Curriculum Vitae –– Wang-Chien Lee

October 2007

Personal

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Education

Ph.D., 1996, Dept. of Computer & Information Science, Ohio State University, Columbus, Ohio, USA.
Dissertation: *"Indexing Techniques for Nontraditional Database Systems"*.

M.S., 1989, Department of Computer Science, Indiana University, Bloomington, Indiana, USA.

B.S., 1985, Department of Information Science, National Chiao-Tung University, Hsinchu, Taiwan.

Research Interests

Data Management; Mobile and Pervasive Computing; Location-based Services; Wireless Sensor Networks; Peer-to-Peer Networks; Information retrieval, analysis, and visualization; XML; and Security.

Professional Experience

January 2002 – Present: Associate Professor, Department of Computer Science & Engineering, Pennsylvania State University, University Park, PA, USA.

> Teach courses in the areas of databases, pervasive/mobile computing and location-based/spatial services. Established and lead the Pervasive Data Access (PDA) Research Group. Perform pioneering research on the following areas: 1) Location-based services in pervasive computing; 2) Peer-to-Peer (P2P) computing, 3) Wireless sensor network and data management, 4) Wireless data broadcast systems, 5) XML and Security, and 6) Information retrieval, analysis, and visualization.

Sept. 2001 – Dec. 2001: Adjunct Professor, Computer Science Department, Worcester Polytechnic Institute, Worcester, MA, USA.

> Taught graduate level database management systems course. Performed pioneering research in the areas of mobile computing and data management.

June 1996 – August 2001: Principal Member of Technical Staff, Verizon/GTE Laboratories Inc., Waltham, MA, USA.

As a technical staff member of the Internet Technologies Department, I planed and lead projects, performed investigative research, developed prototypes, assessed technologies and markets, provided visions and strategies, and consulted on mobile computing and data management aspects of Verizon's software infrastructure. Personal responsibility includes maintaining relationships with customers and vendors, administrating projects, evaluating technologies and products, preparing strategic and technical reports, prototyping systems for proof-of-concepts, consulting on data- and mobility- related issues, and participating in SBU project teams. I have conducted research on architectural and design issues (e.g., energy efficiency and access efficiency) and new techniques (e.g., wireless broadcast, scheduling, caching, indexing, channel allocation) for mobile computing systems; chaired and served in program committees for conferences; guest edited special issues for journals and magazine, and received many professional awards.

- Excellence Award, 2000, Verizon Laboratories Incorporated.
- Excellence Award, 1999, GTE Laboratories Incorporated.
- Achievement Award, 1999, GTE Laboratories Incorporated.
- Excellence Award, 1997, GTE Laboratories Incorporated.

Dec. 1994 - Sept. 1995: Visiting Researcher, Computer Science Department, Hong Kong University of Science & Technology, Hong Kong.

Perform pioneering research on wireless information broadcast, filtering, and caching. Proposed indexing and caching techniques for saving power in mobile devices and for efficient wireless data dissemination. The proposed signature methods became a classic indexing technique for energy efficient wireless data broadcast. This work has been published in the highly selective journals such as Journal of Distributed and Parallel Databases and the ACM Wireless Network Journal.

Sept. 1989 - Nov. 1994; Sept. 1995 - June 1996: Graduate Teaching Associate, Department of Computer and Information Science, The Ohio State University, Columbus, Ohio, USA.

Perform leading-edge research in object-oriented database indexing and query processing and in mobile computing (see above). Proposed a new technology, Path Dictionary, for indexing the deeply nested structures that occur in today's highly complex databases. This technique significantly improves efficiency of retrieval and update operations with a small storage overhead. This research work has resulted in numerous publications, in IEEE Transaction on Knowledge and Data Management and many conferences. Taught many undergraduate courses as a sole lecturer and designed and implemented lab assignments for database courses (offered to both of graduates and undergraduates).

Aug. 1988 - June 1989, Graduate Assistant, Bureau of Evaluative Studies and Testing (B.E.S.T.), Indiana University, Bloomington, Indiana, USA.

Designed and implemented software programs for standardized tests and evaluations; Accumulated test statistics and maintained databases for various tests and evaluations. Also responsible for administrating computer software and hardware systems for the B.E.S.T.

July 1985 - July 1987, System/Research Staff, Computer Center, National Chiao-Tung University, Taiwan.

System programming and managing various mainframes and mini-computers, including CDC Cyber 170/172, PDP-11, and Dec VAX-11. Participated in various research projects, which designed and developed a database management system, an expert systems engine, and a computer network stack based on X.25.

Participated in implementation of the first computer network in Taiwan. Designed and taught training courses for continuation education.

Grants

- Principal Investigator, “Link Quality Estimation for Wireless Sensor Networks", NSF, CNS-0626709, 9/2006-8/2009, $250,000.
- Principal Investigator, “Indexing Multi-Dimensional Data in Peer-to-Peer Systems", (Co-PI: Anand Sivasubramaniam), NSF, IIS-0534343, 1/2006-12/2008, $330,000.
- Principal Investigator, “Location-based Information Access in Pervasive Computing Environments”, NSF, IIS-0328881, 9/2004- 8/2007, $265,000.
- Co-Investigator, “ECOQUAD: Energy-Conserving Quality-Aware Data Collection in Wireless Sensor Networks,” (PI: Jianliang Xu), Research Grants Council (Hong Kong), 9/2005-8/2007, HK$ 391,000.
- Senior Personnel, “STNexus: An Integrated Database and Visualization Environment for Space-Time Information Exploitation,” (PIs: Donna J. Peuquet and Alan M. MacEachren), Advanced Research and Development Activity, NSA/NGA/CIA, 6/2005-5/2007, $806,000.
- Co-Investigator, “Wireless Information Publication and Access,” (PI: Dik Lee), Research Grants Council (Hong Kong), 9/2003-8/2005, HK$ 414,000.
- Co-Principal Investigator, “Bioinformatics Consortium to Enhance Translational and Clinical Research” (PI: Raj Archaya), Public Health Service, 7/2002-6/2005, $358,000.
- Co-Investigator, “Modeling and Service Discovery in Pervasive Computing,” (PI: Dik Lee), Research Grants Council (Hong Kong), 9/2001-8/2003, HK$390,000.
- Principal Investigator, “Web Content Transformation Technology Evaluation Services”, Genuity Inc., 7/2000-6/2001, $180,000.

Students Graduated

Ph.D.

- Mei Li, Ph.D. “Resource Discovery in Large Scale Dynamic Network”, PSU, August 2007. (Microsoft)
- Yingqi Xu, Ph.D. “Spatial Based Services Provisioning in Location-Aware Sensor Networks”, PSU, Dec. 2006. (CISCO)
- Qinglong Hu, Ph.D., “Data Dissemination and Access for Mobile Computing” (Co-advised with D. Lee), Department of Computer Science, Hong Kong University of Science and Technology, January 1999. (IBM San Jose Lab.)

M.S./M. E.

- Julian Winter, MS/CSE, “Performance Evaluation of Prediction-Based Power Saving Techniques for Object Tracking Sensor Networks”, PSU, Dec. 2003 (Pursuing Ph.D. at PSU)
- Sekpon Juntapremjitt, MEng/CSE, “Resource Locating Techniques in P2P Environment”, PSU, Dec. 2003.
- Ravinda Kuhakarn, MEng/CSE, “Peer-to-Peer Network Security”, PSU, Dec. 2003.
- Adegbemiga Taylor, MS/CSE, “Adapting Ring-Based Peer-to-Peer Overlay Using Dynamic Query Pattern”, PSU, August 2004.
- Siddharth Ray, MS/CSE, “An Efficient Data Layout Scheme Using Grouping of Attributes” (co-advised with P. Mitra), PSU, May 2005.
- Steve Sokolowski, M.S./CSE, “Indexing and Querying Terrain Data for Navigation by Autonomous Vehicles”, PSU, Dec. 2005.

- Michael Seltzer, MS/CSE, "Implementation and Performance Evaluation of Peer-to-Peer Infrastructures for Semantic Search", PSU, July 2006.

B.S. (Honor)

- Eric Hough, BS/CMPEN (Honor), "Supporting Multiple Access Points in Wireless Sensor Network", PSU, Dec. 2003. (CMU)
- Josh Schiffman, BS/CS (Honor), "Efficient Valid Scope Determination in a Mobile Broadcast Environment", PSU, May 2006.

Students In-Progress

- Ross Rosemark, Ph.D. Candidate (Started in Fall 2002, passed candidacy exam in Fall 2003), Research Topic: "Sensor Network Infrastructure"
- Julian Winter, Ph.D. Candidate (Started in Spring 2004, passed candidacy exam in Spring 2004), Research Topic: "Spatial Query Processing in Sensor Networks".
- Ken C.K. Lee, Ph.D. Candidate (Started in Fall 2004, passed candidacy exam in Fall 2004), Research Topic: "Spatial Data Management in Pervasive Computing".
- Huajing Li, Ph.D. Candidate, (Started in Fall 2004, passed candidacy exam in Spring 2005), Research Topic: "Search Engine Architecture".
- Bing-Rong Lin, Ph.D. Candidate, (Started in Fall 2006, passed candidacy exam in Spring 2007).
- Congxing Cai, Ph.D. Candidate, (Started in Spring 2007, passed candidacy exam in Fall 2007).
- Xingjie Liu, Ph.D. Candidate, (Started in Fall 2007, passed candidacy exam in Fall 2007).
- Mao Ye (Started in Fall2007).
- Yuan Tian (Started in Fall 2007).
- Brandon Unger, BS/CS (Honor).
- Michael Kozeniauskas, BS/IST (Honor).

Hosted Visiting Scholars

- Zhisheng Li, PhD Candidate, University of Science and Technology, Fall 2007 - Summer 2009.
- Jianliang Xu, Assistant Professor, Hong Kong Baptist University, Summer 2005.
- Jaewoo Chang, Professor, Chonbuk National University, Korea, 2004.

Patents

1. W.-C. Lee, G. Mitchell, E. Rundersteiner, X. Zhang, *System and Method for Automatic Synchronizing and/or updating an Existing Relational Database with Supplemental XML Data,* United State Patent: 7031956B1.
2. W.-C. Lee, G. Mitchell, X. Zhang, *System and Method for Automatic Loading of an XML Document Defined by a Document-Type Definition into a Relational Database Including the Generation of a Relational Schema Therefor,* United State Patent: 7072896B2.

Publications

A. Journal Papers

1. "SSW: A Small World Based Overlay for Peer-to-Peer Search" (with M. Li, A. Sivasubramaniam, and J. Zhao), IEEE Transactions on Distributed and Parallel Systems, to appear.
2. "A New Storage Scheme for Approximate Location Queries in Object Tracking Sensor Networks" (with J. Xu and X. Tang), IEEE Transaction on Distributed and Parallel Systems, to appear.
3. "Energy-Aware and Time-Critical Geo-Routing in Wireless Sensor Networks" (with Y. Xu, J. Xu and G. Mitchell), International Journal of Distributed Sensor Networks (IJDSN), to appear.
4. "Pervasive Data Access in Wireless and Mobile Computing Environments" (with C.K. Lee and S. Madria), *Wireless Communication and Mobile Computing Journal*, to appear.
5. "Round-Eye: A System for Tracking Nearest Surrounders in Moving Object Environments" (with K. Lee, J. Schiffman, B. Zheng and H. Leong), The Journal of Systems & Software, Volume 80, Issue 12, December 2007, pp. 2063-2076.
6. "Materialized In-Network View for Spatial Aggregation Queries in Wireless Sensor Network" (with C.K. Lee, B. Zheng and J. Winter), ISPRS Journal of Photogrammetry and Remote Sensing, Volume 62, Issue 5, October 2007, pp. 382-402.
7. "Processing k nearest neighbor queries in location-aware sensor networks", (with Y. Xu, T.-Y. Fu, J. Winter), Signal Processing, Volume 87, Number 12, pp. 2861-2881.
8. "Path Gluing: A New Technique for Efficient XML Query Processing" (with Y.-H. Chang and C.T. Lee), Journal of Information Science and Engineering (JISE), Volume 23, Number 5, September 2007, pp. 1523-1540.
9. "On Searching Continuous Nearest Neighbors in Wireless Data Broadcast Systems" (with B. Zheng and D.L. Lee), IEEE Transaction on Mobile Computing, Volume 6, Number 7, July 2007, pp. 748-761.
10. Top-k Monitoring in Wireless Sensor Networks" (with M. Wu, J. Xu, and X. Tang), IEEE Transactions on Knowledge and Data Engineering (TKDE), Volume 19, No. 6, June 2007, pp. 962-976.
11. "Cache Invalidation Strategies for Internet-based Mobile Ad Hoc Networks Computer Communications" (with S. Lim, G. Cao, C. Das), Computer Communications Journal, Volume 30, No. 8, June 2007, pp. 1854-1869.
12. "Compressing Moving Object Trajectory in Wireless Sensor Networks" (with Y. Xu), International Journal of Distributed Sensor Networks (IJDSN), Volume 3, Issue 2, April 2007, pp. 151-174.
13. "Performance Evaluation of Neighborhood Signature Techniques for Peer-to-Peer Search" (with M. Li and A. Sivasubramaniam), Journal of Computers, Volume 17, Issue 4, January 2007, pp. 11-36.
14. "Grid-Partition Index: A Hybrid Method for Nearest-Neighbor Queries in Wireless Location-Based Services" (with B. Zheng, J. Xu, D.L. Lee), Very Large Data Base Journal (VLDBJ), Volume 15, No. 1, January 2006, pp. 21-39.
15. "An Error-Resilient and Tunable Distributed Indexing Scheme for Wireless Data Broadcast" (with J.Xu, X. Tang, Q. Gao, S. Li), *IEEE Transactions on Knowledge and Data Engineering (TKDE)*, Volume 18, Issue 3, March 2006, pp. 392-404.
16. "On Scheduling Time-Critical On-Demand Broadcast" (with J. Xu and X. Tang), *IEEE Transactions on Distributed and Parallel Systems*, Volume 17, Issue 1, Jan. 2006, pp. 3-14.
17. "A Novel Caching Scheme for Improving Internet-based Mobile Ad Hoc Networks Performance", (with S. Lim, G. Cao, and C. Das), *Ad Hoc Networks Journal*, Volume 4, Issue 2. 2006, pp. 225-239.
18. "Spatial Queries in Wireless Broadcast Systems" (with B. Zheng and D.L. Lee), *ACM Wireless Networks Journal (WINET)*, Volume 10, Issue 6. November 2004, pp. 723-736.
19. "On Semantic Caching and Query Scheduling for Mobile Nearest Neighbor Search" (with B. Zheng and D.L. Lee), *ACM Wireless Networks Journal (WINET)*, Volume 10, Issue 6. November 2004, pp. 653-664.

20. "The D-tree: An Index Structure for Planar Point Queries in Location-Based Wireless Services", (with J. Xu, B. Zheng and D.L. Lee), *IEEE Transactions on Knowledge and Data Engineering (TKDE),* Volume 16, No. 12, December 2004, pp. 1526-1542.
21. "Performance Evaluation of an Optimal Cache Replacement Policy for Wireless Data Dissemination under Cache Consistency" (with J. Xu, Q. Hu, and D.L. Lee), *IEEE Transactions on Knowledge and Data Engineering (TKDE),* Volume 16, No. 1, January 2004, pp. 125-139.
22. "Monte Carlo Methods on Customer Retrial Calls in Communication Networks" (with J. Lee, C.-P. Liu, A.-T. Wang, and C. Chang), *Chung Yuan Journal*, Vol. 31, No. 3, September 2003, pp. 151-159.
23. "Data Management in Location-Dependent Information Services: Challenges and Issues" (with D.L. Lee, J. Xu, and B. Zheng), *IEEE Pervasive Computing*, Vol. 1, No. 3, July-Sept. 2002, pp. 65-72.
24. "Indexing Techniques for Power Management in Multi-Attribute Data Broadcast" (with Q. Hu and D.L. Lee), *ACM Mobile Networks and Applications Journal (MONET): Special Issue on Management of Mobility in Distributed Systems,* Volume 6, No. 2, March 2001, pp. 185-197.
25. "A Hybrid Index Techniques for Power Efficient Data Broadcast" (with Q. Hu and D.L. Lee), *Distributed and Parallel Databases Journal*, Volume 9, No. 2, March 2001, pp. 151-177.
26. "A Study of Channel Allocation Methods for Data Dissemination in Mobile Computing Environments" (with Q. Hu and D.L. Lee), *ACM Mobile Networks and Applications Journal (MONET): Special Issue on Resource Management in Wireless Network*, Volume 4, No. 2, 1999, pp. 117-129.
27. "Repository Support for Metadata-based Legacy Migration" (with S. Heiler and G. Mitchell), *IEEE Data Engineering Bulletin*, Volume 22, No. 1, March 1999, pp. 37-42.
28. "Signature Caching Techniques for Information Filtering in Mobile Environments" (with D.L. Lee), *ACM Wireless Networks Journal (WINET),* Volume 5, No. 1, January 1999, pp. 57-67.
29. "Path Dictionary: A New Approach to Query Processing in Object-Oriented Database" (with D.L. Lee), *IEEE Transactions on Knowledge and Data Engineering (TKDE),* Volume 10, No. 3, May/June 1998, pp. 371-388.
30. "Using Signature Techniques for Information Filtering in Wireless and Mobile Environments" (with D.L. Lee), *Distributed and Parallel Databases: Special Issue on Database and Mobile Computing*, Vol. 4, No. 3, July 1996, pp. 205-227. (Also appears as a chapter in the book, *Databases and Mobile Computing)*
31. "A New Strategy for Multiple Stacks Manipulation" (with W.-P. Yang, T.-C. Chiu and S.S. Tung), *The Computer Journal*, Vol. 35, No. 3, June 1992, pp. A616-A622.

B. Book Chapters

1. "Window Query Processing in Highly Dynamic GeoSensor Networks: Issues and Solutions" (with Y. Xu) , in *GeoSensor Networks*, edited by A. Stefanidis and S. Nittel, CRC Press LLC., 2004, ISBN: 0-41532-404-1, pp. 31-52.
2. "Data Broadcast" (with J. Xu, D.L. Lee, and Q. Hu), in *Handbook of Wireless Networks and Mobile Computing*, edited by I. Stojmenovic, John Wiley & Sons, 2002, ISBN 0-471-41902-8, pp. 243-265.
3. "Power Conserving and Access Efficient Indexes for Wireless Computing" (with Q. Hu and D.L. Lee), in *Information Organization and Databases*, edited by K. Tanaka, S. Ghandeharizadeh, and Y. Kambayashi, Kluwer Academic Publishers, Boston, MA, 2000, pp. 249-264.
4. "Using Signature Techniques for Information Filtering in Wireless and Mobile Environments" (with D.L. Lee), in *Databases and Mobile Computing*, edited by D. Barbara, R. Jain and N. Krishnakumar, Kluwer Academic Publishers, 1996, ISBN: 0792397495.

C. Conference/Workshop Papers

1. "Optimizing Parallel Itineraries for KNN Query Processing in Wireless Sensor Networks" (with T-Y. Fu and W.-C. Peng), ACM Conference on Information and Knowledge Management (CIKM'07), Nov. 6-9, 2007, to appear. (17% acceptance rat - *Candidate for the Best Interdisciplinary Paper Award*)
2. "Approaching Skyline in Z Order" (with C.K. Lee, B. Zheng, and H. Li), *International Conference on Very Large Data Bases (VLDB'07)*, Vienna, Austria, September 23-28, 2007, pp. 279-290. (~16% acceptance rate)
3. "A Hybrid Cache and Prefetch Mechanism for Scientific Literature" (with H. Li, A. Sivasubramaniam, C. L. Giles), International Conference on Web Engineering (ICWE 2007), Como, Italy, July 16-20, 2007, pp. 121-136.
4. "Using SensorRanks for In-Network Detection of Faulty Readings in Wireless Sensor Networks" (with X.-Y. Hsiao W.-C. Peng, and C.-C. Hung), *the Sixth ACM Workshop on Data Engineering for Wireless and Mobile Access (MobiDE'07)*, Baijing, China, June 2007, 8 pages.
5. "SearchGen: a Synthetic Workload Generator for Scientific Literature Digital Libraries and Search Engines" (with H. Li, A. Sivasubramaniam, C. L. Giles), *ACM/IEEE Joint Conference on Digital Libraries (JCDL'07)*, Vancouver, British Columbia, Canada, June 2007, pp. 137-146.
6. "Analysis of a Loss-Resilient Proactive Data Transmission Protocol in Wireless Sensor Networks" (with Y. Xu and J. Xu), *IEEE Conference on Computer Communications (INFOCOM'07)*, Anchorage, Alaska, USA, May 2007, 9 pages. (~18% acceptance rate)
7. "Incremental Adaptation of XPath Access Control Views" (with P. Ayyagari, P. Mitra, D. Lee, and P. Liu), *the Second ACM Symposium on InformAtion, Computer and Communications Security (ASIACCS'07)*, Singapore, March 2007. (~18% acceptance rate)
8. "Optimizing Energy-Efficient Query Processing in Sensor Networks" (with R. Rosemark and B. Urgaonkar), *the Eighth International Conference on Mobile Data Management (MDM'07)*, Mannheim, Germany, May 7-11, 2007, pp. 24-29.
9. "Protect Moving Trajectories with Dummies" (with T.H. You and W.-C. Peng), *International Workshop on Privacy-Aware Location-based Mobile Services (PALMS)*, Mannheim, Germany, May 11, 2007.
10. "Query Processing in Mobile Sensor Networks, *NSF Workshop on Data Management for Mobile Sensor Networks" (MobiSensors)*, Pittsburgh, January 16-17, 2007, Position Paper.
11. "DPTree: A Balanced Tree Based Indexing Framework for Peer-To-Peer Systems" (with M. Li and A. Sivasubramaniam), *IEEE International Conference on Network Protocols (ICNP'06)*, Santa Barbara, CA, November 2006, pp. 12-21. (~14% acceptance rate)
12. "A New Trajectory Indexing Scheme for Moving Objects on Road Networks" (with J.-W. Chang and J.-H. Um), *the 23rd British National Conference on Databases (BNCOD 2006)*, Belfast, Northern Ireland, UK, July 2006, pp. 291-294. (Poster Paper)
13. "Tracking Nearest Surrounders in Moving Object Environments" (with K. Lee, J. Schiffman, B. Zheng, H. Leong), *IEEE International Conference on Pervasive Services (ICPS'06)*, Lyon, France, June 2006, pp. 3-12. (~21% acceptance rate)
14. "CiteSeerX: an Architecture and Web Service Design for an Academic Document Search Engine" (with H. Li, I. Councill, L. Giles), *the International World Wide Web Conference (WWW'06)*, Edinburgh, Scotland, May 23-26, 2006, pp. 187-188.
15. "Learning Metadata from the Evidence in an On-Line Citation Matching Scheme" (with Isaac G. Councill, Huajing Li, Ziming Zhuang, Sandip Debnath, Levent Bolelli, Anand Sivasubramaniam, C. Lee Giles), *ACM/IEEE Joint Conference on Digital Libraries (JCDL)*, Chapel Hill, NC, USA, June 11-15, 2006, pp. 276-285. (*Vannevar Bush Best Paper Candidate*) (~26% acceptance rate)
16. "CS Cache Engine: Data Access Accelerator for Location-Based Service in Mobile Environments" (with C.K. Lee, J. Winter, B. Zheng, J. Xu), *ACM SIGMOD International Conference on Management of Data (SIGMOD2006)*, Chicago, June 2006, pp. 787-789 (Demonstration Paper)
17. "Transitive Nearest Neighbor Search in Mobile Environments" (with B. Zheng and C.K. Lee), *IEEE International Conference on Sensor Networks, Ubiquitous, and Trustworthy Computing (SUTC'06)*, Taichung, Taiwan, June 2006, pp. 14-21. (~24% acceptance rate)

18. "DTTC: Delay-Tolerant Trajectory Compression for Object Tracking" (with Y. Xu), *IEEE International Conference on Sensor Networks, Ubiquitous, and Trustworthy Computing (SUTC'06)*, Taichung, Taiwan, June 2006, pp. 438-443. (~24% acceptance rate)
19. "In-broker access control: A new access control deployment strategy towards optimal end-to-end performance of information brokerage systems" (with Li, F., B. Luo, D.W. Lee, P. Mitra, C.-H. Chu, P. Liu), *IEEE International Conference on Sensor Networks, Ubiquitous, and Trustworthy Computing (SUTC'06)*, Taichung, Taiwan, June 2006, 252-259. (~24% acceptance rate)
20. "PENS: an Algorithm for Density-Based Clustering in Peer-to-Peer Systems" (with M. Li, G. Lee, and A. Sivasubramaniam), *International Conference on Scalable Information Systems (INFOSCALE'06)*, Hong Kong, May 2006, to appear. (~36% acceptance rate)
21. "Efficient Progressive Processing of Skyline Queries for Peer-to-Peer Systems" (with H. Li, Q. Tan), *International Conference on Scalable Information Systems (INFOSCALE'06)*, Hong Kong, May 2006, to appear. (~36% acceptance rate)
22. "CiteSeerX - A Scalable Autonomous Scientific Digital Library" (with H. Li, I. Councill, L. Bolelli, D. Zhou, Y. Song, A. Sivasubramaniam, L. Giles). *International Conference on Scalable Information Systems (INFOSCALE'06)*, Hong Kong, May 2006, to appear. (~36% acceptance rate)
23. "On Mining Moving Patterns for Object Tracking Sensor Networks" (with W.-C. Peng, Y.-Z. Ko), *International Conference on Mobile Data Management (MDM'06)*, Nara, Japan, May 2006, to appear.
24. "Exploring Spatial Correlation for Link Quality Estimation in Wireless Sensor Networks" (with Y. Xu), *IEEE International Conference on Pervasive Computing and Communications (PerCom'06)*, Pisa, Italy, March 2006, to appear. (~8% acceptance rate)
25. "Processing Multiple Aggregation Queries in Geo-Sensor Networks" (with C.K. Lee, B. Zheng, and J. Winter), *International Conference on Database Systems for Advanced Applications (DASFAA'06)*, Singapore, March 2006, to appear. (~24% acceptance rate)
26. "Caching Complementary Space for Location-Based Services" (with C.K. Lee, B. Zheng and J. Xu), *International Conference on Extending Database Technology (EDBT'06)*, Munich, Germany, March 2006, to appear. (~15% acceptance rate)
27. "Nearest Surrounder Search" (with C.K. Lee and H.V. Leung), *IEEE International Conference on Data Engineering (ICDE'06)*, Atlanta, GA, April 2006, to appear. (~19.5% acceptance rate)
28. "Processing Window Queries in Wireless Sensor Networks" (with Y. Xu, J. Xu, and G. Mitchell), *IEEE International Conference on Data Engineering (ICDE'06)*, Atlanta, GA, April 2006, to appear. (~19.5% acceptance rate)
29. "Monitoring Top-k Query in Wireless Sensor Networks" (with M. Wu, J. Xu, and X. Tang), *IEEE International Conference on Data Engineering (ICDE'06)*, Atlanta, GA, April 2006, to appear. (Poster paper)
30. "PSGR: Priority-based Stateless Geo-Routing in Wireless Sensor Networks" (with Y. Xu, J. Xu, and G. Mitchell), *IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS'05)*, Washington D.C., November 2005, 8 pages.
31. "Balancing Performance and Confidentiality in Air Index" (with Q. Tan, B. Zheng, P. Liu, D.L. Lee), *ACM Fourteenth Conference on Information and Knowledge Management (CIKM'05)*, Breman, Germany, October 2005, pp. 800-807. (~18% acceptance rate)
32. "EASE: An Energy-Efficient In-Network Storage Scheme for Object Tracking in Sensor Networks" (with J. Xu and X. Tang), *IEEE Communications Society Conference on Sensor and Ad Hoc Communications and Networks (SECON'05)*, Santa Clara, California, September 2005, 10 pages. (~27% acceptance rate)
33. "Decentralizing Query Processing in Sensor Networks" (with R. Rosemark), *the Second International Conference on Mobile and Ubiquitous Systems: Networking and Services (Mobiquitous'05)*, San Diego, CA, July, 2005, pp. 270-280.
34. "Energy Efficient Processing of K Nearest Neighbor Queries in Location-aware Sensor Networks" (with J. Winter and Y. Xu), *the Second International Conference on Mobile and Ubiquitous Systems: Networking and Services (Mobiquitous'05)*, San Diego, CA, July, 2005, pp. 281-292.
35. "KTR: an Efficient Key Management Scheme for Air Access Control" (with Q. Gu, P. Liu, and C.-H. Chu),

poster paper, *the Second International Conference on Mobile and Ubiquitous Systems: Networking and Services (Mobiquitous'05)*, San Diego, CA, July, 2005, pp. 499-501.

36. "Deep Set Operators for XQuery" (with B. Luo, D.W. Lee, P. Liu), *International Workshop on XQuery Implementation, Experience and Perspectives (XIME-P'05)*, Baltimore, Maryland, May 2005.
37. "DSI: A Fully Distributed Spatial Index for Wireless Data Broadcast" (with B. Zheng), *IEEE International Conference on Distributed Computing Systems (ICDCS'05)*, Columbus, OH, June 2005, pp. 349-358. (~14% acceptance rate).
38. "Supporting Complex Multi-dimensional Queries in P2P Systems" (with B. Liu and D.L. Lee), *IEEE International Conference on Distributed Computing Systems (ICDCS'05)*, Columbus, OH, June 2005, pp. 155-164. (~14% acceptance rate).
39. "Distributed Caching of Multi-dimensional Data in Mobile Environments" (with B. Liu and D.L. Lee), *International Conference on Mobile Data Management (MDM'05)*, Ayia Napa, Cyprus, May 9-13, 2005, pp. 229-233.
40. "Proactive Caching for Spatial Queries in Mobile Environments" (with H. Hu, J. Xu, W.S. Wong, B. Zheng, and D.L. Lee), *IEEE International Conference on Data Engineering (ICDE'05)*, Tokyo, April 2005, pp. 403-414. (~14% acceptance rate).
41. "A Fully Distributed Spatial Index for Wireless Data Broadcast" (with B. Zheng), *IEEE International Conference on Data Engineering (ICDE'05)*, Tokyo, April 2005, pp. 417-418. (Poster: ~19% acceptance rate).
42. "QFilter: Fine-Grained Run-Time XML Access Control via NFA-based Query Rewriting" (with B. Luo, D.W. Lee, and P. Liu), *ACM International Conference on Information and Knowledge Management (CIKM'04)*, Washington D.C., Nov. 8-13, 2004, pp. 543-552. (~19% acceptance rate).
43. "Performance Comparison of Cache Invalidation Strategies for Internet-based Mobile Ad Hoc Networks" (with S. Lim, G. Cao, and C. Das), *the first IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS'04)*, Fort Lauderdale, Florida, USA, Oct. 2004, pp. 104-113. (Best Paper Candidate) (~25% acceptance rate).
44. "Semantic Small World: An Overlay Network for Peer-to-Peer Search" (with M. Li and A. Sivasubramaniam), *IEEE International Conference on Network Protocols (ICNP'04)*, Berlin, Germany, October 2004, pp. 228-238. (~15% acceptance rate).
45. "KPT: A Dynamic KNN Query Processing Algorithm for Location-aware Sensor Networks" (with J. Winter), *International Workshop on Data Management for Sensor Networks (DMSN'04)*, Toronto, Canada, August 2004, pp. 119-125.
46. "A Flexible Framework for Architecting XML Access Control Enforcement Mechanisms", (with B. Luo, D. Lee, and P. Liu), *International Workshop on Secure Data Management in a Connected World (SDM'04)*, Toronto, Canada, August 2004, pp. 141-155.
47. "Dual Prediction-based Reporting Mechanism for Object Tracking Sensor Networks" (with Y. Xu and J. Winter), *the First International Conference on Mobile and Ubiquitous Systems: Networking and Services (Mobiquitous'04)*, Boston, MA, August 22-26, 2004, pp. 154-163.
48. "Search Continuous Nearest Neighbors on the Air" (with B. Zheng and D.L. Lee), *the First Annual International Conference on Mobile and Ubiquitous Systems: Networking and Services (Mobiquitous'04)*, Boston, MA, August 22-26, 2004, pp. 236-245.
49. "Exponential Index: A Parameterized Distributed Indexing Scheme for Data on Air" (with J. Xu and X. Tang), *the Second International Conference on Mobile Systems, Applications, and Services (MobiSys'04)*, Boston, MA, June 6-9, 2004, pp. 153-164. (~14.2% acceptance rate).
50. "A Small World Overlay Network for Semantic Based Search in P2P Systems" (with M. Li, A. Sivasubramaniam and D.L. Lee), *the Second WWW Workshop on Semantics in Peer-to-Peer and Grid Computing (SemPGRID'04)*, New York City, NY, May 2004, pp. 71-90.
51. "Efficient peer to peer information sharing over mobile ad hoc networks" (with M. Li and A. Sivasubramaniam), *the Second WWW Workshop on Emerging Applications for Wireless and Mobile Access (MobEA'04)*, New York City, NY, May 2004.

52. "Scheduling Web Requests in Broadcast Environments" (Poster paper; with J. Xu and J. Liu), *International World Wide Web Conference (WWW'04),* New York, NY, May 17-22, 2004, pp. 280-281.
53. "Energy-Efficient Air Indexes for Location-Based Wireless Services" (with B. Zheng, J. Xu, D.L. Lee), *International Conference on Extending Database Technology (EDBT'04),* 2004, pp. 48-66. (~14.5% acceptance rate).
54. "Prediction Based Strategies for Energy Saving in Object Tracking Sensor Networks" (with Y. Xu and J. Winter), *IEEE International Conference on Mobile Data Management (MDM'04),* Berkeley, CA, Jan. 2004, pp. 346-357. (~22.5% acceptance rate).
55. "Window Query Processing in Highly Dynamic Geo-Sensor Networks: Issues and Solutions" (with Y. Xu), *NSF Workshop on Geo Sensor Network (GSN'03),* Portland, Maine, Oct. 9-11 2003.
56. "A Novel Caching Scheme for Internet based Mobile Ad Hoc Networks" (with S. Lim, G. Cao, and C. Das), *International Conference on Computer Communications and Networks (ICCCN'03),* Dallas, TX, Oct 2003, U.S.A, pp. 38-43.
57. "Supporting XML Security Models using Relational Databases: A Vision" (with D.W. Lee and P. Liu), *XML Database Symposium (XSym'03),* Berlin, Germany, Sept, 2003, pp. 267-281. (~27% acceptance rate).
58. "Neighborhood Signatures for Searching P2P Networks" (with M. Li and A. Sivasubramaniam), *International Database Engineering and Application Symposium (IDEAS'03),* Hong Kong, July 2003, pp. 142-151. (~28% acceptance rate).
59. "A Caching Mechanism for Improving Internet based Mobile Ad Hoc Networks Performance" (with S. Lim, S.-T. Park, G. Cao, C. R. Das, and C. L. Giles), *the Twelfth International World Wide Web Conference (WWW'03),* Budapest, Hungary, May 20-24, 2003, pp. 306.
60. "On Localized Prediction for Power Efficient Object Tracking in Sensor Networks" (with Y. Xu), *International Workshop on Mobile Distributed Computing (MDC'03),* Providence, Rhode Island, May 2003, pp. 434-439.
61. "Spatial Index on Air" (with B. Zheng and D.L. Lee), *IEEE International Conference on Pervasive Computing and Communications (PerCom'03),* Dallas-Fort Worth, Texas, March 23-26, 2003 pp. 297-304.
62. "Selecting the Best Valid Scopes for Wireless Dissemination of Location-dependent Data" (with B. Zheng and D.L. Lee), *ACM Symposium on Applied Computing (SAC'03),* Melbourne, Florida, March 9-12, 2003, pp. 860-865.
63. "Energy Efficient Index for Querying Location-Dependent Data in Mobile Broadcast Environments" (with J. Xu, B. Zheng, and D.L. Lee), *International Conference on Data Engineering (ICDE'03),* Bangalore, India, March 5 - March 8, 2003, pp. 239-250. (13.5% acceptance rate).
64. "Search K Nearest Neighbors on Air" (with B. Zheng and D.L. Lee), *International Conference on Mobile Data Management (MDM'03),* Australia, January 21-24, 2003, pp. 181-195. (24% acceptance rate).
65. "Models and Infrastructures for Pervasive Computing" (with D.L. Lee), *NSF Workshop on Context-Aware Mobile Database Management (CAMM),* Providence, Rhode Island, January 24-25, 2002.
66. "An Optimal Cache Replacement Policy for Wireless Data Dissemination under Strong Cache Consistency" (with J. Xu, Q. Hu, and D.L. Lee), *International Conference on Parallel Processing,* Valencia, Spain, September 3-7, 2001, pp. 267-274. (46.7% acceptance rate).
67. "Model Management - A Solution to support Multiple Data Models, Their Mappings, and Maintenance" (with K. Claypool, X. Zhang, E. Rundensteiner, S. Hong, H. Kuno, and G. Mitchell), *ACM International Conference on SIGMOD (demonstration paper),* Santa Barbara, CA, May 21-24, 2001, pp. 606.
68. "Clock: Synchronizing Internal Relational Storage with External XML Documents" (with X. Zhang, G. Mitchell, and E. Rundensteiner), *International Workshop on Research Issues in Data Engineering: Document Management (RIDE'01),* Heidelberg, Germany, 2001, pp. 111-118.
69. "SAIU: An Efficient Cache Replacement Policy for Wireless On-demand Broadcasts" (with J. Xu, Q. Hu, and D.L. Lee), *ACM International Conference on Information and Knowledge Management (CIKM'00),* McLean, VA, Nov. 6-11, 2000, pp. 46-53.
70. "Integrating XML Data with Relational Databases" (with G. Mitchell and X. Zhang), *IEEE International Workshop on Knowledge Discovery and Data Mining in World Wide Web*, Taipei, Taiwan, April 10-13, 2000,

pp. F47-F53.

71. "Power Conservative Multi-Attribute Queries on Data Broadcast" (with Q. Hu and D.L. Lee), *IEEE International Conference on Data Engineering (ICDE'00),* San Diego. Feb. 2000, pp. 157-166. (~13.5% acceptance rate).
72. "On Simulation Modeling of Information Dissemination Systems in Mobile environments" (with J. Lee and K. Huff), *International Conference on Mobile Data Access (MDA'99),* Hong Kong, Dec. 1999, pp. 45-57.
73. "Indexing Techniques for Wireless Data Broadcast Under Data Clustering and Scheduling" (with Q. Hu and D.L. Lee), *ACM International Conference on Information and Knowledge Management (CIKM'99),* Kansas City, Missouri, Nov. 1999, pp. 351-358.
74. "Performance Evaluation of a Wireless Hierarchical Data Dissemination System" (with Q. Hu and D.L. Lee), *ACM/IEEE International Conference on Mobile Computing and Networking (MobiCom'99),* Seattle, Washington, August 1999, pp. 163-173. (~13.5% acceptance rate).
75. "Dynamic Data Delivery in Wireless Communication Environments" (with Q. Hu and D.L. Lee), *International Workshop on Mobile Data Access (MDA'98),* Singapore, Nov. 1998, pp. 218-229.
76. "Indexing Techniques for Data Broadcast on Wireless Channel" (with D.L. Lee and Q. Hu), *International Conference of Foundations of Data Organization (FODO'98),* Kobe, Japan, Nov. 1998, pp. 175-182.
77. "Optimal Channel Allocation for Data Dissemination in Mobile Computing Environments" (with Q. Hu and D.L. Lee), *IEEE Conference on Distributed Computing Systems (ICDCS'98),* Amsterdam, Netherlands, May 1998, pp. 480-487. (~22% acceptance rate).
78. "A Framework for TMN-CORBA Interoperability" (with G. Mitchell), *IEEE/IFIP Network Operations and Management Symposium (NOMS'98),* New Orleans, Feb. 1998, pp. 90-99.
79. "A Comparison of Index Methods for Data Broadcast on the Air" (with Q. Hu and D.L. Lee), *International Conference on Information Networking (ICOIN'98),* Tokyo, Japan, Jan. 1998, pp. 656-659.
80. "Channel Allocation Methods for Data Dissemination in Mobile Environments" (with Q. Hu and D.L. Lee), *IEEE International Symposium on High Performance Distributed Computing (HPDC'97),* Portland, Oregon, August 5-8, 1997, pp. 274-281.
81. "On Signature Caching of Wireless Broadcast and Filtering Services" (with D.L. Lee), in *the second International Mobile Computing Conference*, Hsinchu, Taiwan, March 25-27, 1996, pp.15-24.
82. "Signature Path Dictionary for Nested Object Query Processing" (with D.L. Lee), *IEEE International Phoenix Conference on Computers and Communications (IPCCC'96),* March 1996, pp. 275-281.
83. "Information Filtering in Wireless and Mobile Environments" (with D. L. Lee), *IEEE International Phoenix Conference on Computers and Communications (IPCCC'96)*, Phoenix, Arizona, March 1996, pp. 508-514.
84. "Combining Indexing Technique with Path Dictionary for Nested Object Queries" (with D.L. Lee), *International Conference on Database Systems for Advanced Applications (DASFAA'95),* Singapore, Apr. 1995, pp. 107-114.
85. "On Processing Nested Queries in Distributed Object-Oriented Database" (with D.L. Lee), *International Workshop on Research and Issues in Data Engineering - Distributed Object Management Systems (RIDE'95)*, Taipei, March 1995, pp. 10-17.
86. "Short Cuts for Traversals in Object-Oriented Database Systems" (with D.L. Lee), *International Computer Symposium*, Hsinchu, Taiwan, Dec. 1994, pp. 1172-1177.
87. "Using Path Information for Query Processing in Object-Oriented Database Systems" (with D.L. Lee), *ACM International Conference on Information and Knowledge Management (CIKM'94),* Gathersberg, MD, Nov. 1994, pp. 64-71.
88. "Signature File Methods for Indexing Object-Oriented Database Systems" (with D.L. Lee), *International Conference Science Conference*, Hong Kong, Dec. 1992, pp. 616-622.
89. "Message Control Program: a Remote Access Facility in Uni-net" (with K.-A. Hwang), *International Computer Symposium*, R.O.C., 1986, pp. 624-628.
90. "Form Support System," (with W.-P. Yang), *National Computer Symposium*, R.O.C., 1985, pp. 617-624.

D. Tutorials

1. "Location-Aware Wireless Sensor Networks" (with Y. Xu), *International Conference on Mobile Data Management (MDM'07)*, Mannheim, Germany, May 2007.
2. "Data Access Techniques for Location-Based Services" (with. B. Zheng and J. Xu), *International Conference on Mobile Data Management (MDM'06)*, Nara, Japan, May 2006.
3. "Location Dependent Information Systems" (with. B. Zheng and J. Xu), *IEEE International Conference on Data Engineering, (ICDE'04), Boston, March*, 2004.
4. "Peer-to-Peer Systems: State of the Art and Research Issues", *International Computer Symposium (ICS'02)*, Hualien, Taiwan, Dec. 18-21, 2002.
5. "Data Management Systems and Mobile Computing" (with. S. Gupta and P. Srimani), *ACM/IEEE International Conference on Mobile Computing and Networking (MobiCom'00), Boston*, August 6. 2000.
6. "Data Management in a Wireless Environment" (with D.L. Lee), *the 6th International Conference on Database Systems for Advanced Applications (DASFAA'99)*, Taiwan, April 1999.

E. Others

1. "Editorial for Special Issue on Wireless Networks and Mobile Computing" (with Y. Tseng, S. Gupta, and P. Srimani), *ACM Wireless Networks Journal*, Vol. 9, No. 2, pp. 92-93, March 2003.
2. "Guest Editorial: Special Section on Data Management Systems and Mobile Computing" (with P. Srimani and S. Gupta), *IEEE Transactions on Computer*, Volume 51, Number 10, pp. 1121-1123, Oct., 2002.
3. "Editorial for Special Issue on Pervasive Computing" (with S. Gupta, M. Satyanarayanan, and P. Srimani), *ACM Mobile Networks and Applications Journal*, Vol. 7, No. 2, pp. 255-257, August 2002.
4. "An Overview of Pervasive Computing" (with S. Gupta, A. Purakayastha, and P. Srimani), *IEEE Personal Communications Magazine*, Vol.8 No.4, August 2001.
5. "Summary of Panel Discussion: Future of Mobile Computing --- Convergence of Research and Applications", *Advances in Database Technologies: Proceedings of International Workshop on Mobile Data Access*, pp. 380-381, 1999.

F. Submitted Papers

1. "Searching Correlated Objects in a Long Sequence" (with C.K. Lee, B. Zheng, and D. Peuquet), submitted to International Conference on Extending Database Technology (EDBT'08), March 25-30, 2008 Nantes, France.
2. "Efficient Valid Scope Computation for Location-Dependent Spatial Queries" (with B. Unger, C.K. Lee, B. Zheng, C. Cai and M. Kozeniauskas), submitted to International Conference on Extending Database Technology (EDBT'08), March 25-30, 2008 Nantes, France.

Invited Talks

- "Location-Based Services in Pervasive Computing Environments", Fudan University, China, June 2007.
- "Location-Based Information Services in Pervasive Computing Environments", Shanghai Jiaotong University, China, May 2006.
- "Location-Based Information Access in Pervasive Computing Environments", Microsoft Research Asia, China, May 2006.
- "DSI: A Fully Distributed Spatial Index for Wireless Data Broadcast", *National University of Singapore*, August 2005.
- "NR-Tree: Supporting Multi-dimensional Queries in P2P Systems", *Nanyang Technological University*, Singapore, August 2005.
- "Semantic Small World", Department of Computer Science and Information Engineering, *National Chiao-Tung University*, Taiwan, Dec. 2004.

- "An Overlay Network for Peer-to-Peer Search", *Telcordia Technologies, Inc*., Nov. 2004.
- "Evaluation of Mobile Application Platforms", *Wireless and Optical Communications Conference (WOCC2002)*, April 2002.
- "Data and Infrastructure Issues in Mobile Information Access", Department of Electronic Engineering, *National Taiwan University*, Dec. 2001.
- "Research Issues on Wireless Data Dissemination", Dept. of Computer Science, *Worcester Polytechnic Institute*, Dec. 1999.
- "Data Dissemination in a Mobile Environment", Dept. of Computer Science, *Colorado State University*, Fort Collins, Colorado, Sept. 1999
- "Signature Techniques for Information Filtering in Wireless and Mobile Environments", Dept. of Computer Science and Information Engineering, *National Central University*, Taiwan, May 1997.

Professional Activities

A. Editorial Activities

- Guest Editor, Special Issue on Scalable Information Systems, Future Generation Computing Systems (on-going).
- Guest Editor, Special Issue on Wireless Networks and Mobile Computing, ACM Wireless Networks Journal, Vol. 9, No. 2, March 2003.
- Guest Editor, Special Issue on Database Management and Mobile Computing, IEEE Transaction on Computer, Vol. 51, No. 10, Oct. 2002.
- Guest Editor, Special Issue on Pervasive Computing, ACM Mobile Networks and Applications Journal, Vol. 7, No. 4, August 2002.
- Guest Editor, Special Issue on Pervasive Computing, IEEE Personal Communication Magazine, Vol. 8, No. 4, August 2001.

B. Conference/Workshop Organization

- International Conference on Mobile Data Management (MDM)
  - Founding TPC Chair: 1999.
  - Steering Committee Member: 2003-Present.
  - Industrial Track Co-Chair: 2001-2002.
  - TPC Member: 2000-2004, 2006, 2008.
  - Panel Chair: 1999.
  - Session Chair: 2000.
  - Tutorial Speaker: 2006, 2007.
  - Panelist: 2001.
- IEEE International Conference on Distributed Computing Systems (ICDCS)
  - Session Chair: 2003.
  - TPC Member: 2003, 2005-2007.
  - TPC Chair for Joint Workshop on Wireless Networks and Mobile Computing: 2000-2001.
  - Session Chair for Joint Workshop on Knowledge Discovery and Data Mining in WWW: 2000
  - TPC Member for Joint Workshop on Mobile and Distributed Computing (MDC): 2003-2004.
- IEEE International Conference on Data Engineering (ICDE)
  - Tutorial Speaker: 2004.
  - TPC Member: 2005-2008.
  - TPC Member for Joint Workshop on Networking Meets Databases (NetDB): 2006.

- IEEE International Conference on Scalable Information Systems (INFOSCALE)
  - TPC Chair: 2007.
  - Steering Committee Member: 2007 – present.
  - TPC Member: 2006.
  - TPC Chair for Joint Workshop on Peer-to-Peer Information Management: 2006.
- IEEE International Conference on Sensor Networks, Ubiquitous, and Trustworthy Computing (SUTC)
  - TPC Chair: 2008
- ACM International Conference on Information and Knowledge Management (CIKM)
  - Session Chair: 2000.
  - Panelist: 2000.
  - TPC Member: 2000-2002.
  - TPC Member for Joint Workshop on Web Information and Data Management (WIDM): 2001-2004.
- ACM Workshop on Data Engineering for Wireless and Mobile Access (MobiDE)
  - General Chair: 2007
  - TPC Member: 2001, 2003, 2005.
- International World Wide Web Conference
  - Technical Program Vice Chair (Mobility Track): 2008
  - Tutorial Deputy Chair: 2008
- IEEE International Conference on Network Protocol (ICNP)
  - TPC Member: 2005-2007
- IEEE International Conference on Pervasive Computing and Communications (PERCOM)
  - TPC Member: 2007
- IEEE INFOCOM
  - TPC Member: 2004
- IEEE Wireless Communications and Networking Conference (WCNC)
  - TPC Member: 2007
- International Conference on Web-Age Information Management (WAIM)
  - Tutorial Chair: 2006.
- IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS)
  - Session Chair: 2005.
- IEEE Conference on E-Commerce Technology
  - TPC Member: 2006-2007
- IEEE Conference on Enterprise Computing, E-Commerce and E-Services
  - TPC Member: 2006-2007
- International Conference on Very Large Data Base (VLDB)
  - Demonstration PC Member: 2005
- International Conference on Computer Communications and Networks (ICCCN)
  - TPC Member: 2006
- International Conference on Parallel Processing (ICPP)
  - TPC Chair for Joint Workshop on Pervasive Computing: 2000
  - TPC Member: 2003, 2007
  - TPC Member for Joint Workshop on Applications of Ad Hoc Networks: 2003.
- International Symposium on Advances in Databases and Information Systems (DASFAA)
  - Tutorial Speaker: 1999.
  - TPC Member: 2000-2001, 2006-2008.
- International Workshop on Peer-to-Peer Information Management (P2PIM)
  - TPC Co-Chair: 2006.
- International Workshop on Mobility in Database and Distributed Systems (MDDS)
  - TPC Member: 2003-2005.

- ACM Symposium on Applied Computing (SAC)
  - TPC Member: 2003-2007
- International Symposium on Applications and the Internet (SAINT)
  - Publicity Committee Co-chair: 2003.
  - TPC Member: 2003.
- International Conference on Web Information Systems Engineering (WISE)
  - TPC Member: 2006.
- IEEE International Conference on Communications (ICC)
  - TPC Member: 2006.
- International Conference on Embedded and Ubiquitous Computing (EUC)
  - TPC Member: 2007.
- International Conference on Mobile and Ubiquitous Systems: Computing, Networks and Services (Mobiquitous)
  - TPC Member: 2007.
- International Conference on International Conference on Parallel and Distributed Systems (ICPAD)
  - TPC Member: 2007.
- International Conference on Grid and Pervasive Computing (GPC)
  - TPC Member: 2006-2007.
- International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA)
  - TPC Member: 2005.
- International Workshop on Database Management and Application over Networks (DBMAN)
  - TPC Member: 2007.
- International Workshop on Networking Meets Databases (NetDB)
  - TPC Member: 2006.
- International Symposium on Global Service Portability and Infrastructure for Virtual Home/Office Environments
  - TPC Member: 2002.
- International Conference and Exhibits on the Convergence of IT and Communications **(**ITCom)
  - TPC Member: 2001.
- International Workshop on Cooperative Internet Computing (CIC)
  - TPC Member: 2002, 2004-2005.
- International Workshop on Web Based Collaboration (WBC)
  - TPC Member: 2003, 2004.
- International Workshop on Mobile Commerce
  - TPC Member: 2002.
- International Conference on E-Commerce and Web (EC-WEB)
  - TPC Member: 2001.
- International Workshop on Service Portability and Virtual Customer Environments
  - TPC Member: 2000.
- International Workshop on Mobile Data Access (MDA)
  - Panel Chair: 1998.
  - TPC Member: 1998.

C. Reviews

1. **Proposal Reviews:**

- Reviewer for Earmarked Research Grant, Research Grants Council, Hong Kong, 2002-2003, 2006-2007.

- Panelist for Division of Information and Intelligent Systems, National Science Foundation, 2000, 2007.
- Panelist for Division of Computer & Network Systems, National Science Foundation, 2007.
- Reviewer for Faculty Early Career Development, National Science Foundation, 1998.

2. **Referee/Review for**:

- IEEE Transactions on Knowledge and Data Engineering;
- IEEE Transactions on Mobile Computing;
- IEEE Transactions on Computer;
- IEEE Transactions on Parallel and Distributed Systems;
- IEEE Transactions on Vehicular Technology;
- IEEE Communications Magazine;
- ACM Journal on Wireless Networks;
- ACM Journal on ACM Mobile Networks and Applications;
- Very Large Data Base Journal;
- Distributed and Parallel Database Journal;
- Pervasive and Mobile Computing Journal;
- Data & Knowledge Engineering Journal;
- Information Science: an International Journal;
- Signal Processing: an International Journal;
- Computational Intelligence Journal;
- The Computer Journal;
- Journal of Parallel and Distributed Computing;
- Journal of Information Science and Engineering;
- Journal of Photogrammetry and Remote Sensing;
- Journal of Communications and Networks;
- ACM International Conference on SIGMOD;
- IEEE International Phoenix Conference on Computers and Communications;
- IEEE International Symposium on Personal, Indoor and Mobile Radio Communications;
- IEEE International Workshop on Distributed Systems: Operations and Management;
- International Symposium on Software Engineering for Parallel and Distributed Systems.

Courses Taught

- CSE441W: Introduction to Database Management Systems (Penn State University/Spring'03, Spring '04, Spring '05, Spring'06, Spring'07)
- CSE541: Database System I (Penn State University/Fall'02, Fall'03, Fall '05, Fall'06)
- CSE542: Advanced Database Systems (Penn State University/Fall'04)
- CSE597B: Location Based Services (Penn State University/Spring'07)
- CSE597B: Spatial Data Management in Pervasive Computing (Penn State University/Fall'03)
- CSE597F: Web Database and Mobile Computing (Penn State University/Spring'02)
- CS542: Database Management Systems (Worcester Polytechnic Institute/Fall'01).
- CIS201: Elementary Computer Programming (Ohio State University).
- CIS211: Computer Programming for Problem Solving (Ohio State University).

Short Courses

- Outstanding Scholar Series Lectures: Spatial Data Management in Pervasive Computing (Short Course, National Chiao Tung University, Taiwan, Summer 2006).
- Outstanding Scholar Series Lectures: Spatial Data Management in Pervasive Computing (Short Course, National Dong Hwa University, Taiwan, Summer 2005).

Industry Listing

- Listed in International Who's Who of Information Technology, 1999 Edition.

Professional Memberships and Honors

- Member of IEEE.
- Member of Association for Computer Machinery.
- Member of Upsilon Pi Epsilon Association --- the Scholastic Society for Computer Science.

Research Summary

Dr. Wang-Chien Lee is a non-traditional database researcher.

Dr. Lee performs cross-area research in ***database systems***, ***pervasive/mobile computing***, and ***networking***. He is particularly interested in developing data management techniques (including accessing, indexing, caching, aggregation, dissemination, and query processing) for supporting complex queries in a wide spectrum of networking and mobile environments such as peer-to-peer networks, mobile ad-hoc networks, wireless sensor networks, and wireless broadcast systems. He is one of the first few pioneers who started research in the area of mobile and pervasive data access. His research on indexing, caching, data allocation and query processing has been well received in the field and inspired a number of follow-up works. The signature schemes he proposed for wireless information filtering [DAPD 1996] have become a classical energy efficient indexing technique for wireless data broadcast services. The performance evaluation of a wireless hierarchical data dissemination system that integrates the various techniques he developed [MobiCom 1999] is one of the most cited papers in data dissemination. These research results can be used in wireless data services such as MSN Direct and may have practical impact on work in standard bodies (e.g., the Broadcast and Multicast Service for CDMA2000 Wireless IP network, being developed by the Third Generation Partnership Project 2 (http://www.3gpp2.org/). Dr. Lee is one of the earliest researchers working on location-based services. His visionary paper "Data Management in Location-Dependent Information Services" (published in IEEE Pervasive Computing, 2002) is one of the most cited papers in the area of location-based services (60 citations based on Google Scholar). Dr. Lee's research is broad. His research also covers object-oriented databases, XML, security, and information integration and retrieval. He has published over 100 technical papers, many in leading conferences and journals, including ACM Mobicom, ACM MobiSys, IEEE ICDE, IEEE ICDCS, IEEE ICNP, IEEE PerCom, IEEE INFOCOM, IEEE HPDC, IEEE TKDE, IEEE TPDS, IEEE TMC, and VLDB Journal. The following is a summary of his contribution in some of his research areas. More work can be found in his web site: http://www.cse.psu.edu/~wlee.

Mobile and Pervasive Data Access

Efficient data access for mobile and pervasive computing is a field of increasing importance for a wide range of mobile businesses and applications. It will be a key technology as ubiquitous wireless connectivity becomes a reality. Dr. Lee has been studying several fundamental issues in data and resource management of mobile computing systems, including: indexing and caching for reducing power consumption and increasing data access efficiency, data allocation for multiple wireless communication channels, cache invalidation and replacement policy for wireless data dissemination, and performance modeling and evaluation for wireless data access. While many of his work focused on system issues, Dr. Lee also addresses application requirements such as *timeliness* and *security*. He has developed a novel on-demand broadcast scheduling algorithm by taking into consideration the *urgency of requests* and the *number of outstanding requests*. He has investigated the tradeoff between performance and confidentiality of signature-based air indexes in terms of their relationships to false drop and false guess probabilities of the signatures. This is the first time the issue of confidentiality loss in air indexing has been identified and discussed in the literature. Additionally, an efficient key management scheme, *KTR*, has been developed to for access control of broadcast data. KTR allows multiple broadcast programs share a single key tree such that the users subscribing these programs need to hold only a small number of keys. In this scheme, rekey cost is minimized by identifying the minimum set of keys that must be changed to ensure broadcast security. This is also the first time a key management scheme being proposed for wireless data broadcast. Research result has been published in prestigious conferences and journals in the field, such as ACM MobiSys, ACM MobiCom, ACM CIKM, IEEE ICDE, IEEE ICDCS, IEEE HPDC, IEEE TKDE, IEEE TPDS, IEEE TMC, ACM Wireless Network Journal, and ACM Mobile Networks and Applications Journal.

Location-Based Services

Location-based services (LBSs) have emerged as one of the killer applications for mobile computing and wireless data services. These LBSs are critical to transportation, disaster management, emergency response, and public safety, while providing great market values to companies and industries. Efficient processing of location-based spatial queries (LBSQs), which refer to a set of spatial queries that retrieve information based on the current locations of mobile users, is crucial to the provision of LBSs. Dr. Lee has been studying new ways of indexing and caching spatial data to support the processing of LBSQs including point query, planar point query, window query, nearest neighbor search, k nearest neighbor search, continuous nearest neighbor search, spatial join, and other complex spatial queries. In addition to the traditional point-to-point communication channels, he is also interested in broadcast channels, which can serve a large number of mobile users simultaneously and thus naturally scale up the services to meet heavy demands. Fundamental issues faced by all the spatial indexes and caching schemes (such as large index search space, large index size, linear streaming property of wireless data broadcast, continuous movement and requests of mobile users, and cache replacement/invalidation) have been tackled. Query processing algorithms and new mobile caching mechanisms have been developed in support of various spatial queries for mobile users. Research in this direction is supported in part by an NSF grant. The result is expected to have significant impacts on advancing the fields of spatial databases and pervasive computing. Research result in this direction has been published in prestigious journals and conferences, such as VLDB Journal, IEEE TKDE, IEEE ICDCS, and IEEE ICDE.

Peer-to-Peer (P2P) Computing

Peer-to-peer (P2P) computing has received a lot of attention due to the popularity of applications such as SETI, Napster, Gnutella, Morpheus and BitTorrent. The goal of Dr. Lee's research in this area is to build data management systems in support of complex queries and applications on P2P networks. He has been working on developing overlay networks and search algorithms for those queries. He started the research by attacking research issues related to the P2P search problem. A new indexing mechanism, called *neighborhood signatures*, has been proposed for focusing P2P searches along selective network paths instead of taking arbitrary paths blindly. This technique trades a small amount of storage overhead for significant reduction of overall network traffic. In addition, recognizing the need for using semantic information in P2P search, a novel overlay network infrastructure, called *semantic small world (SSW)*, has been developed for P2P systems. The idea is to organize peers with semantically similar data closer to each other into clusters and to form a small world overlay network. SSW is shown to be much more scalable to very large network sizes and very large numbers of data objects compared to other state-of-the-art semantic-based search techniques for P2P systems. In addition, SSW is adaptive to distribution of data and locality of interest; is very resilient to failures; and has excellent load balancing property. More recently, Dr. Lee has developed an efficient and scalable P2P system based on a new technique, called *Networked R-Tree (NR-Trees).* NR-trees facilitate the processing of complex multi-dimensional queries (including both range and KNN queries) in P2P networks. Research result has been published in leading journals and conferences in the area such as IEEE TPDS, IEEE ICNP and IEEE ICDCS.

Location-Aware Wireless Sensor Networks

Wireless sensor networks have recently received a lot of attention due to a wide range of applications such as object tracking, environmental monitoring, and health care. In these applications, physical data is continuously collected by the sensor nodes in order to facilitate application specific processing and analysis. The goal of Dr. Lee's research in this area is to *build data management systems for wireless sensor networks* in support of data collection, aggregation, dissemination, in-network query processing and query optimization. Dr. Lee is particularly interested in *location-aware wireless sensor networks* since sensor network applications typically are concerned more about physical phenomena or events associated with a *geographical location* or *region* than the

raw data on a specific sensor node. His research effort is focused on: 1) location tracking of moving objects; 2) location-based routing; 3) complex query processing (including window, KNN, and aggregation queries). Two prediction-based energy saving methods have been developed to reduce energy consumption of the sensor nodes in object tracking sensor networks for their *monitoring* and *reporting* activities, respectively. In addition, an innovative technique (called *EASE*) is developed to efficiently answer *approximate location queries* in object tracking sensor networks by keeping error-bounded imprecise location data at some designated storage nodes. Moreover, a novel stateless spatial routing protocol, called *PSGR*, for location-aware sensor networks was developed. Based on PSGR, sensor nodes can locally determine their priority to relay a message using dynamically estimated network density. PSGR effectively suppresses potential communication collisions without prolonging routing delays. Finally, two in-network processing algorithms have been developed for k nearest neighbors (KNN) queries: one is based on a distributed spatial index structure and the other one is based upon ad-hoc spatial routing. This is the first study on KNN query processing in wireless sensor networks. Research result in this direction has been published in selective journals and conferences such as IEEE TPDS, IEEE TKDE, IEEE PerCom, IEEE INFOCOM, IEEE MASS and IEEE SECON.