

Kemal Akkaya

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RESEARCH INTERESTS ◇ Wireless Sensor Networks, Wireless Mesh Networks, Wireless Security, Quality of Service, Energy-aware Computing and Routing, Node Deployment, Security and Privacy in Ad hoc Networks, Ubiquitous Computing

EDUCATION ◇ **Doctor of Philosophy** May 2005
Department of Computer Science & Electrical Engineering
University of Maryland, Baltimore County (UMBC), Baltimore, MD, USA
· Dissertation Title: “*Energy and QoS aware routing protocols for Wireless Sensor Networks*”

◇ **Master of Science** June 1999
Department of Computer Science and Engineering
Middle East Technical University (METU), Ankara, Turkey
· Thesis Title: “*Uncertainty Management in Spatial Databases*”

◇ **Bachelor of Science** June 1997
Department of Computer Engineering and Information Sciences
Bilkent University, Ankara, Turkey

EMPLOYMENT HISTORY ◇ **Assistant Professor** Aug 2005 – on going
Department of Computer Science
Southern Illinois University Carbondale (SIUC)
Carbondale, IL

◇ **Graduate Teaching Assistant** Aug. 2003 – May 2005
Department of Computer Science
University of Maryland Baltimore County, Baltimore, MD, USA

◇ **Graduate Research Assistant** Jan. 2002 – Aug. 2003
Department of Computer Science
University of Maryland Baltimore County, Baltimore, MD, USA
Under the supervision of Dr. Mohamed Younis

◇ **Research Assistant & Developer** Aug. 2000 – Dec. 2001
Maryland Center for Telecommunications Research (MCTR)
University of Maryland Baltimore County, Baltimore, MD, USA

- ◇ **Software Technical Application Systems Developer** Dec. 1999 – July 2000
Automation of Local Labor Offices for Turkish Employment Organization
CyberSoft Ltd., Ankara, Turkey
 - ◇ **Graduate Teaching Assistant** Sept. 1997 – Dec. 2000
Department of Computer Science and Engineering
Middle East Technical University (METU), Ankara, Turkey
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GRANTS,
AWARDS &
HONORS

- ◇ **SIUC ORDA Faculty Seed Grant**, \$14400, 2007.
 - ◇ **Total citations for the papers reached over 1000**, Google Scholar 2009.
 - ◇ **Made the list for the 10 most downloaded papers** from Elsevier Ad Hoc Network Journal, 2007
 - ◇ **Special Research Initiative Support (SRIS)**, University of Maryland Baltimore County, 2003
 - ◇ **Best Project Award for Graduation Project**, 1997
 - ◇ **Full scholarship, Bilkent University**, Turkey, 1993
 - ◇ **Ranked in the top 200 among 1.2 million examinees in Nation-wide University Entrance Examinations**, Turkey, 1993
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REFEREED
BOOK
CHAPTERS

- ◇ **1.** K. Akkaya and I. Ari, “In-network Data Aggregation in Wireless Sensor Networks”, *Book Chapter, Handbook of Computer Networks*, Ed. H. Bidgoli, John Wiley & Sons, Vol. 2, 2007, pp. 1131-1146.
 - ◇ **2.** M. Younis and K. Akkaya “Node Positioning for Increased Dependability of Wireless Sensor Networks”, *Book Chapter, Algorithms and Protocols for Wireless Ad Hoc and Sensor Networks*, Ed. A. Boukerche, Wiley & Sons, New Jersey (to appear).
 - ◇ **3.** M. Younis, K. Akkaya and Moustafa Youssef “Efficient Handling of QoS Traffic in Wireless Sensor Networks”, *Book Chapter, Encyclopedia on Ad Hoc and Ubiquitous Computing*, Ed. Dharma P Agrawal, World Scientific (to appear).
 - ◇ **4.** A. Yazici and K. Akkaya, “Conceptual Design of GIS (Geographic Information Systems) applications”, *Book Chapter, Recent Research Issues on the Management of Fuzziness in Databases*, edited by G. Bordogna and G. Pasi, Physica- Verlag, Heidelberg and New York, 2000.
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REFEREED
JOURNAL
PAPERS

- ◇ **1.** R. S. Aygun, Y. Ma, K. Akkaya, G. Cox and A. Bicak, “A Conceptual Model for Data Management and Distribution in Peer-to-Peer Systems”, *Springer Peer-to-Peer Networking and Applications Journal* (to appear).
- ◇ **2.** K. Akkaya, I. Guneydas and A. Bicak, “Autonomous Actor Positioning in Wireless Sensor and Actor Networks using Stable-Matching”, *International Journal of Parallel, Emergent and Distributed Systems (IJPEDS)* (to appear).
- ◇ **3.** K. Akkaya, F. Senel, A. Thimmapuram and S. Uludag, “Distributed Recovery from Network Partitioning in Movable Sensor/Actor Networks via Controlled Mobility”, *IEEE Transactions on Computers* (to appear).

- ◇ 4. A. Abbasi, M. Younis and K. Akkaya, "Movement Assisted Connectivity Restoration in Wireless Sensor and Actor Networks", *IEEE Transactions on Parallel and Distributed Systems*, Vol. 20, No. 9, 2009, pp.1366-1379.
 - ◇ 5. K. Akkaya and A. Newell, "Distributed Node Deployment for Maximized Connected Coverage in Underwater Acoustic Sensor Networks", *Elsevier Computer Communications Journal*, vol. 32, no. 7, 2009, pp. 1233-1244.
 - ◇ 6. K. Akkaya, F. Senel and B. Mclaughlan, "Clustering of Wireless Sensor and Actor Networks based on Sensor Distribution and Connectivity", *Elsevier Journal of Parallel and Distributed Computing*, vol. 69, no. 6, 2009, pp. 573-587.
 - ◇ 7. K. Akkaya and F. Senel, "Detecting and Connecting Disjoint Sub-networks in Wireless Sensor and Actor Networks", *Elsevier Ad Hoc Networks Journal*, vol. 7, no. 7, 2009, pp. 1330-1346.
 - ◇ 8. K. Akkaya and S. Janapala, "Maximizing Connected Coverage via Controlled Actor Relocation in Wireless Sensor and Actor Networks", *Elsevier Computer Networks Journal*, Vol. 52, Issue 14, 2008, pp. 2779-2796.
 - ◇ 9. K. Akkaya and M. Younis, "Coverage and Delay aware Actor Placement Mechanisms for Wireless Sensor and Actor Networks," *International Journal of Sensor Networks*, Vol. 3, No. 3, 2008.
 - ◇ 10. M. Younis and K. Akkaya, "Strategies and Techniques for Node Placement in Wireless Sensor Networks: A Survey," *Elsevier Ad Hoc Network Journal*, Vol. 6 No. 4, pp. 621-655, 2008. **(Cited by 27)**
 - ◇ 11. K. Akkaya, M. Demirbas and R. S. Aygun, "The Impact of Data Aggregation on the Performance of Wireless Sensor Networks", *Wiley Wireless Communications & Mobile Computing (WCMC) Journal*, Vol. 8 pp. 171-193, 2008.
 - ◇ 12. W. Youssef, M. Younis and K. Akkaya, "Improving Gateway Safety in Wireless Sensor Networks using Cognitive Techniques", *International Journal of Sensor Networks*, Vol. 43, No. 5, pp. 649668, 2007.
 - ◇ 13. K. Akkaya, M. Younis and W. Youssef, "Positioning of Base-Stations in Wireless Sensor Networks," *IEEE Communications*, Vol. 45, No. 4, pp. 96-102, April 2007.
 - ◇ 14. K. Akkaya and M. Younis, "Sink Repositioning for Enhanced Performance in Wireless Sensor Networks," *Elsevier Computer Networks Journal*, Vol. 49/4, pp. 512-534, 2005. **(Cited by 43)**
 - ◇ 15. K. Akkaya and M. Younis, "Energy-aware routing of time-constrained traffic in wireless sensor networks," *International Journal of Communication Systems, Special Issue on Service Differentiation and QoS in Ad Hoc Networks*, Vol. 17(6), pp. 663-687, 2004. **(Cited by 12)**
 - ◇ 16. K. Akkaya and M. Younis, "Energy-Aware and QoS Routing in Wireless Sensor Networks," *Springer Cluster Computing Journal*, Vol. 8 pp. 179-188, 2005. **(Cited by 36)**
 - ◇ 17. K. Akkaya and M. Younis, "A Survey of Routing Protocols in Wireless Sensor Networks," *Elsevier Ad Hoc Network Journal*, Vol. 3/3 pp. 325-349, 2005. **(Cited by 674)**
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- REFEREED
PROCEED-
INGS
- ◇ 1. W. Zhang, Yu and K. Akkaya, “Static Worst-case Lifetime Analysis of Wireless Sensor Networks”, in the *Proceedings of IEEE International Performance Computing and Communications Conference (IPCCC’09)* (to appear).
 - ◇ 2. H. Oztarak, K. Akkaya and A. Yazici, “Lightweight Object Localization with a Single Camera in Wireless Multimedia Sensor Networks”, in the *Proceedings of IEEE GLOBECOM 2009* (to appear).
 - ◇ 3. F. Senel, M. Younis and K. Akkaya, “A Robust Relay Node Placement Heuristic for Structurally Damaged Wireless Sensor Networks”, in the *Proceedings of IEEE Local Computer Networks (LCN’09)*, Zurich, Switzerland, Oct. 2009.
 - ◇ 4. A. Abbasi, U. Baraudi, M. Younis, K. Akkaya, “C2AM: An Algorithm for Application-Aware Movement-Assisted Recovery in Wireless Sensor and Actor Networks”, in the *Proceedings of IEEE International Conference on Wireless Communications and Mobile Computing*, Leipzig, Germany, June 2009.
 - ◇ 5. A. Newell and K. Akkaya, “Self-Actuation of Cameras for Redundant Data Elimination in Wireless Multimedia Sensor Networks”, in the *Proceedings of International Conference on Communications (ICC’09)*, Dresden, Germany, June 2009.
 - ◇ 6. I. Guneydas, K. Akkaya and A. Bicak, “Actor Positioning in Wireless Sensor and Actor Networks Using Matching Theory”, in the *Proceedings of WWSAN, in conjunction with ICDCS’09*, Montreal, Canada, June 2009.
 - ◇ 7. S. Uludag and K. Akkaya, “Distributed Channel Assignment in Wireless Mesh Networks with Guaranteed Connectivity”, in the *Proceedings of IEEE Local Computer Networks (LCN’08)*, short paper, Montreal, Canada, Oct. 2008.
 - ◇ 8. A. Sama and K. Akkaya, “Real-time Routing for Mobile Sensor/Actor Networks”, in the *Proceedings of 8th IEEE International Workshop on Wireless Local Networks (WLN) in conjunction with LCN’08*, Montreal, Canada, Oct. 2008.
 - ◇ 9. K. Akkaya, A. Thimmapuram, F. Senel and S. Uludag, “Distributed Recovery of Actor Failures in Wireless Sensor and Actor Networks,” in the *Proceedings of IEEE Wireless Communication and Networking Conference (WCNC’08)*, Las Vegas, NV, April 2008. **(Cited by 11)**
 - ◇ 10. F. Senel, K. Akkaya and M. Younis, “An efficient mechanism for establishing connectivity in Wireless Sensor and Actor Networks,” in the *Proceedings of IEEE GLOBECOM 2007*, Washington, DC, Nov. 2007.
 - ◇ 11. B. McLaughlan and K. Akkaya, “Coverage-based Clustering of Wireless Sensor and Actor Networks,” in the *Proceedings of IEEE International Conference on Pervasive Services (ICPS’07)*, Istanbul, Turkey, July 2007.
 - ◇ 12. A. Abbasi, K. Akkaya and M. Younis, “An distributed connectivity restoration Algorithm in Wireless Sensor and Actor Networks,” in the *Proceedings of IEEE International Conference on Local Computer Networks, (LCN’07)*, Dublin, Ireland, Oct. 2007.
 - ◇ 13. S. Uludag, L. Perkovic, A. Kashkanova and K. Akkaya, “Quality-of-Service Provisioning via Stochastic Path Selection under Weibullian Link Delays,” in the *Proceedings of IEEE/ACM International Conference on Quality of Service in Heterogeneous Wired/Wireless Networks (QShine’07)*, Vancouver, CA, Aug. 2007.

- ◇ 14. K. Akkaya and M. Younis, "C2AP: Coverage-aware and Connectivity Constrained Actor Positioning in Wireless Sensor and Actor Networks", in the *Proceedings of IEEE International Performance Computing and Communications Conference (IPCCC'07)*, New Orleans, LA, April 2007.
- ◇ 15. K. Akkaya and M. Younis, "COLA: A Coverage and Latency aware Actor Placement for Wireless Sensor and Actor Networks", in the *Proceedings of IEEE Vehicular Technology Conference (VTC'06)*, Montreal, CA, Sept. 2006. **(Cited by 12)**
- ◇ 16. W. Youssef, M. Younis and K. Akkaya, "An Intelligent Safety-Aware Gateway Relocation Scheme for Wireless Sensor Networks", in the *Proceedings of the IEEE International Conference on Communications (ICC'06)*, Istanbul, Turkey, June 2006.
- ◇ 17. K. Akkaya, M. Younis and M. Youssef, "Efficient Aggregation of Delay-Constrained Data in Wireless Sensor Networks," in the *Proceedings of Internet Compatible QoS in Ad Hoc Wireless Networks*, Cairo, Egypt, 2005. **(Cited by 19)**
- ◇ 18. K. Akkaya and M. Younis, "Energy-Aware Routing to a Mobile Gateway in Wireless Sensor Networks," in the *Proceedings of the IEEE Globecom Wireless Ad Hoc and Sensor Networks Workshop*, Dallas, TX, November, 2004. **(Cited by 21)**
- ◇ 19. K. Akkaya and M. Younis, "Relocation of gateway for enhanced timeliness in wireless sensor networks," in the *Proceedings of IEEE Workshop on Energy-Efficient Wireless Communications and Networks (EWCN)*, Phoenix, AZ, April 2004. **(Cited by 15)**
- ◇ 20. M. Younis, K. Akkaya, M. Eltowiessy and A. Wadaa, "On Handling QoS Traffic in Wireless Sensor Networks", in the *Proceedings of the International Conference HAWAII International Conference on System Sciences (HICSS-37)*, Big Island, Hawaii, January 2004. **(Cited by 76)**
- ◇ 21. M. Younis, K. Akkaya and A. Kunjithapatham, "Optimization of Task Allocation in a ClusterBased Sensor Network" in the *Proceedings of the 8th IEEE Symposium on Computers and Communications (ISCC03)*, Antalya, Turkey, June 2003. **(Cited by 24)**
- ◇ 22. M. Younis, M. Bangad and K. Akkaya, "Base-Station Repositioning For Optimized Performance of Sensor Networks", in the *Proceedings of the IEEE VTC 2003 - Wireless Ad hoc, Sensor, and Wearable Networks*, Orlando, Florida, October 2003. **(Cited by 32)**
- ◇ 23. K. Akkaya and M. Younis, "An Energy-Aware QoS Routing Protocol for Wireless Sensor Networks", in the *Proceedings of the IEEE Workshop on Mobile and Wireless Networks (MWN'03)*, Providence, Rhode Island, May 2003. **(Cited by 137)**
- ◇ 24. K. Akkaya and A. Yazici, "A Multi-dimensional Index Structure for Fuzzy Spatial Databases", in the *Proceedings of IFSA-2001*, Vancouver, Canada, July 2001.
- ◇ 25. K. Akkaya and A. Yazici, "An Indexing Method for Spatial Databases", in the *Proceedings of 17th International Symposium on Computer and Information Systems (ISCIS'99)*, Kusadasi, Turkey 1999.

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- TECHNICAL REPORTS
- ◇ **1.** K. Akkaya, “Relocation of Base-Station for Jamming Attack Avoidance in Wireless Sensor Networks,” *Technical Report, TR-08-01, Department of Computer Science, Southern Illinois University Carbondale*, 2008.
 - ◇ **2.** A. Newell and K. Akkaya, “Implementation Experiences with Motes and TinyDB in a Greenhouse Monitoring Application,” *Technical Report, TR-08-02, Department of Computer Science, Southern Illinois University Carbondale*, 2008.
-
- COURSES TAUGHT
- ◇ **CS 215:** Discrete Mathematics (*Fall 2009, Spring 2008, Fall 2008, Spring 2007, Fall 2007, Spring 2007, Fall 2006, Spring 2006, Fall 2005*)
 - ◇ **CS 441:** Mobile and Wireless Computing (*Fall 2009, Fall 2008, Fall 2007, Fall 2006, Fall 2005*)
 - ◇ **CS 591:** Wireless and Network Security (*Spring 2009*)
-
- RESEARCH SUPERVISION
- ◇ **Ph.D.:** Tom Imboden, Fatih Senel (Co-Advisor at UMBC), Hakan Oztarak (Co-Advisor at METU, Turkey)
 - ◇ **M.S.:** Marshall Riley, Shanthi Vemulapalli (Fall 2009), Aravind R. Sama (Spring 2008), Fatih Senel (Spring 2008), Ismail Guneydas (Fall 2008), Srinavas Janapala (Spring 2007), Aravind Thimmapuran (Fall 2007)
-
- PROF. ACTIVITIES
- ◇ **Editor** for Elsevier Ad Hoc Networks Journal
 - ◇ **Guest Editor** for Journal of High Speed Networks
 - ◇ **Chair of Special Session on Wireless Sensor Networks**, International Conference on Computers and Their Applications (CATA’07)
 - ◇ **Technical Program Committee Member** of
 - IEEE Local Computer Networks (LCN), 2009
 - IEEE Global Telecommunications Conference (GLOBECOM), 2009
 - IEEE International Conference on Communications (ICC), 2009
 - IEEE Global Telecommunications Conference (GLOBECOM), 2008
 - IEEE International Conference on Communications (ICC), 2008
 - IEEE Wireless Communications and Networking Conference (WCNC), 2008
 - IEEE International Symposium on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS), 2008
 - IEEE International Conference on Computer Systems and Applications (AICCSA), 2008
 - IEEE International Conference on Pervasive Systems (ICPS), 2008
 - International Conference on Communications and Networking in China (CHINACOM), 2008
 - International Conference on Embedded and Ubiquitous Computing (EUC), 2008

- IEEE Local Computer Networks (LCN), 2007
- IEEE Global Telecommunications Conference (GLOBECOM), 2007
- IEEE International Performance Computing and Communications Conference (IPCCC), 2007
- IFIP Networking, 2007
- International Conference on Computational Science, 2007
- International Symposium on Computer and Information Sciences (ISCIS), 2007
- International Conference on Embedded Software and Systems (ICESS), 2007
- IEEE International Conference on Advance Information Networking and Applications (AINA), 2006
- International Conference on algorithms, systems, and applications (WASA), 2006
- International Conference on Computational Science, 2006

◇ **Journal referee for (among others):**

- IEEE Transactions on Parallel and Distributed Systems,
- IEEE Transactions on Computers,
- IEEE Transactions on Vehicular Technology,
- IEEE Transactions on Wireless Communications
- IEEE Transactions on Mobile Computing
- IEEE Transactions on Aerospace and Electronic Systems
- ACM Journal of Selected Areas in Communications
- Elsevier Ad Hoc Networks,
- Elsevier Computer Networks,
- Elsevier Computer Communications,
- IEEE Communications Letters,
- IEEE Communications Magazine,
- Journal of Parallel and Distributed Computing,
- Wiley Wireless Communications and Mobile Computing Journal
- International Journal of Parallel, Emergent and Distributed Systems
- International Journal of Computational Intelligence: Theory and Practice
- International Journal of Communication Systems

◇ **Panel member:**

- Swiss National Science Foundation (2009)
- The Netherlands Organization for Scientific Research (2009)
- ORDA Panel for Faculty Seed Grant SIUC (2009)

Kemal Akkaya

- ◇ **Committees:** Computer Science Representative for Computing Advisory Committee (2009), Computer Science Representative for Reflective Responsive University Grants Program (2006-2008).

- COLLEGE SERVICE ◇ **Outreach:** Served in Illinois Junior Science and Humanities Symposium 2008, 2009
- ◇ **Graduation Ceremony:** Computer Science Representative May 2007, Asher May 2008.

- DEPT. SERVICE ◇ **Committee member:** Graduate Committee (2005-2007), Undergraduate Committee (2007-2009), ABET CAC Committee (2009)
- ◇ **Outreach:** Served on CS Day as Presenter (2005-2009)

- TALKS ◇ Dept. of Computer Science, SIUC, Colloquium, Oct. 2009.
A Group-based Lightweight Authentication Protocol for Vehicular Ad Hoc Networks
- ◇ IEEE International Conference on Communications (ICC'09), Dresden, Germany, June 2009.
Self-Actuation of Cameras for Redundant Data Elimination in Wireless Multimedia Sensor Networks
- ◇ Dept. of Computer Science and Engineering, Middle East Technical University, Ankara, Turkey, May 2008.
State-of-the-art and Future Research Trends in Wireless Sensor Networks
- ◇ Dept. of Computer Science, SIUC, Colloquium, Oct. 2008.
Distributed Node Deployment in Underwater Acoustic Sensor Networks
- ◇ IEEE Global Telecommunications Conference (Globecom'07), Washington, DC, Nov. 2007.
An efficient mechanism for establishing connectivity in Wireless Sensor and Actor Networks
- ◇ Dept. of Computer Science, SIUC, Colloquium, Oct. 2007.
Maximizing Connected Coverage via Controlled Actor Deployment in Wireless Sensor and Actor Networks
- ◇ IEEE International Conference on Pervasive Services (ICPS'07), Istanbul, Turkey, July 2007.
Coverage-based Clustering of Wireless Sensor and Actor Networks
- ◇ IEEE International Conference on Vehicular Technology (VTC'06), Montreal, Canada, Sept. 2006.
COLA: A Coverage and Latency aware Actor Placement for Wireless Sensor and Actor Networks

- COMPUTER SKILLS ◇ **Languages:** Pascal, C, C++, Java,
- ◇ **Operating systems:** UNIX, Linux, Windows, TinyOS
- ◇ **Tools:** MS Visual Source Safe (VSS), MS Visual C++, Oracle8, Borland C++ Builder, Jini, JSP, JDBC, Java Servlets, PHP, Tomcat Webserver, Delphi, VHDL, Matlab

- REFERENCES Available upon request.