperative spatial modulation for wireless networks," *IEEE Transactions on Communications*, vol. 61, no. 11, pp. 4500–4511, November 2013.
- [597] D. Liang, S. X. Ng, and L. Hanzo, "Near-capacity turbo coded soft-decision aided dapsk/star-qam for amplify-and-forward based cooperative communications," *IEEE Transactions on Communications*, vol. 61, no. 3, pp. 1080–1087, March 2013.
- [598] L. Hanzo, A. F. Molisch, and R. Vida, "Ieee icc 2013 concludes with thousands of international communications experts attending hundreds of presentations in budapest, hungary [conference review]," *IEEE Communications Magazine*, vol. 51, no. 8, pp. 14–18, August 2013.
- [599] K. T. K. Cheung, S. Yang, and L. Hanzo, "Achieving maximum energy-efficiency in multi-relay ofdma cellular networks: A fractional programming approach," *IEEE Transactions on Communications*, vol. 61, no. 7, pp. 2746–2757, July 2013.
- [600] L. Li, R. G. Maunder, B. M. Al-Hashimi, and L. Hanzo, "A low-complexity turbo decoder architecture for energy-efficient wireless sensor networks," *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, vol. 21, no. 1, pp. 14–22, Jan 2013.
- [601] P. Zhang, S. Chen, and L. Hanzo, "Differential space-time shift keying-aided successive-relaying-assisted decode-and-forward cooperative multiuser cdma," *IEEE Transactions on Vehicular Technology*, vol. 62, no. 5, pp. 2156–2169, Jun 2013.
- [602] S. Wang, S. Chen, A. Wang, J. An, and L. Hanzo, "Joint timing and channel estimation for bandlimited long-code-based mcds-cdma: A low-complexity near-optimal algorithm and the crlb," *IEEE Transactions on Communications*, vol. 61, no. 5, pp. 1998–2011, May 2013.

- [603] Y. Huo, C. Zhu, and L. Hanzo, "Spatio-temporal iterative source-channel decoding aided video transmission," *IEEE Transactions on Vehicular Technology*, vol. 62, no. 4, pp. 1597–1609, May 2013.
- [604] C. Xu, S. Sugiura, S. X. Ng, and L. Hanzo, "Spatial modulation and space-time shift keying: Optimal performance at a reduced detection complexity," *IEEE Transactions on Communications*, vol. 61, no. 1, pp. 206–216, January 2013.
- [605] J. Hu, L. L. Yang, and L. Hanzo, "Maximum average service rate and optimal queue scheduling of delay-constrained hybrid cognitive radio in nakagami fading channels," *IEEE Transactions on Vehicular Technology*, vol. 62, no. 5, pp. 2220–2229, Jun 2013.
- [606] B. Zhang, H. Chen, M. El-Hajjar, R. Maunder, and L. Hanzo, "Distributed multiple-component turbo codes for cooperative hybrid arq," *IEEE Signal Processing Letters*, vol. 20, no. 6, pp. 599–602, June 2013.
- [607] V. A. Thomas, S. Ghafoor, M. El-Hajjar, and L. Hanzo, "Baseband radio over fiber aided millimeter-wave distributed antenna for optical/wireless integration," *IEEE Communications Letters*, vol. 17, no. 5, pp. 1012–1015, May 2013.
- [608] C. Xu, D. Liang, S. X. Ng, and L. Hanzo, "Reduced-complexity noncoherent soft-decision-aided dapsk dispensing with channel estimation," *IEEE Transactions on Vehicular Technology*, vol. 62, no. 6, pp. 2633–2643, July 2013.
- [609] R. G. Maunder, W. Zhang, T. Wang, and L. Hanzo, "A unary error correction code for the near-capacity joint source and channel coding of symbol values from an infinite set," *IEEE Transactions on Communications*, vol. 61, no. 5, pp. 1977–1987, May 2013.
- [610] Y. Huo, M. El-Hajjar, and L. Hanzo, "Inter-layer fec aided unequal error protection for multilayer video transmission in mobile tv," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 23, no. 9, pp. 1622–1634, Sept 2013.
- [611] P. Zhang, S. Chen, and L. Hanzo, "Reduced-complexity near-capacity joint channel estimation and three-stage turbo detection for coherent space-time shift keying," *IEEE Transactions on Communications*, vol. 61, no. 5, pp. 1902–1913, May 2013.
- [612] W. Liang, S. X. Ng, and L. Hanzo, "Cooperative communication between cognitive and primary users," *IET Communications*, vol. 7, no. 17, pp. 1982–1992, Nov 2013.
- [613] P. Botsinis, S. X. Ng, and L. Hanzo, "Quantum search algorithms, quantum wireless, and a low-complexity maximum likelihood iterative quantum multi-user detector design," *IEEE Access*, vol. 1, pp. 94–122, 2013.
- [614] J. Zhang, R. Zhang, G. Li, and L. Hanzo, "Distributed antenna systems in fractional-frequency-reuse-aided cellular networks," *IEEE Transactions on Vehicular Technology*, vol. 62, no. 3, pp. 1340–1349, March 2013.
- [615] L. Li, R. G. Maunder, B. M. Al-Hashimi, M. Zwolinski, and L. Hanzo, "Energy-conscious turbo decoder design: A joint signal processing and transmit energy reduction approach," *IEEE Transactions on Vehicular Technology*, vol. 62, no. 8, pp. 3627–3638, Oct 2013.
- [616] Z. Babar, S. X. Ng, and L. Hanzo, "Near-capacity code design for entanglement-assisted classical communication over quantum depolarizing channels," *IEEE Transactions on Communications*, vol. 61, no. 12, pp. 4801–4807, December 2013.
- [617] R. Rajashekar, K. V. S. Hari, and L. Hanzo, "A reduced-complexity partial-interference-cancellation group decoder for stbcs," *IEEE Signal Processing Letters*, vol. 20, no. 10, pp. 929–932, Oct 2013.
- [618] —, "Antenna selection in spatial modulation systems," *IEEE Communications Letters*, vol. 17, no. 3, pp. 521–524, March 2013.
- [619] J. Zhang, L. L. Yang, and L. Hanzo, "Energy-efficient dynamic resource allocation for opportunistic-relaying-assisted sc-fdma using turbo-equalizer-aided soft decode-and-forward," *IEEE Transactions on Vehicular Technology*, vol. 62, no. 1, pp. 235–246, Jan 2013.
- [620] H. Chen, R. G. Maunder, and L. Hanzo, "A survey and tutorial on low-complexity turbo coding techniques and a holistic hybrid arq design example," *IEEE Communications Surveys Tutorials*, vol. 15, no. 4, pp. 1546–1566, Fourth 2013.
- [621] H. Jie, Y. Lieliang, and L. Hanzo, "Mobile social networking aided content dissemination in heterogeneous networks," *China Communications*, vol. 10, no. 6, pp. 1–13, June 2013.
- [622] M. I. Kadir, S. Sugiura, J. Zhang, S. Chen, and L. Hanzo, "Ofdma/sc-fdma aided space-time shift keying for dispersive multiuser scenarios," *IEEE Transactions on Vehicular Technology*, vol. 62, no. 1, pp. 408–414, Jan 2013.
- [623] M. El-Hajjar and L. Hanzo, "A survey of digital television broadcast transmission techniques," *IEEE Communications Surveys Tutorials*, vol. 15, no. 4, pp. 1924–1949, Fourth 2013.

- [624] C. Xu, D. Liang, S. Sugiura, S. X. Ng, and L. Hanzo, "Reduced-complexity approx-log-map and max-log-map soft psk/qam detection algorithms," *IEEE Transactions on Communications*, vol. 61, no. 4, pp. 1415–1425, April 2013.
- [625] S. Sugiura and L. Hanzo, "On the joint optimization of dispersion matrices and constellations for near-capacity irregular precoded space-time shift keying," *IEEE Transactions on Wireless Communications*, vol. 12, no. 1, pp. 380–387, January 2013.
- [626] J. Yang, Q. Zheng, H. Xi, and L. Hanzo, "Receiver-driven adaptive enhancement layer switching algorithm for scalable video transmission over link-adaptive networks," *IEEE Signal Processing Letters*, vol. 20, no. 1, pp. 47–50, Jan 2013.
- [627] Q. Xie, Z. Yang, J. Song, and L. Hanzo, "Exit-chart-matching-aided near-capacity coded modulation design and a bicm-id design example for both gaussian and rayleigh channels," *IEEE Transactions on Vehicular Technology*, vol. 62, no. 3, pp. 1216–1227, March 2013.
- [628] A. J. Aljohani, S. X. Ng, R. G. Maunder, and L. Hanzo, "Exit-chart-aided joint source coding, channel coding, and modulation design for two-way relaying," *IEEE Transactions on Vehicular Technology*, vol. 62, no. 6, pp. 2496–2506, July 2013.
- [629] Y. Huo, T. Wang, R. G. Maunder, and L. Hanzo, "Iterative source and channel decoding relying on correlation modelling for wireless video transmission," *IET Communications*, vol. 7, no. 14, pp. 1465–1475, September 2013.
- [630] R. Rajashekar, K. V. S. Hari, and L. Hanzo, "Spatial modulation aided zero-padded single carrier transmission for dispersive channels," *IEEE Transactions on Communications*, vol. 61, no. 6, pp. 2318–2329, June 2013.
- [631] R. Zhang and L. Hanzo, "Multi-layer modulation for intensity-modulated direct-detection optical ofdm," *IEEE/OSA Journal of Optical Communications and Networking*, vol. 5, no. 12, pp. 1402–1412, Dec 2013.
- [632] L. Li, L. Wang, and L. Hanzo, "Generalized adaptive network coding aided successive relaying for noncoherent cooperation," *IEEE Transactions on Communications*, vol. 61, no. 5, pp. 1750–1763, May 2013.
- [633] R. Rajashekar, K. V. S. Hari, and L. Hanzo, "Structured dispersion matrices from division algebra codes for space-time shift keying," *IEEE Signal Processing Letters*, vol. 20, no. 4, pp. 371–374, April 2013.
- [634] V. A. Thomas, S. Ghafoor, M. El-Hajjar, and L. Hanzo, "A full-duplex diversity-assisted hybrid analogue/digitized radio over fibre for optical/wireless integration," *IEEE Communications Letters*, vol. 17, no. 2, pp. 409–412, February 2013.
- [635] F. Jin, R. Zhang, and L. Hanzo, "Fractional frequency reuse aided twin-layer femtocell networks: Analysis, design and optimization," *IEEE Transactions on Communications*, vol. 61, no. 5, pp. 2074–2085, May 2013.
- [636] L. Li, L. Wang, and L. Hanzo, "Successive af/df relaying in the cooperative ds-cdma uplink: Capacity analysis and its system architecture," *IEEE Transactions on Vehicular Technology*, vol. 62, no. 2, pp. 655–666, Feb 2013.
- [637] Z. Babar, S. X. Ng, and L. Hanzo, "Reduced-complexity syndrome-based ttcm decoding," *IEEE Communications Letters*, vol. 17, no. 6, pp. 1220–1223, June 2013.
- [638] S. Yang, L. Wang, T. Lv, and L. Hanzo, "Approximate bayesian probabilistic-data-association-aided iterative detection for mimo systems using arbitrary m -ary modulation," *IEEE Transactions on Vehicular Technology*, vol. 62, no. 3, pp. 1228–1240, March 2013.
- [639] X. Zhou, D. Zhang, R. Zhang, and L. Hanzo, "A photon-counting spatial-diversity-and-multiplexing mimo scheme for poisson atmospheric channels relying on q-ary ppm," *Opt. Express*, vol. 20, no. 24, pp. 26379–26393, Nov 2012. [Online]. Available: http://www.opticsexpress.org/abstract.cfm?URI=oe-20-24-26379
- [640] S. Won and L. Hanzo, "Initial synchronisation of wideband and uwb direct sequence systems: Single- and multiple-antenna aided solutions," *IEEE Communications Surveys Tutorials*, vol. 14, no. 1, pp. 87–108, First 2012.
- [641] H. A. Ngo and L. Hanzo, "Area spectral efficiency of soft-decision space-time-frequency shift-keying-aided slow-frequencyhopping multiple access," *IEEE Transactions on Vehicular Technology*, vol. 61, no. 3, pp. 1433–1439, March 2012.
- [642] S. Sugiura, S. X. Ng, L. Kong, S. Chen, and L. Hanzo, "Quasi-synchronous cooperative networks: A practical cooperative transmission protocol," *IEEE Vehicular Technology Magazine*, vol. 7, no. 4, pp. 66–76, Dec 2012.
- [643] L. Wang and L. Hanzo, "Dispensing with channel estimation: Differentially modulated cooperative wireless communications," *IEEE Communications Surveys Tutorials*, vol. 14, no. 3, pp. 836–857, Third 2012.
- [644] L. Hanzo, H. Haas, S. Imre, D. O'Brien, M. Rupp, and L. Gyongyosi, "Wireless myths, realities, and futures: From 3g/4g to optical and quantum wireless," *Proceedings of the IEEE*, vol. 100, no. Special Centennial Issue, pp. 1853–1888, May 2012.

- [645] —, "Prolog to the section on wireless communications technology," *Proceedings of the IEEE*, vol. 100, no. Special Centennial Issue, pp. 1849–1852, May 2012.
- [646] W. Liu, C. Li, J. D. Li, and L. Hanzo, "Singular value decomposition-based multiuser multiple-input multiple-output vector perturbationaided downlink transmitter and lattice-reductionassisted uplink receiver pair," *IET Communications*, vol. 6, no. 15, pp. 2448–2454, October 2012.
- [647] S. Ghafoor, V. A. Thomas, and L. Hanzo, "Duplex digitized transmission of 64-qam signals over a single fiber using a single pulsed laser source," *IEEE Communications Letters*, vol. 16, no. 8, pp. 1312–1315, August 2012.
- [648] S. Sugiura, S. Chen, and L. Hanzo, "Mimo-aided near-capacity turbo transceivers: Taxonomy and performance versus complexity," *IEEE Communications Surveys Tutorials*, vol. 14, no. 2, pp. 421–442, Second 2012.
- [649] K. Ghanem, I. Khan, P. Hall, and L. Hanzo, "Mimo stochastic model and capacity evaluation of on-body channels," *IEEE Transactions on Antennas and Propagation*, vol. 60, no. 6, pp. 2980–2986, June 2012.
- [650] J. Zhang, S. Chen, X. Mu, and L. Hanzo, "Turbo multi-user detection for ofdm/sdma systems relying on differential evolution aided iterative channel estimation," *IEEE Transactions on Communications*, vol. 60, no. 6, pp. 1621–1633, June 2012.
- [651] S. Sugiura and L. Hanzo, "Effects of channel estimation on spatial modulation," *IEEE Signal Processing Letters*, vol. 19, no. 12, pp. 805–808, Dec 2012.
- [652] W. Liu, C. Li, J. d. Li, and L. Hanzo, "Block diagonalisation-based multiuser multiple input multiple output-aided downlink relaying," *IET Communications*, vol. 6, no. 15, pp. 2371–2377, October 2012.
- [653] F. Babich, A. Crismani, M. Driusso, and L. Hanzo, "Design criteria and genetic algorithm aided optimization of three-stageconcatenated space-time shift keying systems," *IEEE Signal Processing Letters*, vol. 19, no. 8, pp. 543–546, Aug 2012.
- [654] S. Won and L. Hanzo, "Synchronization of noncoherent mimo systems: Synchronization issues," *IEEE Vehicular Technology Magazine*, vol. 7, no. 4, pp. 95–103, Dec 2012.
- [655] H. V. Nguyen, C. Xu, S. X. Ng, and L. Hanzo, "Non-coherent near-capacity network coding for cooperative multi-user communications," *IEEE Transactions on Communications*, vol. 60, no. 10, pp. 3059–3070, October 2012.
- [656] Nasruminallah and L. Hanzo, "Near-capacity h.264 multimedia communications using iterative joint source-channel decoding," *IEEE Communications Surveys Tutorials*, vol. 14, no. 2, pp. 538–564, Second 2012.
- [657] W. Liu, C. Li, J. D. Li, and L. Hanzo, "Maximum-snr optimal weighting matrix for multiple relay-antenna-assisted orthogonal space time block codes," *IEEE Transactions on Vehicular Technology*, vol. 61, no. 4, pp. 1936–1940, May 2012.
- [658] L. Wang and L. Hanzo, "Low-complexity near-optimum multiple-symbol differential detection of dapsk based on iterative amplitude/phase processing," *IEEE Transactions on Vehicular Technology*, vol. 61, no. 2, pp. 894–900, Feb 2012.
- [659] H. A. Ngo, S. Ahmed, L. L. Yang, and L. Hanzo, "Non-coherent cooperative communications dispensing with channel estimation relying on erasure insertion aided reed-solomon coded sfh m-ary fsk subjected to partial-band interference and rayleigh fading," *IEEE Transactions on Communications*, vol. 60, no. 8, pp. 2177–2186, August 2012.
- [660] C. Dong, L.-L. Yang, and L. Hanzo, "Performance analysis of multihop-diversity-aided multihop links," *IEEE Transactions on Vehicular Technology*, vol. 61, no. 6, pp. 2504–2516, July 2012.
- [661] L. Li, L. Wang, and L. Hanzo, "Differential interference suppression aided three-stage concatenated successive relaying," *IEEE Transactions on Communications*, vol. 60, no. 8, pp. 2146–2155, August 2012.
- [662] M. F. U. Butt, S. X. Ng, and L. Hanzo, "Self-concatenated code design and its application in power-efficient cooperative communications," *IEEE Communications Surveys Tutorials*, vol. 14, no. 3, pp. 858–883, Third 2012.
- [663] J. Zhang, R. Zhang, G. Li, and L. Hanzo, "Remote coalition network elements for base station cooperation aided multicell processing," *IEEE Transactions on Vehicular Technology*, vol. 61, no. 3, pp. 1406–1415, March 2012.
- [664] S. Sugiura, S. Chen, and L. Hanzo, "A universal space-time architecture for multiple-antenna aided systems," *IEEE Communica*tions Surveys Tutorials, vol. 14, no. 2, pp. 401–420, Second 2012.
- [665] S. Sugiura, C. Xu, S. X. Ng, and L. Hanzo, "Reduced-complexity iterative-detection-aided generalized space-time shift keying," *IEEE Transactions on Vehicular Technology*, vol. 61, no. 8, pp. 3656–3664, Oct 2012.

- [666] J. Feng, R. Zhang, and L. Hanzo, "A spectrum leasing cooperative medium access protocol and its stability analysis," *IEEE Transactions on Vehicular Technology*, vol. 61, no. 8, pp. 3718–3730, Oct 2012.
- [667] R. G. Maunder and L. Hanzo, "Evolutionary algorithm aided interleaver design for serially concatenated codes," *IEEE Transac*tions on Communications, vol. 59, no. 7, pp. 1753–1758, July 2011.
- [668] H. Chen, R. G. Maunder, and L. Hanzo, "Low-complexity multiple-component turbo-decoding-aided hybrid arq," *IEEE Trans*actions on Vehicular Technology, vol. 60, no. 4, pp. 1571–1577, May 2011.
- [669] L. He, Z. Wang, F. Yang, S. Chen, and L. Hanzo, "Preamble design using embedded signaling for ofdm broadcast systems based on reduced-complexity distance detection," *IEEE Transactions on Vehicular Technology*, vol. 60, no. 3, pp. 1217–1222, March 2011.
- [670] J. Zhang, L. L. Yang, and L. Hanzo, "Energy-efficient channel-dependent cooperative relaying for the multiuser sc-fdma uplink," *IEEE Transactions on Vehicular Technology*, vol. 60, no. 3, pp. 992–1004, March 2011.
- [671] C. Xu, S. Sugiura, S. X. Ng, and L. Hanzo, "Reduced-complexity soft-decision aided space-time shift keying," *IEEE Signal Processing Letters*, vol. 18, no. 10, pp. 547–550, Oct 2011.
- [672] S. Sugiura, S. Chen, H. Haas, P. M. Grant, and L. Hanzo, "Coherent versus non-coherent decode-and-forward relaying aided cooperative space-time shift keying," *IEEE Transactions on Communications*, vol. 59, no. 6, pp. 1707–1719, June 2011.
- [673] S. Wang, A. h. Wang, J. p. An, and L. Hanzo, "Timing acquisition for bandlimited long-code ds-cdma in doubly-selective fading channels," *IEEE Signal Processing Letters*, vol. 18, no. 11, pp. 671–674, Nov 2011.
- [674] D. Yang, C. Xu, L. L. Yang, and L. Hanzo, "Transmit-diversity-assisted space-shift keying for colocated and distributed/cooperative mimo elements," *IEEE Transactions on Vehicular Technology*, vol. 60, no. 6, pp. 2864–2869, July 2011.
- [675] C. Xu, S. Sugiura, S. X. Ng, and L. Hanzo, "Reduced-complexity noncoherently detected differential space-time shift keying," *IEEE Signal Processing Letters*, vol. 18, no. 3, pp. 153–156, March 2011.
- [676] N. Wu, S. Sugiura, and L. Hanzo, "Coherent versus noncoherent," *IEEE Vehicular Technology Magazine*, vol. 6, no. 4, pp. 38–48, Dec 2011.
- [677] S. Sugiura, C. Xu, S. X. Ng, and L. Hanzo, "Reduced-complexity coherent versus non-coherent qam-aided space-time shift keying," *IEEE Transactions on Communications*, vol. 59, no. 11, pp. 3090–3101, November 2011.
- [678] L. Hanzo, M. El-Hajjar, and O. Alamri, "Near-capacity wireless transceivers and cooperative communications in the mimo era: Evolution of standards, waveform design, and future perspectives," *Proceedings of the IEEE*, vol. 99, no. 8, pp. 1343–1385, Aug 2011.
- [679] L. Wang and L. Hanzo, "Differential interference suppression for sdma-ofdm based on joint multiple-symbol filtering and detection," *IEEE Transactions on Vehicular Technology*, vol. 60, no. 9, pp. 4656–4662, Nov 2011.
- [680] Y. J. Kim, S. H. Won, N. Y. Park, and L. Hanzo, "Reduced-complexity transmit-beamforming codebook search algorithm," *Electronics Letters*, vol. 47, no. 16, pp. 938–939, Aug 2011.
- [681] D. Liang, S. X. Ng, and L. Hanzo, "Soft-decision star-qam aided bicm-id," *IEEE Signal Processing Letters*, vol. 18, no. 3, pp. 169–172, March 2011.
- [682] R. Zhang and L. Hanzo, "Multiple-source cooperation: From code-division multiplexing to variable-rate network coding," *IEEE Transactions on Vehicular Technology*, vol. 60, no. 3, pp. 1005–1015, March 2011.
- [683] C. Xu, L. Wang, S. X. Ng, and L. Hanzo, "Multiple-symbol differential sphere detection aided differential space-time block codes using qam constellations," *IEEE Signal Processing Letters*, vol. 18, no. 9, pp. 497–500, Sept 2011.
- [684] N. Bonello, S. Chen, and L. Hanzo, "Design of low-density parity-check codes," *IEEE Vehicular Technology Magazine*, vol. 6, no. 4, pp. 16–23, Dec 2011.
- [685] N. Bonello, Y. Yang, S. Aissa, and L. Hanzo, "Myths and realities of rateless coding," *IEEE Communications Magazine*, vol. 49, no. 8, pp. 143–151, August 2011.
- [686] C. Han, T. Harrold, S. Armour, I. Krikidis, S. Videv, P. M. Grant, H. Haas, J. S. Thompson, I. Ku, C. X. Wang, T. A. Le, M. R. Nakhai, J. Zhang, and L. Hanzo, "Green radio: radio techniques to enable energy-efficient wireless networks," *IEEE Communications Magazine*, vol. 49, no. 6, pp. 46–54, June 2011.

- [687] J. Zhang, L. Hanzo, and X. Mu, "Joint decision-directed channel and noise-variance estimation for mimo ofdm/sdma systems based on expectation-conditional maximization," *IEEE Transactions on Vehicular Technology*, vol. 60, no. 5, pp. 2139–2151, Jun 2011.
- [688] H. Chen, R. G. Maunder, and L. Hanzo, "Lookup-table-based deferred-iteration aided low-complexity turbo hybrid arq," *IEEE Transactions on Vehicular Technology*, vol. 60, no. 7, pp. 3045–3053, Sept 2011.
- [689] S. Sugiura, S. Chen, and L. Hanzo, "Generalized space-time shift keying designed for flexible diversity-, multiplexing- and complexity-tradeoffs," *IEEE Transactions on Wireless Communications*, vol. 10, no. 4, pp. 1144–1153, April 2011.
- [690] H. A. Ngo, T. D. Nguyen, and L. Hanzo, "Amplify-forward and decode-forward cooperation relying on systematic luby transform coded hybrid automatic-repeat-request," *IET Communications*, vol. 5, no. 8, pp. 1096–1106, May 2011.
- [691] W. Yao, S. Chen, and L. Hanzo, "Generalized mber-based vector precoding design for multiuser transmission," *IEEE Transactions on Vehicular Technology*, vol. 60, no. 2, pp. 739–745, Feb 2011.
- [692] C. Zhang, Z. Wang, C. Pan, S. Chen, and L. Hanzo, "Low-complexity iterative frequency domain decision feedback equalization," *IEEE Transactions on Vehicular Technology*, vol. 60, no. 3, pp. 1295–1301, March 2011.
- [693] H. V. Nguyen, S. X. Ng, and L. Hanzo, "Performance bounds of network coding aided cooperative multiuser systems," *IEEE Signal Processing Letters*, vol. 18, no. 7, pp. 435–438, July 2011.
- [694] L. H. II. and R. Tafazolli, "Qos-aware routing and admission control in shadow-fading environments for multirate manets," *IEEE Transactions on Mobile Computing*, vol. 10, no. 5, pp. 622–637, May 2011.
- [695] J. Yang, H. Hu, H. Xi, and L. Hanzo, "Online buffer fullness estimation aided adaptive media playout for video streaming," *IEEE Transactions on Multimedia*, vol. 13, no. 5, pp. 1141–1153, Oct 2011.
- [696] S. Ghafoor and L. Hanzo, "Sub-carrier-multiplexed duplex 64-qam radio-over-fiber transmission for distributed antennas," *IEEE Communications Letters*, vol. 15, no. 12, pp. 1368–1371, December 2011.
- [697] R. Zhang and L. Hanzo, "Cooperative downlink multicell preprocessing relying on reduced-rate back-haul data exchange," *IEEE Transactions on Vehicular Technology*, vol. 60, no. 2, pp. 539–545, Feb 2011.
- [698] C. Xu, S. X. Ng, and L. Hanzo, "Near-capacity irregular convolutional coded cooperative differential linear dispersion codes using multiple-symbol differential detection," *IEEE Signal Processing Letters*, vol. 18, no. 3, pp. 173–176, March 2011.
- [699] N. Bonello, S. Chen, and L. Hanzo, "Low-density parity-check codes and their rateless relatives," *IEEE Communications Surveys Tutorials*, vol. 13, no. 1, pp. 3–26, First 2011.
- [700] J. Zhang, S. Chen, X. Mu, and L. Hanzo, "Joint channel estimation and multiuser detection for sdma/ofdm based on dual repeated weighted boosting search," *IEEE Transactions on Vehicular Technology*, vol. 60, no. 7, pp. 3265–3275, Sept 2011.
- [701] R. Zhang and L. Hanzo, "A unified treatment of superposition coding aided communications: Theory and practice," *IEEE Communications Surveys Tutorials*, vol. 13, no. 3, pp. 503–520, Third 2011.
- [702] R. G. Maunder and L. Hanzo, "Extrinsic information transfer analysis and design of block-based intermediate codes," *IEEE Transactions on Vehicular Technology*, vol. 60, no. 3, pp. 762–770, March 2011.
- [703] H. A. Ngo, C. Xu, S. Sugiura, and L. Hanzo, "Space-time-frequency shift keying for dispersive channels," *IEEE Signal Processing Letters*, vol. 18, no. 3, pp. 177–180, March 2011.
- [704] X. Xu, R. Zhang, S. Ghafoor, and L. Hanzo, "Imperfect digital-fiber-optic-link-based cooperative distributed antennas with fractional frequency reuse in multicell multiuser networks," *IEEE Transactions on Vehicular Technology*, vol. 60, no. 9, pp. 4439–4449, Nov 2011.
- [705] S. Yang, T. Lv, R. G. Maunder, and L. Hanzo, "Distributed probabilistic-data-association-based soft reception employing base station cooperation in mimo-aided multiuser multicell systems," *IEEE Transactions on Vehicular Technology*, vol. 60, no. 7, pp. 3532–3538, Sept 2011.
- [706] ——, "Unified bit-based probabilistic data association aided mimo detection for high-order qam constellations," *IEEE Transactions on Vehicular Technology*, vol. 60, no. 3, pp. 981–991, March 2011.
- [707] L. Wang, L. Kong, S. X. Ng, and L. Hanzo, "Code-rate-optimized differentially modulated near-capacity cooperation," *IEEE Transactions on Communications*, vol. 59, no. 8, pp. 2185–2195, August 2011.

- [708] M. El-Hajjar, O. Alamri, R. G. Maunder, and L. Hanzo, "Layered steered space-time-spreading-aided generalized mc ds-cdma," *IEEE Transactions on Vehicular Technology*, vol. 59, no. 2, pp. 999–1005, Feb 2010.
- [709] N. Bonello, D. Yang, S. Chen, and L. Hanzo, "Generalized mimo transmit preprocessing using pilot symbol assisted rateless codes," *IEEE Transactions on Wireless Communications*, vol. 9, no. 2, pp. 754–763, February 2010.
- [710] L. Kong, S. X. Ng, R. Y. S. Tee, R. G. Maunder, and L. Hanzo, "Reduced-complexity near-capacity downlink iteratively decoded generalized multi-layer space-time coding using irregular convolutional codes," *IEEE Transactions on Wireless Communications*, vol. 9, no. 2, pp. 684–695, February 2010.
- [711] M. F. U. Butt, R. A. Riaz, S. X. Ng, and L. Hanzo, "Distributed self-concatenated coding for cooperative communication," *IEEE Transactions on Vehicular Technology*, vol. 59, no. 6, pp. 3097–3104, July 2010.
- [712] K. Lee and L. Hanzo, "Resource-efficient wireless relaying protocols," *IEEE Wireless Communications*, vol. 17, no. 2, pp. 66–72, April 2010.
- [713] B. Smida, L. Hanzo, and S. Affes, "Exact ber performance of asynchronous mc-ds-cdma over fading channels [transactions letters]," *IEEE Transactions on Wireless Communications*, vol. 9, no. 4, pp. 1249–1254, April 2010.
- [714] L. Wang and L. Hanzo, "Optimum time resource allocation for tdma-based differential decode-and-forward cooperative systems: a capacity perspective," *IEEE Communications Letters*, vol. 14, no. 6, pp. 506–508, June 2010.
- [715] R. G. Maunder and L. Hanzo, "Iterative decoding convergence and termination of serially concatenated codes," *IEEE Transactions on Vehicular Technology*, vol. 59, no. 1, pp. 216–224, Jan 2010.
- [716] S. Chen, S. Sugiura, and L. Hanzo, "Semi-blind joint channel estimation and data detection for space-time shift keying systems," *IEEE Signal Processing Letters*, vol. 17, no. 12, pp. 993–996, Dec 2010.
- [717] L. Li, R. G. Maunder, B. M. Al-Hashimi, and L. Hanzo, "An energy-efficient error correction scheme for ieee 802.15.4 wireless sensor networks," *IEEE Transactions on Circuits and Systems II: Express Briefs*, vol. 57, no. 3, pp. 233–237, March 2010.
- [718] S. Sugiura, S. Chen, and L. Hanzo, "Coherent and differential space-time shift keying: A dispersion matrix approach," *IEEE Transactions on Communications*, vol. 58, no. 11, pp. 3219–3230, November 2010.
- [719] J. Akhtman and L. Hanzo, "Heterogeneous networking: An enabling paradigm for ubiquitous wireless communications [point of view]," *Proceedings of the IEEE*, vol. 98, no. 2, pp. 135–138, Feb 2010.
- [720] M. El-Hajjar and L. Hanzo, "Dispensing with channel estimation," *IEEE Vehicular Technology Magazine*, vol. 5, no. 2, pp. 42–48, June 2010.
- [721] R. Zhang and L. Hanzo, "Wireless cellular networks," IEEE Vehicular Technology Magazine, vol. 5, no. 4, pp. 31–39, Dec 2010.
- [722] M. Jiang and L. Hanzo, "Unitary linear dispersion code design and optimization for mimo communication systems," *IEEE Signal Processing Letters*, vol. 17, no. 5, pp. 497–500, May 2010.
- [723] M. F. U. Butt, R. A. Riaz, S. X. Ng, and L. Hanzo, "Near-capacity iterative decoding of binary self-concatenated codes using soft decision demapping and 3-d exit charts," *IEEE Transactions on Wireless Communications*, vol. 9, no. 5, pp. 1608–1616, May 2010.
- [724] M. El-Hajjar and L. Hanzo, "Multifunctional mimo systems: A combined diversity and multiplexing design perspective," *IEEE Wireless Communications*, vol. 17, no. 2, pp. 73–79, April 2010.
- [725] S. Sugiura, S. Chen, and L. Hanzo, "Cooperative differential space-time spreading for the asynchronous relay aided cdma uplink using interference rejection spreading code," *IEEE Signal Processing Letters*, vol. 17, no. 2, pp. 117–120, Feb 2010.
- [726] R. Zhang and L. Hanzo, "Superposition-aided delay-constrained hybrid automatic repeat request," *IEEE Transactions on Vehic-ular Technology*, vol. 59, no. 4, pp. 2109–2115, May 2010.
- [727] W. Yao, S. Chen, and L. Hanzo, "A transceiver design based on uniform channel decomposition and mber vector perturbation," *IEEE Transactions on Vehicular Technology*, vol. 59, no. 6, pp. 3153–3159, July 2010.
- [728] N. Bonello, S. Chen, and L. Hanzo, "Multilevel-structured low-density parity-check codes for awgn and rayleigh channels," *IEEE Transactions on Vehicular Technology*, vol. 59, no. 7, pp. 3311–3320, Sept 2010.

- [729] L. Kong, S. X. Ng, R. G. Maunder, and L. Hanzo, "Near-capacity cooperative space-time coding employing irregular design and successive relaying," *IEEE Transactions on Communications*, vol. 58, no. 8, pp. 2232–2241, August 2010.
- [730] F. Zabini, B. M. Masini, A. Conti, and L. Hanzo, "Partial equalization for mc-cdma systems in non-ideally estimated correlated fading," *IEEE Transactions on Vehicular Technology*, vol. 59, no. 8, pp. 3818–3830, Oct 2010.
- [731] R. Zhang, L. Xu, S. Chen, and L. Hanzo, "Exit-chart-aided hybrid multiuser detector for multicarrier interleave-division multiple access," *IEEE Transactions on Vehicular Technology*, vol. 59, no. 3, pp. 1563–1567, March 2010.
- [732] L. Kong, S. X. Ng, R. G. Maunder, and L. Hanzo, "Maximum-throughput irregular distributed space-time code for near-capacity cooperative communications," *IEEE Transactions on Vehicular Technology*, vol. 59, no. 3, pp. 1511–1517, March 2010.
- [733] L. H. Ii. and R. Tafazolli, "Admission control schemes for 802.11-based multi-hop mobile ad hoc networks: a survey," *IEEE Communications Surveys Tutorials*, vol. 11, no. 4, pp. 78–108, Fourth 2009.
- [734] Nasruminallah and L. Hanzo, "Exit-chart optimized short block codes for iterative joint source and channel decoding in h.264 video telephony," *IEEE Transactions on Vehicular Technology*, vol. 58, no. 8, pp. 4306–4315, Oct 2009.
- [735] S. Chen and L. Hanzo, "Fast converging semi-blind space-time equalisation for dispersive qam mimo systems," *IEEE Transac*tions on Wireless Communications, vol. 8, no. 8, pp. 3969–3974, August 2009.
- [736] L. Wang, L. Xu, S. Chen, and L. Hanzo, "Three-stage irregular convolutional coded iterative center-shifting k -best sphere detection for soft-decision sdma-ofdm," *IEEE Transactions on Vehicular Technology*, vol. 58, no. 4, pp. 2103–2109, May 2009.
- [737] S. H. Won and L. Hanzo, "Initial and post-initial code acquisition in the noncoherent multiple-input/multiple-output-aided dscdma downlink," *IEEE Transactions on Vehicular Technology*, vol. 58, no. 5, pp. 2322–2330, Jun 2009.
- [738] S. Ahmed, R. G. Maunder, L. L. Yang, and L. Hanzo, "Iterative detection of unity-rate precoded ffh-mfsk and irregular variablelength coding," *IEEE Transactions on Vehicular Technology*, vol. 58, no. 7, pp. 3765–3770, Sept 2009.
- [739] W. Yao, S. Chen, S. Tan, and L. Hanzo, "Minimum bit error rate multiuser transmission designs using particle swarm optimisation," *IEEE Transactions on Wireless Communications*, vol. 8, no. 10, pp. 5012–5017, October 2009.
- [740] R. Zhang and L. Hanzo, "Superposition-coding-aided multiplexed hybrid arq scheme for improved end-to-end transmission efficiency," *IEEE Transactions on Vehicular Technology*, vol. 58, no. 8, pp. 4681–4686, Oct 2009.
- [741] R. G. Maunder and L. Hanzo, "Genetic algorithm aided design of component codes for irregular variable length coding," *IEEE Transactions on Communications*, vol. 57, no. 5, pp. 1290–1297, May 2009.
- [742] S. X. Ng, M. F. U. Butt, and L. Hanzo, "On the union bounds of self-concatenated convolutional codes," *IEEE Signal Processing Letters*, vol. 16, no. 9, pp. 754–757, Sept 2009.
- [743] W. Fang, L. L. Yang, and L. Hanzo, "Transmitter-preprocessing-assisted cooperative downlink transmission in ds-cdma systems experiencing propagation path loss and nakagami-m fading," *IEEE Transactions on Vehicular Technology*, vol. 58, no. 8, pp. 4182–4192, Oct 2009.
- [744] R. Y. S. Tee, R. G. Maunder, and L. Hanzo, "Exit-chart aided near-capacity irregular bit-interleaved coded modulation design," *IEEE Transactions on Wireless Communications*, vol. 8, no. 1, pp. 32–37, Jan 2009.
- [745] R. Zhang and L. Hanzo, "Coding schemes for energy efficient multi-source cooperation aided uplink transmission," *IEEE Signal Processing Letters*, vol. 16, no. 5, pp. 438–441, May 2009.
- [746] J. Akhtman and L. Hanzo, "Closed-form approximation of mimo capacity," *Electronics Letters*, vol. 45, no. 1, pp. 68–69, January 2009.
- [747] S. Sugiura, S. Chen, and L. Hanzo, "Reduced-complexity iterative markov chain mber detection for mimo systems," *IEEE Signal Processing Letters*, vol. 16, no. 3, pp. 160–163, March 2009.
- [748] R. Y. S. Tee, O. Alamri, S. X. Ng, and L. Hanzo, "Bit-interleaved sphere-packing-aided iteratively detected space-time coded modulation," *IEEE Transactions on Vehicular Technology*, vol. 58, no. 1, pp. 493–499, Jan 2009.
- [749] N. Wu and L. Hanzo, "Near-capacity irregular-convolutional-coding-aided irregular precoded linear dispersion codes," *IEEE Transactions on Vehicular Technology*, vol. 58, no. 6, pp. 2863–2871, July 2009.

- [750] L. Wang, O. Alamri, and L. Hanzo, "Sphere packing modulation in the sdma uplink using k -best sphere detection," *IEEE Signal Processing Letters*, vol. 16, no. 4, pp. 291–294, April 2009.
- [751] W. Fang, L. L. Yang, and L. Hanzo, "Performance of ds-cdma downlink using transmitter preprocessing and relay diversity over nakagami-m fading channels," *IEEE Transactions on Wireless Communications*, vol. 8, no. 2, pp. 678–682, Feb 2009.
- [752] K. Lee and L. Hanzo, "Mimo-assisted hard versus soft decoding-and-forwarding for network coding aided relaying systems," *IEEE Transactions on Wireless Communications*, vol. 8, no. 1, pp. 376–385, Jan 2009.
- [753] O. Alamri, J. Wang, S. X. Ng, L. I. Yang, and L. Hanzo, "Near-capacity three-stage turbo detection of irregular convolutional coded joint sphere-packing modulation and space-time coding," *IEEE Transactions on Communications*, vol. 57, no. 5, pp. 1486– 1495, May 2009.
- [754] C. Xu, R. G. Maunder, L. L. Yang, and L. Hanzo, "Near-optimum multiuser detectors using soft-output ant-colony-optimization for the ds-cdma uplink," *IEEE Signal Processing Letters*, vol. 16, no. 2, pp. 137–140, Feb 2009.
- [755] M. El-Hajjar, O. Alamri, J. Wang, S. Zummo, and L. Hanzo, "Layered steered space-time codes using multi-dimensional sphere packing modulation," *IEEE Transactions on Wireless Communications*, vol. 8, no. 7, pp. 3335–3340, July 2009.
- [756] L. Wang and L. Hanzo, "The amplify-and-forward cooperative uplink using multiple-symbol differential sphere-detection," *IEEE Signal Processing Letters*, vol. 16, no. 10, pp. 913–916, Oct 2009.
- [757] C. Y. Wei, L. Wang, and L. Hanzo, "Iterative irregular sphere detection in high-rate downlink sdma systems," *IEEE Transactions on Vehicular Technology*, vol. 58, no. 7, pp. 3855–3861, Sept 2009.
- [758] W. Liu, L. L. Yang, and L. Hanzo, "Svd-assisted multiuser transmitter and multiuser detector design for mimo systems," *IEEE Transactions on Vehicular Technology*, vol. 58, no. 2, pp. 1016–1021, Feb 2009.
- [759] R. G. Maunder and L. Hanzo, "Near-capacity irregular variable length coding and irregular unity rate coding," *IEEE Transactions on Wireless Communications*, vol. 8, no. 11, pp. 5500–5507, November 2009.
- [760] S. Won, K. Lee, and L. Hanzo, "Initial code acquisition in the cooperative noncoherent mimo ds-cdma downlink," *IEEE Transactions on Vehicular Technology*, vol. 58, no. 3, pp. 1387–1395, March 2009.
- [761] N. Bonello, R. Zhang, S. Chen, and L. Hanzo, "Channel code-division multiple access and its multilevel-structured ldpc-based instantiation," *IEEE Transactions on Vehicular Technology*, vol. 58, no. 5, pp. 2549–2553, Jun 2009.
- [762] R. Zhang and L. Hanzo, "Iterative multiuser detection and channel decoding for ds-cdma using harmony search," *IEEE Signal Processing Letters*, vol. 16, no. 10, pp. 917–920, Oct 2009.
- [763] S. Won and L. Hanzo, "Initial acquisition performance of the multiple receive antenna assisted ds-uwb downlink using search space reduction and iterative code phase estimation," *IEEE Transactions on Wireless Communications*, vol. 8, no. 1, pp. 386–395, Jan 2009.
- [764] N. Bonello, S. Chen, and L. Hanzo, "Pilot symbol assisted coding," *Electronics Letters*, vol. 45, no. 10, pp. 518–519, May 2009.
- [765] N. Bonello, R. Zhang, S. Chen, and L. Hanzo, "Reconfigurable rateless codes," *IEEE Transactions on Wireless Communications*, vol. 8, no. 11, pp. 5592–5600, November 2009.
- [766] N. S. Othman, M. El-Hajjar, O. Alamri, S. X. Ng, and L. Hanzo, "Iterative amr-wb source and channel decoding using differential space-time spreading-assisted sphere-packing modulation," *IEEE Transactions on Vehicular Technology*, vol. 58, no. 1, pp. 484– 490, Jan 2009.
- [767] R. Zhang and L. Hanzo, "Interleaved random space-time coding for multisource cooperation," *IEEE Transactions on Vehicular Technology*, vol. 58, no. 4, pp. 2120–2125, May 2009.
- [768] H. A. Sweeney, L. Hanzo, A. V. Alejos, M. G. Sanchez, I. Cuinas, P. Saengudomlert, K. Sripimanwat, and L. M. Correia, "Global communications newsletter," *IEEE Communications Magazine*, vol. 47, no. 11, pp. 1–4, November 2009.
- [769] K. Lee and L. Hanzo, "Optimal decoding for hard-decision forwarding aided cooperative spatial multiplexing systems," *IEEE Transactions on Wireless Communications*, vol. 8, no. 9, pp. 4416–441, September 2009.
- [770] L. Wang and L. Hanzo, "The resource-optimized differentially modulated hybrid af/df cooperative cellular uplink using multiplesymbol differential sphere detection," *IEEE Signal Processing Letters*, vol. 16, no. 11, pp. 965–968, Nov 2009.

- [771] R. A. Riaz, R. G. Maunder, M. F. U. Butt, S. X. Ng, S. Chen, and L. Hanzo, "Exit-chart-aided three-stage concatenated ultrawideband time-hopping spread-spectrum impulse radio design," *IEEE Transactions on Vehicular Technology*, vol. 58, no. 9, pp. 5320–5324, Nov 2009.
- [772] R. G. Maunder and L. Hanzo, "Block-based precoding for serially concatenated codes," *IEEE Communications Letters*, vol. 13, no. 10, pp. 794–796, October 2009.
- [773] S. Chen, A. Wolfgang, C. J. Harris, and L. Hanzo, "Symmetric rbf classifier for nonlinear detection in multiple-antenna-aided systems," *IEEE Transactions on Neural Networks*, vol. 19, no. 5, pp. 737–745, May 2008.
- [774] A. Q. Pham, L. L. Yang, N. S. Othman, and L. Hanzo, "Exit-chart optimized block codes for wireless video telephony," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 18, no. 12, pp. 1671–1680, Dec 2008.
- [775] L. Wang, L. Xu, S. Chen, and L. Hanzo, "Generic iterative search-centre-shifting k-best sphere detection for rank-deficient sdm-ofdm systems," *Electronics Letters*, vol. 44, no. 8, pp. 552–553, April 2008.
- [776] C. Y. Wei, J. Akhtman, S. X. Ng, and L. Hanzo, "Iterative near-maximum-likelihood detection in rank-deficient downlink sdma systems," *IEEE Transactions on Vehicular Technology*, vol. 57, no. 1, pp. 653–657, Jan 2008.
- [777] S. H. Won and L. Hanzo, "Analysis of serial-search-based code acquisition in the multiple-transmit/multiple-receive-antennaaided ds-cdma downlink," *IEEE Transactions on Vehicular Technology*, vol. 57, no. 2, pp. 1032–1039, March 2008.
- [778] R. Zhang and L. Hanzo, "Space-time coding for high-throughput interleave division multiplexing aided multi-source cooperation," *Electronics Letters*, vol. 44, no. 5, pp. 367–368, Feb 2008.
- [779] X. Liu and L. Hanzo, "Precise ber formulas for asynchronous qpsk-modulated ds-cdma systems using random quaternary spreading over rayleigh channels," *IEEE Transactions on Vehicular Technology*, vol. 57, no. 1, pp. 239–242, Jan 2008.
- [780] Nasruminallah and L. Hanzo, "Short block codes for guaranteed convergence in soft-bit assisted iterative joint source and channel decoding," *Electronics Letters*, vol. 44, no. 22, pp. 1315–1316, October 2008.
- [781] S. Chen, W. Yao, and L. Hanzo, "Semi-blind adaptive spatial equalization for mimo systems with high-order qam signalling," *IEEE Transactions on Wireless Communications*, vol. 7, no. 11, pp. 4486–4491, November 2008.
- [782] S. Chen, A. Livingstone, H. Q. Du, and L. Hanzo, "Adaptive minimum symbol error rate beamforming assisted detection for quadrature amplitude modulation," *IEEE Transactions on Wireless Communications*, vol. 7, no. 4, pp. 1140–1145, April 2008.
- [783] S. Tan, S. Chen, and L. Hanzo, "On multi-user exit chart analysis aided turbo-detected mber beamformer designs," *IEEE Trans*actions on Wireless Communications, vol. 7, no. 1, pp. 314–323, Jan 2008.
- [784] D. Yang, N. Wu, L. L. Yang, and L. Hanzo, "Closed-loop linear dispersion coded eigen-beam transmission and its capacity," *Electronics Letters*, vol. 44, no. 19, pp. 1144–1146, September 2008.
- [785] N. Bonello, S. Chen, and L. Hanzo, "Construction of regular quasi-cyclic protograph ldpc codes based on vandermonde matrices," *IEEE Transactions on Vehicular Technology*, vol. 57, no. 4, pp. 2583–2588, July 2008.
- [786] M. Abuthinien, S. Chen, and L. Hanzo, "Semi-blind joint maximum likelihood channel estimation and data detection for mimo systems," *IEEE Signal Processing Letters*, vol. 15, pp. 202–205, 2008.
- [787] R. G. Maunder, J. Wang, S. X. Ng, L. L. Yang, and L. Hanzo, "On the performance and complexity of irregular variable length codes for near-capacity joint source and channel coding," *IEEE Transactions on Wireless Communications*, vol. 7, no. 4, pp. 1338–1347, April 2008.
- [788] S. Chen, L. Hanzo, and S. Tan, "Symmetric complex-valued rbf receiver for multiple-antenna-aided wireless systems," *IEEE Transactions on Neural Networks*, vol. 19, no. 9, pp. 1659–1665, Sept 2008.
- [789] R. Jantti and S. L. Kim, "Downlink resource management in the frequency domain for multicell ofcdm wireless networks," *IEEE Transactions on Vehicular Technology*, vol. 57, no. 5, pp. 3241–3246, Sept 2008.
- [790] L. Xu, S. Chen, and L. Hanzo, "Exit chart analysis aided turbo mud designs for the rank-deficient multiple antenna assisted ofdm uplink," *IEEE Transactions on Wireless Communications*, vol. 7, no. 6, pp. 2039–2044, June 2008.
- [791] M. El-Hajjar, O. Alamri, S. X. Ng, and L. Hanzo, "Turbo detection of precoded sphere packing modulation using four transmit antennas for differential space-time spreading," *IEEE Transactions on Wireless Communications*, vol. 7, no. 3, pp. 943–952, March 2008.

- [792] S. Tan, J. Wang, S. X. Ng, S. Chen, and L. Hanzo, "Three-stage turbo mber multiuser beamforming receiver using irregular convolutional codes," *IEEE Transactions on Vehicular Technology*, vol. 57, no. 3, pp. 1657–1663, May 2008.
- [793] B. Hu, L. L. Yang, and L. Hanzo, "Time- and frequency-domain-spread generalized multicarrier ds-cdma using subspace-based blind and group-blind space-time multiuser detection," *IEEE Transactions on Vehicular Technology*, vol. 57, no. 5, pp. 3235– 3241, Sept 2008.
- [794] R. A. Riaz, M. F. U. Butt, S. Chen, and L. Hanzo, "Generic z-domain discrete-time transfer function estimation for ultra-wideband systems," *Electronics Letters*, vol. 44, no. 25, pp. 1491–1492, December 2008.
- [795] W. Fang, L. L. Yang, and L. Hanzo, "Single-user performance of direct-sequence code-division multiple-access using relay diversity and power allocation," *IET Communications*, vol. 2, no. 3, pp. 462–472, March 2008.
- [796] S. H. Won and L. Hanzo, "Iterative code acquisition for ds-uwb downlink using multiple-component decoders," *Electronics Letters*, vol. 44, no. 2, pp. 162–163, January 2008.
- [797] N. Wu, O. Alamri, S. X. Ng, and L. Hanzo, "Precoded sphere-packing-aided bit-interleaved differential space-time coded modulation using iterative decoding," *IEEE Transactions on Vehicular Technology*, vol. 57, no. 2, pp. 1311–1316, March 2008.
- [798] S. Tan, S. Chen, and L. Hanzo, "Iterative multiuser minimum symbol error rate beamforming aided qam receiver," *IEEE Signal Processing Letters*, vol. 15, pp. 301–304, 2008.
- [799] O. Alamri, S. X. Ng, F. Guo, S. Zummo, and L. Hanzo, "Nonbinary ldpc-coded sphere-packed transmit diversity," *IEEE Transactions on Vehicular Technology*, vol. 57, no. 5, pp. 3200–3205, Sept 2008.
- [800] C. Xu, B. Hu, L. L. Yang, and L. Hanzo, "Ant-colony-based multiuser detection for multifunctional-antenna-array-assisted mc ds-cdma systems," *IEEE Transactions on Vehicular Technology*, vol. 57, no. 1, pp. 658–663, Jan 2008.
- [801] R. Zhang and L. Hanzo, "Three design aspects of multicarrier interleave division multiple access," *IEEE Transactions on Vehic-ular Technology*, vol. 57, no. 6, pp. 3607–3617, Nov 2008.
- [802] S. Ahmed, L. L. Yang, and L. Hanzo, "Mellin-transform-based performance analysis of ffh m -ary fsk using product combining for combatting partial-band noise jamming," *IEEE Transactions on Vehicular Technology*, vol. 57, no. 5, pp. 2757–2765, Sept 2008.
- [803] R. Y. S. Tee, O. R. Alamri, S. X. Ng, and L. Hanzo, "Equivalent capacity-based joint multilevel coding and space-time transmit diversity design," *IEEE Transactions on Vehicular Technology*, vol. 57, no. 5, pp. 3006–3014, Sept 2008.
- [804] S. X. Ng, O. R. Alamri, Y. Li, J. Kliewer, and L. Hanzo, "Near-capacity turbo trellis coded modulation design based on exit charts and union bounds - [transactions papers]," *IEEE Transactions on Communications*, vol. 56, no. 12, pp. 2030–2039, December 2008.
- [805] S. Won and L. Hanzo, "Non-coherent and differentially coherent code acquisition in mimo assisted ds-cdma multi-path downlink scenarios," *IEEE Transactions on Wireless Communications*, vol. 7, no. 5, pp. 1585–1593, May 2008.
- [806] R. G. Maunder, J. Kliewer, S. X. Ng, J. Wang, L. L. Yang, and L. Hanzo, "Joint iterative decoding of trellis-based vq and tcm," *IEEE Transactions on Wireless Communications*, vol. 6, no. 4, pp. 1327–1336, April 2007.
- [807] S. Ahmed, L. L. Yang, and L. Hanzo, "Erasure insertion in rs-coded sfh mfsk subjected to tone jamming and rayleigh fading," *IEEE Transactions on Vehicular Technology*, vol. 56, no. 6, pp. 3563–3571, Nov 2007.
- [808] L. Hanzo and B. J. Choi, "Near-instantaneously adaptive hsdpa-style ofdm versus mc-cdma transceivers for wifi, wimax, and next-generation cellular systems," *Proceedings of the IEEE*, vol. 95, no. 12, pp. 2368–2392, Dec 2007.
- [809] M. Jiang and L. Hanzo, "Multiuser mimo-ofdm for next-generation wireless systems," *Proceedings of the IEEE*, vol. 95, no. 7, pp. 1430–1469, July 2007.
- [810] J. Akhtman and L. Hanzo, "Channel impulse response tap prediction for time-varying wireless channels," *IEEE Transactions on Vehicular Technology*, vol. 56, no. 5, pp. 2767–2769, Sept 2007.
- [811] L. Hanzo and R. Tafazolli, "A survey of qos routing solutions for mobile ad hoc networks," *IEEE Communications Surveys Tutorials*, vol. 9, no. 2, pp. 50–70, Second 2007.

- [812] M. Dohler, S. McLaughlin, P. Sweeney, and L. Hanzo, "Implementable wireless access for b3g networks. iii. complexity reducing transceiver structures [topics in radio communications]," *IEEE Communications Magazine*, vol. 45, no. 3, pp. 98–104, March 2007.
- [813] M. Jiang, J. Akhtman, and L. Hanzo, "Soft-information assisted near-optimum nonlinear detection for blast-type space division multiplexing ofdm systems," *IEEE Transactions on Wireless Communications*, vol. 6, no. 4, pp. 1230–1234, April 2007.
- [814] X. Liu, H. Wei, and L. Hanzo, "Analytical bit error rate performance of ds-cdma ad hoc networks using large area synchronous spreading sequences," *IET Communications*, vol. 1, no. 4, pp. 760–764, August 2007.
- [815] L. Hao and P. Fan, "On the peak factors of bpsk and qpsk modulated mc-cdma signals employing wh sequences and wh-based complementary sequences," *IEEE Transactions on Wireless Communications*, vol. 6, no. 8, pp. 2782–2787, August 2007.
- [816] M. El-Hajjar, B. Hu, L. I. Yang, and L. Hanzo, "Coherent and differential downlink space-time steering aided generalised multicarrier ds-cdma," *IEEE Transactions on Wireless Communications*, vol. 6, no. 11, pp. 3857–3863, November 2007.
- [817] J. Akhtman and L. Hanzo, "Decision directed channel estimation aided ofdm employing sample-spaced and fractionally-spaced cir estimators," *IEEE Transactions on Wireless Communications*, vol. 6, no. 4, pp. 1171–1175, April 2007.
- [818] S. X. Ng, J. Wang, M. Tao, L. I. Yang, and L. Hanzo, "Iteratively decoded variable length space-time coded modulation: Code construction and convergence analysis," *IEEE Transactions on Wireless Communications*, vol. 6, no. 5, pp. 1953–1963, May 2007.
- [819] X. Liu and L. Hanzo, "A unified exact ber performance analysis of asynchronous ds-cdma systems using bpsk modulation over fading channels," *IEEE Transactions on Wireless Communications*, vol. 6, no. 10, pp. 3504–3509, October 2007.
- [820] S. Won and L. Hanzo, "Non-coherent code acquisition in the multiple transmit/multiple receive antenna aided single- and multicarrier ds-cdma downlink," *IEEE Transactions on Wireless Communications*, vol. 6, no. 11, pp. 3864–3869, November 2007.
- [821] M. Jiang, J. Akhtman, and L. Hanzo, "Iterative joint channel estimation and multi-user detection for multiple-antenna aided ofdm systems," *IEEE Transactions on Wireless Communications*, vol. 6, no. 8, pp. 2904–2914, August 2007.
- [822] O. R. Alamri, B. L. Yeap, and L. Hanzo, "A turbo detection and sphere-packing-modulation-aided space-time coding scheme," *IEEE Transactions on Vehicular Technology*, vol. 56, no. 2, pp. 575–582, March 2007.
- [823] S. Chen, K. Labib, and L. Hanzo, "Clustering-based symmetric radial basis function beamforming," *IEEE Signal Processing Letters*, vol. 14, no. 9, pp. 589–592, Sept 2007.
- [824] S. H. Won and L. Hanzo, "Differentially coherent code acquisition in the mimo-aided multi-carrier ds-cdma downlink," *IET Communications*, vol. 1, no. 4, pp. 662–670, August 2007.
- [825] S. Ni, J. S. Blogh, and L. Hanzo, "Adaptive beamforming and adaptive modulation-assisted network performance of multiuser detection-aided fdd and tdd cdma systems," *IEEE Transactions on Vehicular Technology*, vol. 56, no. 4, pp. 1881–1891, May 2007.
- [826] A. Wolfgang, S. Chen, and L. Hanzo, "Parallel interference cancellation based turbo space-time equalization in the sdma uplink," *IEEE Transactions on Wireless Communications*, vol. 6, no. 2, pp. 609–616, Feb 2007.
- [827] W. Liu, S. X. Ng, L. L. Yang, and L. Hanzo, "Joint channel prediction aided differentially encoded ttcm and bicmid assisted eigen-beamforming," *Electronics Letters*, vol. 43, no. 4, pp. 232–234, February 2007.
- [828] S. Chen, A. Wolfgang, Y. Shi, and L. Hanzo, "Space-time decision feedback equalisation using a minimum bit error rate design for single-input multiple-output channels," *IET Communications*, vol. 1, no. 4, pp. 671–678, August 2007.
- [829] A. Wolfgang, J. Akhtman, S. Chen, and L. Hanzo, "Reduced-complexity near-maximum-likelihood detection for decision feedback assisted space-time equalization," *IEEE Transactions on Wireless Communications*, vol. 6, no. 7, pp. 2407–2411, July 2007.
- [830] J. Akhtman, A. Wolfgang, S. Chen, and L. Hanzo, "An optimized-hierarchy-aided approximate log-map detector for mimo systems," *IEEE Transactions on Wireless Communications*, vol. 6, no. 5, pp. 1900–1909, May 2007.
- [831] K. Lee, J. Chun, and L. Hanzo, "Optimal lattice-reduction aided successive interference cancellation for mimo systems," *IEEE Transactions on Wireless Communications*, vol. 6, no. 7, pp. 2438–2443, July 2007.
- [832] M. El-Hajjar and L. Hanzo, "Layered steered space-time codes and their capacity," *Electronics Letters*, vol. 43, no. 12, pp. 680–682, June 2007.

- [833] L. Hanzo, J. P. Woodard, and P. Robertson, "Turbo decoding and detection for wireless applications," *Proceedings of the IEEE*, vol. 95, no. 6, pp. 1178–1200, June 2007.
- [834] H. Wei and L. Hanzo, "On the uplink performance of las-cdma," *IEEE Transactions on Wireless Communications*, vol. 5, no. 5, pp. 1187–1196, May 2006.
- [835] S. X. Ng and L. Hanzo, "On the mimo channel capacity of multidimensional signal sets," *IEEE Transactions on Vehicular Technology*, vol. 55, no. 2, pp. 528–536, March 2006.
- [836] H. T. How, T. H. Liew, E.-L. Kuan, L.-L. Yang, and L. Hanzo, "A redundant residue number system coded burst-by-burst adaptive joint-detection based cdma speech transceiver," *IEEE Transactions on Vehicular Technology*, vol. 55, no. 1, pp. 387–396, Jan 2006.
- [837] S. X. Ng, J. Y. Chung, P. Cherriman, and L. Hanzo, "Burst-by-burst adaptive decision feedback equalized tcm, ttcm, and bicm for h.263-assisted wireless video telephony," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 16, no. 3, pp. 363–374, March 2006.
- [838] H. Mohamad, S. Weiss, M. Rupp, and L. Hanzo, "Performance limitation of subband adaptive equalisers," *Electronics Letters*, vol. 42, no. 17, pp. 1009–1010, August 2006.
- [839] J. Kliewer, S. X. Ng, and L. Hanzo, "Efficient computation of exit functions for nonbinary iterative decoding," *IEEE Transactions on Communications*, vol. 54, no. 12, pp. 2133–2136, Dec 2006.
- [840] M. Jiang, S. X. Ng, and L. Hanzo, "Hybrid iterative multiuser detection for channel coded space division multiple access ofdm systems," *IEEE Transactions on Vehicular Technology*, vol. 55, no. 1, pp. 115–127, Jan 2006.
- [841] S. Chen, A. Livingstone, and L. Hanzo, "Minimum bit-error rate design for space-time equalization-based multiuser detection," *IEEE Transactions on Communications*, vol. 54, no. 5, pp. 824–832, May 2006.
- [842] M. Jiang and L. Hanzo, "Multiuser mimo-ofdm systems using subcarrier hopping," *IEE Proceedings Communications*, vol. 153, no. 6, pp. 802–809, Dec 2006.
- [843] L.-L. Yang, W. Hua, and L. Hanzo, "Multiuser detection assisted time- and frequency-domain spread multicarrier code-division multiple-access," *IEEE Transactions on Vehicular Technology*, vol. 55, no. 1, pp. 397–404, Jan 2006.
- [844] R. Y. S. Tee, F. C. Kuo, and L. Hanzo, "Multilevel generalised low-density parity-check codes," *Electronics Letters*, vol. 42, no. 3, pp. 167–168, Feb 2006.
- [845] H. Wei, L. L. Yang, and L. Hanzo, "Downlink space ndash; time spreading using interference rejection codes," *IEEE Transactions on Vehicular Technology*, vol. 55, no. 6, pp. 1838–1847, Nov 2006.
- [846] X. Liu and L. Hanzo, "Exact ber of rectangular-constellation qam subjected to asynchronous co-channel interference and nakagami-m fading," *Electronics Letters*, vol. 42, no. 15, pp. 868–869, July 2006.
- [847] A. Wolfgang, J. Akhtman, S. Chen, and L. Hanzo, "Iterative mimo detection for rank-deficient systems," *IEEE Signal Processing Letters*, vol. 13, no. 11, pp. 699–702, Nov 2006.
- [848] H. Wei, L.-L. Yang, and L. Hanzo, "On the performance of band-limited asynchronous ds-cdma over nakagami-m channels," *IEEE Transactions on Wireless Communications*, vol. 5, no. 7, pp. 1586–1593, July 2006.
- [849] S. Chen, L. Hanzo, and A. Livingstone, "Mber space-time decision feedback equalization assisted multiuser detection for multiple antenna aided sdma systems," *IEEE Transactions on Signal Processing*, vol. 54, no. 8, pp. 3090–3098, Aug 2006.
- [850] T.-H. Liew and L. Hanzo, "Space-time trellis and space-time block coding versus adaptive modulation and coding aided ofdm for wideband channels," *IEEE Transactions on Vehicular Technology*, vol. 55, no. 1, pp. 173–187, Jan 2006.
- [851] T. H. Liew, L.-L. Yang, and L. Hanzo, "Systematic redundant residue number system codes: analytical upper bound and iterative decoding performance over awgn and rayleigh channels," *IEEE Transactions on Communications*, vol. 54, no. 6, pp. 1006–1016, June 2006.
- [852] W. Liu, S. Weiss, and L. Hanzo, "A generalized sidelobe canceller employing two-dimensional frequency invariant filters," *IEEE Transactions on Antennas and Propagation*, vol. 53, no. 7, pp. 2339–2343, July 2005.
- [853] S. Ni, H. Wei, and L. Hanzo, "Loosely synchronised spreading code aided network performance of quasi-synchronous utra-like tdd and fdd cdma systems," *Electronics Letters*, vol. 41, no. 15, pp. 861–863, July 2005.

- [854] L.-L. Yang and L. Hanzo, "Differential acquisition of m-sequences using recursive soft sequential estimation," *IEEE Transactions on Wireless Communications*, vol. 4, no. 1, pp. 128–136, Jan 2005.
- [855] M. Munster and L. Hanzo, "Parallel-interference-cancellation-assisted decision-directed channel estimation for ofdm systems using multiple transmit antennas," *IEEE Transactions on Wireless Communications*, vol. 4, no. 5, pp. 2148–2162, Sept 2005.
- [856] L.-L. Yang and L. Hanzo, "Performance of broadband multicarrier ds-cdma using space-time spreading-assisted transmit diversity," *IEEE Transactions on Wireless Communications*, vol. 4, no. 3, pp. 885–894, May 2005.
- [857] S. Chen, N. N. Ahmad, and L. Hanzo, "Adaptive minimum bit-error rate beamforming," *IEEE Transactions on Wireless Commu*nications, vol. 4, no. 2, pp. 341–348, March 2005.
- [858] H. Wei, L. L. Yang, and L. Hanzo, "Interference-free broadband single- and multicarrier ds-cdma," *IEEE Communications Magazine*, vol. 43, no. 2, pp. 68–73, Feb 2005.
- [859] S. Ni and L. Hanzo, "Genetic algorithm aided timeslot scheduling for utra tdd cdma networks," *Electronics Letters*, vol. 41, no. 7, pp. 422–424, March 2005.
- [860] L.-L. Yang and L. Hanzo, "Performance of fractionally spread multicarrier cdma in awgn as well as slow and fast nakagami-m fading channels," *IEEE Transactions on Vehicular Technology*, vol. 54, no. 5, pp. 1817–1827, Sept 2005.
- [861] S. X. Ng, J. Y. Chung, and L. Hanzo, "Turbo-detected unequal protection mpeg-4 wireless video telephony using multi-level coding, trellis coded modulation and space-time trellis coding," *IEE Proceedings - Communications*, vol. 152, no. 6, pp. 1116– 1124, Dec 2005.
- [862] M. Y. Alias, S. Chen, and L. Hanzo, "Multiple-antenna-aided ofdm employing genetic-algorithm-assisted minimum bit error rate multiuser detection," *IEEE Transactions on Vehicular Technology*, vol. 54, no. 5, pp. 1713–1721, Sept 2005.
- [863] H. Wei and L. Hanzo, "Coding against spreading gain optimisation of nonbinary bch coded cdma system," *Electronics Letters*, vol. 41, no. 14, pp. 816–817, July 2005.
- [864] J. Wang, L.-L. Yang, and L. Hanzo, "Iterative construction of reversible variable-length codes and variable-length error-correcting codes," *IEEE Communications Letters*, vol. 8, no. 11, pp. 671–673, Nov 2004.
- [865] L.-L. Yang and L. Hanzo, "Acquisition of m-sequences using recursive soft sequential estimation," *IEEE Transactions on Communications*, vol. 52, no. 2, pp. 199–204, Feb 2004.
- [866] M. Jiang and L. Hanzo, "Improved hybrid mmse detection for turbo-trellis-coded modulation-assisted multi-user ofdm systems," *Electronics Letters*, vol. 40, no. 16, pp. 1002–1003, Aug 2004.
- [867] S. Chen, L. Hanzo, and B. Mulgrew, "Adaptive minimum symbol-error-rate decision feedback equalization for multilevel pulseamplitude modulation," *IEEE Transactions on Signal Processing*, vol. 52, no. 7, pp. 2092–2101, July 2004.
- [868] F. Guo and L. Hanzo, "Reliability ratio based weighted bit-flipping decoding for low-density parity-check codes," *Electronics Letters*, vol. 40, no. 21, pp. 1356–1358, Oct 2004.
- [869] B. L. Yeap and L. Hanzo, "Reduced complexity i/q turbo detection for space-time trellis-coded systems," *IEEE Transactions on Vehicular Technology*, vol. 53, no. 4, pp. 1278–1286, July 2004.
- [870] S. H. Hwang and L. Hanzo, "Effects of multipath propagation delay on uplink performance of synchronous ds-cdma systems communicating in dispersive rayleigh fading channels," *Electronics Letters*, vol. 40, no. 25, pp. 1589–1591, Dec 2004.
- [871] S. X. Ng, M.-S. Yee, and L. Hanzo, "Coded modulation assisted radial basis function aided turbo equalization for dispersive rayleigh-fading channels," *IEEE Transactions on Wireless Communications*, vol. 3, no. 6, pp. 2198–2206, Nov 2004.
- [872] K. Yen and L. Hanzo, "Genetic-algorithm-assisted multiuser detection in asynchronous cdma communications," *IEEE Transac*tions on Vehicular Technology, vol. 53, no. 5, pp. 1413–1422, Sept 2004.
- [873] A. Wolfgang, S. Chen, and L. Hanzo, "Radial basis function network assisted space-time equalisation for dispersive fading environments," *Electronics Letters*, vol. 40, no. 16, pp. 1006–1007, Aug 2004.
- [874] S. Chen, L. Hanzo, and A. Wolfgang, "Kernel-based nonlinear beamforming construction using orthogonal forward selection with the fisher ratio class separability measure," *IEEE Signal Processing Letters*, vol. 11, no. 5, pp. 478–481, May 2004.

- [875] A. Wolfgang, N. N. Ahmad, S. Chen, and L. Hanzo, "Genetic algorithm assisted error probability optimisation for beamforming," *Electronics Letters*, vol. 40, no. 5, pp. 320–322, March 2004.
- [876] W. Liu, S. Weiss, and L. Hanzo, "A subband-selective broadband gsc with cosine-modulated blocking matrix," *IEEE Transactions on Antennas and Propagation*, vol. 52, no. 3, pp. 813–820, March 2004.
- [877] T. H. Liew, B. L. Yeap, C. H. Wong, and L. Hanzo, "Turbo-coded adaptive modulation versus space-time trellis codes for transmission over dispersive channels," *IEEE Transactions on Wireless Communications*, vol. 3, no. 6, pp. 2019–2029, Nov 2004.
- [878] L.-L. Yang and L. Hanzo, "Adaptive rate ds-cdma systems using variable spreading factors," *IEEE Transactions on Vehicular Technology*, vol. 53, no. 1, pp. 72–81, Jan 2004.
- [879] K. Hamaguchi, L.-L. Yang, and L. Hanzo, "Multi-stage multi-user detection assisted fast-fh/mfsk," *Electronics Letters*, vol. 39, no. 4, pp. 399–400, Feb 2003.
- [880] E.-L. Kuan and L. Hanzo, "Burst-by-burst adaptive multiuser detection cdma: a framework for existing and future wireless standards," *Proceedings of the IEEE*, vol. 91, no. 2, pp. 278–302, Feb 2003.
- [881] B. L. Yeap, C. H. Wong, and L. Hanzo, "Reduced complexity in-phase/quadrature-phase m-qam turbo equalization using iterative channel estimation," *IEEE Transactions on Wireless Communications*, vol. 2, no. 1, pp. 2–10, Jan 2003.
- [882] L.-L. Yang and L. Hanzo, "Multicarrier ds-cdma: a multiple access scheme for ubiquitous broadband wireless communications," *IEEE Communications Magazine*, vol. 41, no. 10, pp. 116–124, Oct 2003.
- [883] —, "Performance of generalized multicarrier ds-cdma using various chip waveforms," *IEEE Transactions on Communications*, vol. 51, no. 5, pp. 748–752, May 2003.
- [884] S. Chen, B. Mulgrew, and L. Hanzo, "Least bit error rate adaptive nonlinear equalisers for binary signalling," *IEE Proceedings Communications*, vol. 150, no. 1, pp. 29–36, Feb 2003.
- [885] M.-S. Yee, B. L. Yeap, and L. Hanzo, "Radial basis function-assisted turbo equalization," *IEEE Transactions on Communications*, vol. 51, no. 4, pp. 664–675, April 2003.
- [886] B.-J. Choi and L. Hanzo, "Crest factors of complementary-sequence-based multicode mc-cdma signals," *IEEE Transactions on Wireless Communications*, vol. 2, no. 6, pp. 1114–1119, Nov 2003.
- [887] B. Choi and L. Hanzo, "Optimum mode-switching-assisted constant-power single- and multicarrier adaptive modulation," *IEEE Transactions on Vehicular Technology*, vol. 52, no. 3, pp. 536–560, May 2003.
- [888] K. Yen and L. Hanzo, "Antenna-diversity-assisted genetic-algorithm-based multiuser detection schemes for synchronous cdma systems," *IEEE Transactions on Communications*, vol. 51, no. 3, pp. 366–370, March 2003.
- [889] M. Y. Alias, A. K. Samingan, S. Chen, and L. Hanzo, "Multiple antenna aided ofdm employing minimum bit error rate multiuser detection," *Electronics Letters*, vol. 39, no. 24, pp. 1769–1770, Nov 2003.
- [890] S. H. Hwang and L. Hanzo, "Reverse-link performance of synchronous ds-cdma systems in dispersive rician multipath fading channels," *Electronics Letters*, vol. 39, no. 23, pp. 1682–4–, Nov 2003.
- [891] S. X. Ng, F. Guo, J. Wang, L. L. Yang, and L. Hanzo, "Joint source-coding, channel-coding and modulation schemes for awgn and rayleigh fading channels," *Electronics Letters*, vol. 39, no. 17, pp. 1259–1261, Aug 2003.
- [892] L.-L. Yang and L. Hanzo, "Low complexity erasure insertion in rs-coded sfh spread-spectrum communications with partial-band interference and nakagami-m fading," *IEEE Transactions on Communications*, vol. 50, no. 6, pp. 914–925, Jun 2002.
- [893] E.-L. Kuan, S. X. Ng, and L. Hanzo, "Joint-detection and interference cancellation based burst-by-burst adaptive cdma schemes," *IEEE Transactions on Vehicular Technology*, vol. 51, no. 6, pp. 1479–1493, Nov 2002.
- [894] L.-L. Yang and L. Hanzo, "Residue number system assisted fast frequency-hopped synchronous ultra-wideband spread-spectrum multiple-access: a design alternative to impulse radio," *IEEE Journal on Selected Areas in Communications*, vol. 20, no. 9, pp. 1652–1663, Dec 2002.
- [895] T. H. Liew and L. Hanzo, "Space-time codes and concatenated channel codes for wireless communications [prolog]," Proceedings of the IEEE, vol. 90, no. 2, pp. 185–186, Feb 2002.

- [896] L.-L. Yang and L. Hanzo, "Serial acquisition performance of single-carrier and multicarrier ds-cdma over nakagami-m fading channels," *IEEE Transactions on Wireless Communications*, vol. 1, no. 4, pp. 692–702, Oct 2002.
- [897] P. Cherriman, E. L. Kuan, and L. Hanzo, "Burst-by-burst adaptive joint detection cdma/h.263 based video telephony," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 12, no. 5, pp. 342–348, May 2002.
- [898] H. Mohamad, S. Weiss, M. Rupp, and L. Hanzo, "Fast adaptation of fractionally spaced equalisers," *Electronics Letters*, vol. 38, no. 2, pp. 96–98, Jan 2002.
- [899] M. S. Yee and L. Hanzo, "A wide-band radial basis function decision feedback equalizer-assisted burst-by-burst adaptive modem," *IEEE Transactions on Communications*, vol. 50, no. 5, pp. 693–697, May 2002.
- [900] L.-L. Yang and L. Hanzo, "A residue number system based parallel communication scheme using orthogonal signaling. ii. multipath fading channels," *IEEE Transactions on Vehicular Technology*, vol. 51, no. 6, pp. 1547–1559, Nov 2002.
- [901] —, "Software-defined-radio-assisted adaptive broadband frequency hopping multicarrier ds-cdma," *IEEE Communications Magazine*, vol. 40, no. 3, pp. 174–183, Mar 2002.
- [902] T. H. Liew and L. Hanzo, "Space-time codes and concatenated channel codes for wireless communications," *Proceedings of the IEEE*, vol. 90, no. 2, pp. 183–184, Feb 2002.
- [903] —, "Space-time codes and concatenated channel codes for wireless communications," *Proceedings of the IEEE*, vol. 90, no. 2, pp. 187–219, Feb 2002.
- [904] L.-L. Yang and L. Hanzo, "Performance of generalized multicarrier ds-cdma over nakagami-m fading channels," *IEEE Transac*tions on Communications, vol. 50, no. 6, pp. 956–966, Jun 2002.
- [905] S. X. Ng and L. Hanzo, "Space-time iq-interleaved tcm and ttcm for awgn and rayleigh fading channels," *Electronics Letters*, vol. 38, no. 24, pp. 1553–1555, Nov 2002.
- [906] L.-L. Yang and L. Hanzo, "Iterative soft sequential estimation assisted acquisition of m-sequences," *Electronics Letters*, vol. 38, no. 24, pp. 1550–1551, Nov 2002.
- [907] S. X. Ng, K. Yen, and L. Hanzo, "Ttcm assisted genetic-algorithm aided reduced-complexity multiuser detection," *Electronics Letters*, vol. 38, no. 14, pp. 722–724, Jul 2002.
- [908] P. Cherriman, B. L. Yeap, and L. Hanzo, "The performance of h263-based video telephony over turbo-equalized gsm/gprs," IEEE Transactions on Circuits and Systems for Video Technology, vol. 12, no. 10, pp. 909–915, Oct 2002.
- [909] P. J. Cherriman, T. Keller, and L. Hanzo, "Subband-adaptive turbo-coded ofdm-based interactive video telephony," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 12, no. 10, pp. 829–839, Oct 2002.
- [910] B. L. Yeap, T. H. Liew, J. Hamorsky, and L. Hanzo, "Comparative study of turbo equalization schemes using convolutional, convolutional turbo, and block-turbo codes," *IEEE Transactions on Wireless Communications*, vol. 1, no. 2, pp. 266–273, Apr 2002.
- [911] L.-L. Yang and L. Hanzo, "A residue number system based parallel communication scheme using orthogonal signaling .i. system outline," *IEEE Transactions on Vehicular Technology*, vol. 51, no. 6, pp. 1534–1546, Nov 2002.
- [912] K. Yen and L. Hanzo, "Genetic algorithm assisted joint multiuser symbol detection and fading channel estimation for synchronous cdma systems," *IEEE Journal on Selected Areas in Communications*, vol. 19, no. 6, pp. 985–998, Jun 2001.
- [913] A. K. Samingan, S. Chen, and L. Hanzo, "Adaptive minimum-ber linear multiuser detection for cdma signals in multipath channels with 4-qam constellation," *Electronics Letters*, vol. 37, no. 11, pp. 721–723, May 2001.
- [914] M. S. Yee, T. H. Liew, and L. Hanzo, "Burst-by-burst adaptive turbo-coded radial basis function-assisted decision feedback equalization," *IEEE Transactions on Communications*, vol. 49, no. 11, pp. 1935–1945, Nov 2001.
- [915] L.-L. Yang and L. Hanzo, "Performance analysis of coded m-ary orthogonal signaling using errors-and-erasures decoding over frequency-selective fading channels," *IEEE Journal on Selected Areas in Communications*, vol. 19, no. 2, pp. 211–221, Feb 2001.
- [916] S. Chen, A. K. Samingan, B. Mulgrew, and L. Hanzo, "Adaptive minimum-ber linear multiuser detection for ds-cdma signals in multipath channels," *IEEE Transactions on Signal Processing*, vol. 49, no. 6, pp. 1240–1247, Jun 2001.

- [917] J. Blogh, P. Cherriman, and L. Hanzo, "Comparative study of adaptive beam-steering and adaptive modulation-assisted dynamic channel allocation algorithms," *IEEE Transactions on Vehicular Technology*, vol. 50, no. 2, pp. 398–415, Mar 2001.
- [918] T. Keller, L. Piazzo, P. Mandarini, and L. Hanzo, "Orthogonal frequency division multiplex synchronization techniques for frequency-selective fading channels," *IEEE Journal on Selected Areas in Communications*, vol. 19, no. 6, pp. 999–1008, Jun 2001.
- [919] L. L. Yang and L. Hanzo, "Slow frequency-hopping multicarrier ds-cdma for transmission over nakagami multipath fading channels," *IEEE Journal on Selected Areas in Communications*, vol. 19, no. 7, pp. 1211–1221, Jul 2001.
- [920] J. S. Blogh, P. J. Cherriman, and L. Hanzo, "Adaptive antenna array assisted dynamic channel allocation techniques," *IEEE Journal on Selected Areas in Communications*, vol. 19, no. 2, pp. 305–311, Feb 2001.
- [921] M. S. Yee, B. L. Yeap, and L. Hanzo, "Rbf-based decision feedback aided turbo equalisation of convolutional and space-time trellis-coded systems," *Electronics Letters*, vol. 37, no. 21, pp. 1298–1299, Oct 2001.
- [922] L.-L. Yang and L. Hanzo, "Serial acquisition of ds-cdma signals in multipath fading mobile channels," *IEEE Transactions on Vehicular Technology*, vol. 50, no. 2, pp. 617–628, Mar 2001.
- [923] S. Chen, L. Hanzo, and B. Mulgrew, "Decision-feedback equalization using multiple-hyperplane partitioning for detecting isicorrupted m-ary pam signals," *IEEE Transactions on Communications*, vol. 49, no. 5, pp. 760–764, May 2001.
- [924] B. J. Choi, M. Munster, L. L. Yang, and L. Hanzo, "Performance of rake receiver assisted adaptive-modulation based cdma over frequency selective slow rayleigh fading channels," *Electronics Letters*, vol. 37, no. 4, pp. 247–249, Feb 2001.
- [925] S. Chen, A. K. Samingan, and L. Hanzo, "Support vector machine multiuser receiver for ds-cdma signals in multipath channels," *IEEE Transactions on Neural Networks*, vol. 12, no. 3, pp. 604–611, May 2001.
- [926] J. S. Blogh, P. J. Cherriman, and L. Hanzo, "Dynamic channel allocation techniques using adaptive modulation and adaptive antennas," *IEEE Journal on Selected Areas in Communications*, vol. 19, no. 2, pp. 312–321, Feb 2001.
- [927] L.-L. Yang and L. Hanzo, "A recursive algorithm for the error probability evaluation of m-qam," *IEEE Communications Letters*, vol. 4, no. 10, pp. 304–306, Oct 2000.
- [928] T. Keller, M. Munster, and L. Hanzo, "A turbo-coded burst-by-burst adaptive wide-band speech transceiver," *IEEE Journal on Selected Areas in Communications*, vol. 18, no. 11, pp. 2363–2372, Nov 2000.
- [929] M. Breiling and L. Hanzo, "The super-trellis structure of turbo codes," *IEEE Transactions on Information Theory*, vol. 46, no. 6, pp. 2212–2228, Sep 2000.
- [930] L.-L. Yang, K. Yen, and L. Hanzo, "A reed-solomon coded ds-cdma system using noncoherent m-ary orthogonal modulation over multipath fading channels," *IEEE Journal on Selected Areas in Communications*, vol. 18, no. 11, pp. 2240–2251, Nov 2000.
- [931] C.-S. Lee, S. Vlahoyiannatos, and L. Hanzo, "Satellite based turbo-coded, blind-equalized 4-qam and 16-qam digital video broadcasting," *IEEE Transactions on Broadcasting*, vol. 46, no. 1, pp. 23–33, Mar 2000.
- [932] L.-L. Yang and L. Hanzo, "Blind joint soft-detection assisted slow frequency-hopping multicarrier ds-cdma," *IEEE Transactions on Communications*, vol. 48, no. 9, pp. 1520–1529, Sep 2000.
- [933] T. Keller, T. H. Liew, and L. Hanzo, "Adaptive redundant residue number system coded multicarrier modulation," *IEEE Journal on Selected Areas in Communications*, vol. 18, no. 11, pp. 2292–2301, Nov 2000.
- [934] C.-S. Lee, T. Keller, and L. Hanzo, "Ofdm-based turbo-coded hierarchical and non-hierarchical terrestrial mobile digital video broadcasting," *IEEE Transactions on Broadcasting*, vol. 46, no. 1, pp. 1–22, Mar 2000.
- [935] T. Keller and L. Hanzo, "Prolog to adaptive multicarrier modulation: a convenient framework for time-frequency processing in wireless communications," *Proceedings of the IEEE*, vol. 88, no. 5, pp. 609–610, May 2000.
- [936] J. P. Woodard and L. Hanzo, "Comparative study of turbo decoding techniques: an overview," IEEE Transactions on Vehicular Technology, vol. 49, no. 6, pp. 2208–2233, Nov 2000.
- [937] T. Keller and L. Hanzo, "Adaptive multicarrier modulation: a convenient framework for time-frequency processing in wireless communications," *Proceedings of the IEEE*, vol. 88, no. 5, pp. 611–640, May 2000.

- [938] F. C. A. Brooks and L. Hanzo, "A multiband excited waveform-interpolated 2.35-kbps speech codec for bandlimited channels," *IEEE Transactions on Vehicular Technology*, vol. 49, no. 3, pp. 766–777, May 2000.
- [939] S. Chen, A. K. Samingan, and L. Hanzo, "Optimal decision feedback equaliser for m-pam signals using support vector machine solution," *Electronics Letters*, vol. 36, no. 20, pp. 1742–1744, Sep 2000.
- [940] S. Chen, B. Mulgrew, and L. Hanzo, "Asymptotic bayesian decision feedback equalizer using a set of hyperplanes," *IEEE Transactions on Signal Processing*, vol. 48, no. 12, pp. 3493–3500, Dec 2000.
- [941] L. Hanzo, P. Cherriman, and E. L. Kuan, "Interactive cellular and cordless video telephony: State-of-the-art system design principles and expected performance," *Proceedings of the IEEE*, vol. 88, no. 9, pp. 1388–1413, Sept 2000.
- [942] T. Keller and L. Hanzo, "Adaptive modulation techniques for duplex ofdm transmission," *IEEE Transactions on Vehicular Technology*, vol. 49, no. 5, pp. 1893–1906, Sep 2000.
- [943] C. H. Wong and L. Hanzo, "Upper-bound performance of a wide-band adaptive modem," *IEEE Transactions on Communications*, vol. 48, no. 3, pp. 367–369, Mar 2000.
- [944] P. Cherriman, C. H. Wong, and L. Hanzo, "Turbo- and bch-coded wide-band burst-by-burst adaptive h.263-assisted wireless video telephony," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 10, no. 8, pp. 1355–1363, Dec 2000.
- [945] L. Hanzo, C. H. Wong, and P. Cherriman, "Channel-adaptive wideband wireless video telephony," *IEEE Signal Processing Magazine*, vol. 17, no. 4, pp. 10–30, Jul 2000.
- [946] P. Cherriman and L. Hanzo, "Error-rate-based power-controlled multimode h.263-assisted video telephony," *IEEE Transactions on Vehicular Technology*, vol. 48, no. 5, pp. 1726–1738, Sep 1999.
- [947] D. Lim and L. Hanzo, "The probability of multiple correct packet reception in coded synchronous frequency-hopped spreadspectrum networks," *IEEE Transactions on Communications*, vol. 47, no. 8, pp. 1227–1232, Aug 1999.
- [948] A. Knickenberg, B. L. Yeap, J. Hamorsky, M. Breiling, and L. Hanzo, "Joint channel equalisation and channel decoding," *Electronics Letters*, vol. 35, no. 19, pp. 1628–1630, Sep 1999.
- [949] J. M. Torrance, L. Hanzo, and T. Keller, "Interference aspects of adaptive modems over slow rayleigh fading channels," *IEEE Transactions on Vehicular Technology*, vol. 48, no. 5, pp. 1527–1545, Sep 1999.
- [950] L.-L. Yang and L. Hanzo, "Overlapping m-ary frequency shift keying spread-spectrum multiple-access systems using random signal sequences," *IEEE Transactions on Vehicular Technology*, vol. 48, no. 6, pp. 1984–1995, Nov 1999.
- [951] J. M. Torrance and L. Hanzo, "Latency and networking aspects of adaptive modems over slow indoors rayleigh fading channels," *IEEE Transactions on Vehicular Technology*, vol. 48, no. 4, pp. 1237–1251, Jul 1999.
- [952] L.-L. Yang and L. Hanzo, "Residue number system arithmetic assisted m-ary modulation," *IEEE Communications Letters*, vol. 3, no. 2, pp. 28–30, February 1999.
- [953] P. Cherriman, T. Keller, and L. Hanzo, "Orthogonal frequency-division multiplex transmission of h.263 encoded video over highly frequency-selective wireless networks," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 9, no. 5, pp. 701–712, Aug 1999.
- [954] L. Hanzo, "Bandwidth-efficient wireless multimedia communications," *Proceedings of the IEEE*, vol. 86, no. 7, pp. 1342–1382, Jul 1998.
- [955] P. Cherriman and L. Hanzo, "Programmable h.263-based wireless video transceivers for interference-limited environments," IEEE Transactions on Circuits and Systems for Video Technology, vol. 8, no. 3, pp. 275–286, Jun 1998.
- [956] M. Breiling and L. Hanzo, "Non-iterative optimum super-trellis decoding of turbo codes," *Electronics Letters*, vol. 33, no. 10, pp. 848–849, May 1997.
- [957] J. Streit and L. Hanzo, "Dual-mode vector-quantized low-rate cordless videophone systems for indoors and outdoors applications," *IEEE Transactions on Vehicular Technology*, vol. 46, no. 2, pp. 340–357, May 1997.
- [958] J. M. Torrance and L. Hanzo, "Upper bound performance of adaptive modulation in a slow rayleigh fading channel," *Electronics Letters*, vol. 32, no. 8, pp. 718–719, Apr 1996.
- [959] —, "Demodulation level selection in adaptive modulation," *Electronics Letters*, vol. 32, no. 19, pp. 1751–1752, Sep 1996.

- [960] J. Streit and L. Hanzo, "Quadtree-based reconfigurable cordless videophone systems," IEEE Transactions on Circuits and Systems for Video Technology, vol. 6, no. 2, pp. 225–237, Apr 1996.
- [961] J. M. Torrance and L. Hanzo, "Optimisation of switching levels for adaptive modulation in slow rayleigh fading," *Electronics Letters*, vol. 32, no. 13, pp. 1167–1169, Jun 1996.
- [962] L. Hanzo and J. P. Woodard, "An intelligent multimode voice communications system for indoor communications," *IEEE Transactions on Vehicular Technology*, vol. 44, no. 4, pp. 735–748, Nov 1995.
- [963] H. Yuen and L. Hanzo, "Robust differential chain coding scheme," *Electronics Letters*, vol. 31, no. 16, pp. 1334–1335, Aug 1995.
- [964] L. Hanzo and J. Streit, "Adaptive low-rate wireless videophone schemes," IEEE Transactions on Circuits and Systems for Video Technology, vol. 5, no. 4, pp. 305–318, Aug 1995.
- [965] H. Yuen and L. Hanzo, "Adaptive fixed-length differential chain coding for transmission of line graphics," *Electronics Letters*, vol. 31, no. 11, pp. 862–863, May 1995.
- [966] J. E. B. Williams, L. Hanzo, R. Steele, and J. C. S. Cheung, "A comparative study of narrowband microcellular speech transmission schemes," *IEEE Transactions on Vehicular Technology*, vol. 43, no. 4, pp. 909–924, Nov 1994.
- [967] L. Hanzo, J. C. S. Cheung, R. Steele, and W. T. Webb, "A packet reservation multiple access assisted cordless telecommunication scheme," *IEEE Transactions on Vehicular Technology*, vol. 43, no. 2, pp. 234–244, May 1994.
- [968] L. Hanzo, J. C. S. Cheung, and R. Steele, "Prma efficiency in adaptive transceivers," *Electronics Letters*, vol. 29, no. 8, pp. 697–699, April 1993.
- [969] J. C. S. Cheung, L. Hanzo, W. T. Webb, and R. Steele, "Effects of prma on objective speech quality," *Electronics Letters*, vol. 29, no. 2, pp. 152–153, Jan 1993.
- [970] R. Stedman, H. Gharavi, L. Hanzo, and R. Steele, "Transmission of subband-coded images via mobile channels," *IEEE Transac*tions on Circuits and Systems for Video Technology, vol. 3, no. 1, pp. 15–26, Feb 1993.
- [971] M. Eastwood, L. Hanzo, and J. C. S. Cheung, "Packet reservation multiple access for wireless multimedia communications," *Electronics Letters*, vol. 29, no. 13, pp. 1178–1180, June 1993.
- [972] X. Lin, L. Hanzo, R. Steele, and W. T. Webb, "Subband-multipulse digital audio broadcasting for mobile receivers," *IEEE Transactions on Broadcasting*, vol. 39, no. 4, pp. 373–382, Dec 1993.
- [973] L. Hanzo, R. Salami, R. Steele, and P. M. Fortune, "Transmission of digitally encoded speech at 1.2 kbaud for pcn," *IEE Proceedings I Communications, Speech and Vision*, vol. 139, no. 4, pp. 437–447, Aug 1992.
- [974] W. T. Webb, L. Hanzo, and R. Steele, "Bandwidth efficient qam schemes for rayleigh fading channels," *IEE Proceedings I Communications, Speech and Vision*, vol. 138, no. 3, pp. 169–175, June 1991.
- [975] L. Hanzo, R. Steele, and P. M. Fortune, "A subband coding, bch coding, and 16-qam system for mobile radio speech communications," *IEEE Transactions on Vehicular Technology*, vol. 39, no. 4, pp. 327–339, Nov 1990.
- [976] R. Steele, D. Twelves, and L. Hanzo, "Effect of cochannel interference on handover in microcellular mobile radio," *Electronics Letters*, vol. 25, no. 20, pp. 1329–1330, Sept 1989.