

REFERENCES

- [1] I.F. Akyildiz, D. Pompili, and T. Melodia, "Challenges for efficient communication in underwater acoustic sensor networks," *ACM SIGBED Review*, vol.1, pp. 3-8, 2004.
- [2] J. Preisig, "Acoustic propagation considerations for underwater acoustic communications network development," in *Procs. Int. Conf. Mobile Computing and Networking*, 2006, pp. 1-5.
- [3] M. Stojanovic, "Underwater acoustic communication," Northeastern University, Dept., of Elect. and Comput. Eng., Boston, MA, 2005.
- [4] M. Chitre, "A high-frequency warm shallow water acoustic communications channel model and measurements," *J. Acoust. Soc. of America*, 122(5), pp. 2580-2586, 2007.
- [5] A. Shaw. (2006, Mac.). Underwater Communications. Liverpool John Moores University, U.K. [Online]. Available: <http://www.ljmu.ac.uk/geri/rfm/emcomms.htm>
- [6] I.F. Akyildiz, D. Pompili, and T. Melodia, "Underwater acoustic sensor networks: research challenges," *Elsevier's J. of Ad Hoc Networks*, vol.3, pp. 257-279, May 2005.
- [7] J. Heidemann, W. Ye, J. Willis, A.A. Syed, and Y. Li, "Research challenges and applications for underwater sensor networking," in *Proc. IEEE Wireless Communications and Networking Conf., WCNC*, Las Vegas, NV, 2006, pp. 229-235.
- [8] M. Chitre, S. Shahabodeen, and M. Stojanovic, "Underwater acoustic communications and networking: recent advances and future challenges," *J. Marine Technology Soc.*, vol. 42, pp. 103–116, Spring 2008.
- [9] M. Stojanovic, "Recent advances in high-speed underwater acoustic communications," *IEEE J. Oceanic Eng.*, vol. 121, pp.125-136, Apr. 1996.
- [10] M. Stojanovic, "Underwater wireless communications: current achievements and research challenges," *IEEE Oceanic Eng. Soc. Newsletter*, Spring 2006.

- [11] M. Chitre, M. Stojanovic, S. Shahabudeen, and L. Freitag, "Recent advances in underwater acoustic communications & networking," in *Proc. IEEE Oceans Conf., Quebec City, Canada*, 2008, pp. 1–10.
- [12] Y. Zhang, and F. Shu, "Packet size optimization for goodput and energy efficiency enhancement in slotted IEEE 802.15.4 networks," in *Proc. IEEE WCNC*, Budapest, 2009, pp. 1–6 .
- [13] G. Ciccicarese, M. De Blasi, P. Marra, C. Palazzo, and L. Patrono, "A packet size control algorithm for IEEE 802.16e", in *Proc. IEEE WCNC*, Las Vegas, 2008, pp. 1420–1425.
- [14] D. Wu, S. Ci, H Sharif, and Y. Yang, "Packet size optimization for goodput enhancement of multi-rate wireless networks", in *Proc. IEEE WCNC*, Hong Kong, 2007, pp. 3575–3580 .
- [15] J. Yin, X. Wang, and D.P. Agrawal, "Optimal packet size in error-prone channel for IEEE 802.11 distributed coordination function", in *Proc. IEEE WCNC*, Atlanta, Georgia, 2004, pp. 1654–1659.
- [16] S. Basagni, C. Petrioli, R. Petroccia, and M. Stojanovic, "Choosing the packet size in multi-hop underwater networks", Northern University, Boston, MA, 2009.
- [17] M. Stojanovic, "Optimization of a data link protocol for an underwater acoustic channel", in *Proc. IEEE Oceans Conf.*, Brest, France, 2005, pp. 68–73.
- [18] M.C. Vuran, and I.F. Akyildiz, "Cross-layer packet size optimization for wireless terrestrial, undewater, and underground sensor networks", in *Proc. IEEE INFOCOM*, Phoenix, Arizona, 2008, pp.226 –230.
- [19] A. F. Harris III, and M. Zorzi, "Modeling the underwater acoustic channel in ns2", in *Proc. Int. Conf. Performance Evaluation Methodologies and Tools*, Brussels, Belgium, 2007, pp. 85–90.
- [20] M. Schwartz, *Telecommunication Nnetworks*, Adison Wesley, 1988.
- [21] W. Dong, X. Liu, C. Chen, Y. He, G. Chen, Y. Liu, and J. Bu, "DPLC: Dynamic packet length control in wireless sensor networks," in *Proc. IEEE INFOCOM*, San Diego, 2010, pp. 1–9.
- [22] G. Hackmann, O. Chipara, and C. Lu, "Robust topology control for indoor wireless sensor networks," in *Proc. ACM Conf. SenSys*, Raleigh, NC, USA, 2008, pp. 1–14.

- [23] P. Levis, N. Lee, M. Welsh, and D. Culler, "TOSSIM: Accurate and scalable simulation of entire TinyOS applications", in *Proc. Of ACM SenSys*, Los Angeles, CA, USA, 2003, pp. 7–19.
- [24] O. Gnawali, R. Fonseca, K. Jamieson, D. Moss, and P. Levis. (2009, Jan.). Collection Tree Protocol. Stanford University, USA. [Online]. Available: <http://sing.stanford.edu/pubs/sing-09-01.pdf>
- [25] S. Ci, H. Sharif, and K. Nuli, "Study of an adaptive frame size predictor to enhance energy conservation in wireless sensor networks," *IEEE J. Selected Areas in Commun.*, vol. 23, pp. 283–292, Feb. 2005.
- [26] S. Haykin, *Adaptive Filter Theory*. 4th ed. New York, Prentice-Hall, 2002.
- [27] S.J. Julier, and J.K. Uhlmann, "A new extension of Kalman filter to nonlinear systems," in *Int. Symp. Aerospace/Defense Sensing, Simul. and Controls*, Orlando, FL, USA, 1997.
- [28] E. Modiano, "An adaptive algorithm for optimizing the packet size used in wireless ARQ protocols," *Wireless Networks*, vol. 5, pp. 279–286, Jul. 1999.
- [29] D.P. Bertsekas and R. Gallager, *Data Network*. Englewood Cliffs, NJ, Prentice-Hall, 1987.
- [30] E. Modiano. (1994, Oct.). Data Link Protocols for LDR MILSTAR Communications. Lincoln Laboratory, Communications Division Internal Memorandum. [Online]. Available: <http://www.ll.mit.edu/publications/journal/journal.html>
- [31] Y. Sankarasubramaniam, I.F. Akyildiz, and S.W. McLaughlin, "Energy efficiency based packet size optimization in wireless sensor networks," in *Proc. IEEE Int. Workshop, SNPA*, Anchorage, 2003, pp. 1–8.
- [32] E. Shih, S.H. Cho, N. Ickes, R. Min, A. Sinha, A. Wang, and A. Chandralaran, "Physical layer driven protocol and algorithm design for energy-efficient wireless sensor networks," in *Proc. of ACM MobiCom*, Rome, 2001, pp. 272-286.
- [33] I. Joe, "Optimal packet length with energy efficiency for wireless sensor networks," *IEEE Int. Symp. on Circuits and Systems*, 2005, pp. 2955-2957.
- [34] Y. Zhang and F. Shu, "Packet size optimization for goodput and energy efficiency enhancement in slotted IEEE 802.15.4 networks," *IEEE Wireless Commun. and Networking Conf., WCNC*, Budapest, 2009, pp. 1–6.

- [35] *IEEE 802.15.4 Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low Rate Wireless Personal Area Networks (LR-WPANS)*, IEEE Standard, 2006.
- [36] S. Pollin, M. Ergen, S. Ergen, B. Bougard, L.D. Perre, F. Catthoor, I. Moerman, A. Bahai, and P. Varaiya, "Performance analysis of slotted carrier sense IEEE 802.15.4 medium access layer," *IEEE J. Wireless Commun.*, vol. 7, pp. 3359–3371, Nov. 2008.
- [37] D. Wu, S. Ci, H. Sharif, and Y. Yang, "Packet Size Optimization for Goodput Enhancement of Multi-Rate Wireless Networks," *IEEE Wireless Commun. and Networking Conf., WCNC*, 2007, pp 3575–3580.
- [38] D. Qiao, S. Choi, and K. Shin, "Goodput analysis and link adaptation for IEEE 802.11a wireless LANs," *IEEE J. Trans. on Mobile Computing*, vol. 1, pp. 278–292, Oct. 2002.
- [39] A. Sastry, "Improving automatic repeat-request (ARQ) performance on satellite channels under high error rate conditions," *IEEE J. Trans. Commun.*, vol. 23, pp. 1008, Apr. 1975.
- [40] M. Moeneclaey, H. Bruneel, I. Bruyland, and D.Y. Chung, "Throughput optimization for a generalized stop-and-wait ARQ scheme," *IEEE J. Trans. Commun.*, vol. 34, pp. 205–207, Feb. 1986.
- [41] J.M. Morris, "Optimal blocklengths for ARQ error control schemes," *IEEE J. Trans. Commun.*, vol. 27, pp.488–493, Feb. 1979.
- [42] P.F. Turney, "An improved stop-and-wait ARQ logic for data transmission in mobile radio systems," *IEEE J. Trans. Commun.*, vol. 29, pp.68-71, Jan. 1981.
- [43] J.A.C. Martins and J.D.C. Alves, "ARQ protocols with adaptive block size perform better over a wide range of bit error rates," *IEEE J. Trans. Commun.*, vol. 38, pp.737–739, Jun. 1990.
- [44] S. Hara, A. Ogino, M. Araki, M. Okada, and N. Morinaga, "Throughput performance of SAW-ARQ protocol with adaptive packet length in mobile packet data transmission," *IEEE J. Trans. Vehic. Technology*, vol. 45, pp. 561–569, Aug. 1996.

- [45] A. Annamalai and V.K. Bhargava, "Efficient ARQ error control strategies with adaptive packet length for mobile radio networks," in *Proc. IEEE Int. Conf. on Universal Personal Commun.*, ICUPC, vol. 2, pp. 1247–1251, Oct. 1998.
- [46] M. Schwartz, *Telecommunication Networks: Protocols; Modeling and Analysis*. New York, Addison-Wesley, 1987, pp. 125–156.
- [47] J.A.C. Martins and J.D.C. Alves, "ARQ protocols with adaptive block size perform better over a wide range of bit error rates", *IEEE J. Trans. Commun.* vol. 38, pp. 737–739, Jun. 1990.
- [48] J.D. Spragins, I.L. Hammond, and K. Pawlowski. *Telecommunications: Protocols and Design*. Addison Wesley, 1991.
- [50] F. Guerra, "World Ocean Simulation System (WOSS) Library," Regents of the SIGNET lab, University of Padova, 2007.
- [51] N. Baldo, M. Miozzo, F. Guerra, M. Rossi, and M. Zorzi, "Miracle: The Multi-Interface Cross-Layer Extension of ns2," *EURASIP J. Wireless Commun. and Networking*, vol. 2010, pp. 16, 2010.
- [52] J. Ammer and J. Rabacy, "The energy-per-useful-bit metric for evaluating and optimizing sensor network physical layers," *3rd Ann. IEEE Commun. Soc. on Sensor and Ad Hoc Commun. and Networks, SECON*, pp. 695–700, Jan 2007.
- [53] E.Y. Lin, "A comprehensive study of power-efficient rendezvous schemes for wireless sensor networks," Ph.D. dissertation, Dept. Elect. Eng., Nat. Taiwan Univ., Taipei, Taiwan, 2005.
- [54] N. Baldo, F. Maguolo, M. Miozzo, M. Rossi, and M. Zorzi, "ns2-MIRACLE: A modular framework for multi-technology and cross-layer support in network simulator 2," *2nd Int. Conf. Performance Evaluation Methodologies and Tools*, 2007, pp. 16 – 18.
- [55] D. Bertsekas and R. Gallager. *Data Networks*. Prentice Hall, 1988.
- [56] P. Muhlethaler, M. Salaun, A. Qayyum, and Y. Toor, "Comparison between Aloha and CSMA in multi hop ad hoc networks," Research Report, Nat. Inst. for Research in Comput. Sci. and Control, France, ISSN 0249-6399, article 5129, Mar. 2004.
- [57] Water Framework Directive (WFD, Council Directive 2000/60/EC). [Online]. Available: <http://www.defra.gov.uk/environment/water/wfd/>

- [58] F. Regan, A. Lawlor, and A. McCarthy, “SmartCoast project – smart water quality monitoring system,” Marine Inst./Environment Protection Agency Partnership: Advanced Technologies for Monitoring Water Quality, STRIVE Programme 2007-2013, Synthesis report (AT-04-01-06), 2009.
- [59] A. Ethier and J. Bedard, “Development of a real-time water quality buoy for the Fraser River estuary,” in *Proc. of IEEE Conf. OCEANS*, Vancouver, Sept. 2007, pp. 1–6 .
- [60] J.H. Cui, J. Kong, M. Gerla, and S. Zhou, “Challenges: Building scalable mobile underwater wireless sensor networks for aquatic applications,” *IEEE J. Network*, vol. 20, May 2006, pp 12–18.
- [61] E. Sozer, M. Stojanovic, and J. Proakis, “Underwater acoustic networks”, *IEEE J. Oceanic Eng.*, vol. 25, 2000, pp. 72–83.
- [62] I.F. Akyildiz, D. Pompili, and T. Melodia, “State of the art in protocol research for underwater acoustic sensor networks,” *SIGMOBILE Mob. J. Comput. Commun. Rev.*, vol. 11, , 2007, pp. 11–22.
- [63] J. Kong, J.H. Cui, D. Wu, and M. Gerla, “Building underwater ad-hoc networks and sensor networks for large scale real-time aquatic applications,” *IEEE Conf., MILCOM*, vol. 3, 2005, pp. 1535–1541.
- [64] Y.D. Lin, J.H. Yeh, T.H. Yang, and C.Y. Ku, “Efficient dynamic frame aggregation in IEEE 802.11s mesh networks,” *Int. J. Commun. Syst.* 2009:22, pp. 1319–1338.
- [65] EvoLogics (Germany), LinkQuest Inc. (USA), Woods Hole Oceanographic Institution, (USA).
- [66] D. Penteado, L.H.M.K. Costa, and A.C.P. Pedroza, “Deep-ocean data acquisition using underwater sensor networks,” Universidade Federal do Rio de Janeiro, Brasileiro, 2010.
- [67] M. Bhardwaj, T. Garnett, and A.P. Chandrakasan, “Upper bounds on the lifetime of sensor networks”, *IEEE Int. Conf. on Commun.*, vol. 3, 2001, pp 785–790.
- [68] K. Kalpakis, K. Dasgupta, and P. Namjoshi, “Maximum lifetime data gathering and aggregation in wireless sensor networks,” *Int. Conf. on Networking*, 2002, pp. 685–696.

- [69] A.B. Boehm, S.B. Grant, J.H. Kim, S.L. Mowbray, C.D. McGee, C.D. Clark, D.M. Foley, and D.E. Wellman, “Decadal and shorter period variability of surf zone water quality at Huntington beach, California,” *Environ. Sci. Technol.*, 36(18), pp. 3885–3892, Aug. 2002.
- [70] R. Holman, J. Stanley, and T. Ozkan-Haller, “Applying video sensor networks to near-shore environment monitoring,” *IEEE J. Pervasive Computing*, vol. 2, pp. 14–21, 2003.
- [71] R. J. Urick. *Principles of Underwater Sound*. 3rd Ed., New York, McGraw-Hill, 1983.
- [72] Sound pressure or acoustic pressure. http://en.wikipedia.org/wiki/Sound_pressure.
- [73] Reson, “Support > Self-help > Essential Acoustic Formulae”, <http://www.reson.com/support/self-help/essential-acoustic-formulae/>
- [74] P.H. Dahl, J.H. Miller, D.H. Cato, and R.K. Andrew, “Underwater ambient noise,” *J. Acoust. Today*, vol. 3, 2007, pp. 23–33.
- [75] Nat. Phy. Lab. (NPL), UK, <http://resource.npl.co.uk/acoustics/techguides/concepts/sonarequ.html>
- [76] F.H. Fisher and V.P. Simmons, “Sound absorption in sea water,” *J. Acoust. Soc. America*, vol. 62, 1977, pp. 558–564.
- [77] R. Jurdak, C.V. Lopes, and P. Baldi, “Battery lifetime estimation and optimization for underwater sensor networks,” *IEEE J. Sensor Network Operations*, vol. 2006, 2004, pp. 397–420.
- [78] M.A. Ainslie and J.G. McColm, “A simplified formula for viscous and chemical absorption in sea water,” *J. Acoust. Soc. America*, vol. 103, 1998, pp. 1671–1672.
- [79] L.E. Kinsler, A. R. Frey, A.B. Coppens, and J.V. Sanders. *Fundamentals of Acoustics*. 3rd Ed., New York, Wiley, 1982.
- [80] W.E. Johns, *Notes on batteries*. [Online]. Available: <http://www.gizmology.net/batteries.htm>
- [81] Z. Zhou and J.H. Cui. (2008, Mac.). Energy Efficient Multi-path Communication for Time-Critical Applications in Underwater Sensor Networks. UCONN CSE Technical Report: UbiNet-TR08-01.

LIST OF PUBLICATIONS

- [1] M. Ayaz, A. Abdullah, and T.J. Low, "Temporary cluster based routing for underwater wireless sensor network," in *Proc. IEEE 4th Int. Symp. Information Technology*, Kuala Lumpur, 2010, pp. 1009–1014.
- [2] T.J. Low and A. Abdullah, "Underwater Acoustic Communications: data packet size, throughput, and BER," in *Proc. 4th Global Conf. Power Control & Optimization*, Kuching, 2010, pp. 11–16.
- [3] N. Zaman, A. Abdullah, and T.J. Low, "Optimization of energy usage in wireless sensor network using position responsive routing protocol (PRRP)," in *Proc. IEEE Symp. Computer & Informatics*, Kuala Lumpur, 2011, pp. 51–55.
- [4] T.J. Low and A. Abdullah, "*Underwater acoustic communications: optimizing data packet size with respect to throughput efficiency, BER, and energy efficiency*," *Int. Conf. Telecom. Technology Apps. Proc. CSIT*, Sydney, vol. 5, 2011, pp. 7–14.
- [5] T.J. Low and A. Abdullah, "Underwater acoustic communications: Relationship between data packet size, throughput efficiency, BER, distance, and energy efficiency," *Elsevier Special Issue: PCO 2010 Borneo of Mathematical and Computer Modelling (MACM)*, 2011, in press.
- [6] T.J. Low and A. Abdullah, "Wireless Sensor Networks: Data Packet Size Optimization," *IGI Global Publishers*, in press.
- [7] M. Ayaz, T.J. Low, and A. Abdullah, "Reliable data delivery using packet optimization in multi-hop underwater wireless sensor network," *Int. J. Phy. Sci.*, available online SciVerse/ScienceDirect Nov 2011.
- [8] T.J. Low and A. Abdullah, "Underwater wireless network energy efficiency and optimal data packet size," in *Proc. IEEE Int. Conf. Elect. Control Comput. Eng.*, Kuantan, 2011, pp. 3–8.