
JAWEI HAN: BIOGRAPHICAL SKETCH

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NAME Han, Jiawei (Email: hanj@cs.uiuc.edu) Tel (217) 333-6903. Fax (217) 265-6494		POSITION TITLE Professor, Computer Science, University of Illinois, Urbana, IL 6180, Web: www.cs.uiuc.edu/~hanj	
EDUCATION/TRAINING (<i>Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.</i>)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Univ. of Wisconsin - Madison	Ph.D.	1985	Computer Sciences
Univ. of Wisconsin - Madison	M.S.	1981	Computer Sciences
Univ. of Science and Technology of China	B.S. (equiv)	1979	Information Science

A. Positions and Honors

Positions and Appointments

- 1986-1987 Assistant Professor of Computer Science, Northwestern University, Illinois, U.S.A.
1987-2001 Assistant (1987-1991), Associate (1991-1995), Full (1995-2001) and University Endowed (1999-2001) Professor, Computing Science, Simon Fraser University, B.C., Canada
2001-present Professor, Computer Science, Univ. of Illinois at Urbana-Champaign, Illinois, U.S.A.

Other Experience and Professional Memberships

- 1983-present Member of ACM, Board member: ACM SIGKDD Executive Committee since 2001, Fellow since 2004
1983-present Member of IEEE Computer Society, senior member since 2003
1996-2000 Associate Editor, IEEE Transactions on Knowledge and Data Engineering (TKDE)
1997-present Member of Editorial Board, (Journal of) Data Mining and Knowledge Discovery (DMKD)
1997-present Member of Editorial Board, International Journal of Intelligent Information Systems (JIIS)
2005-present Editor-in-Chief, ACM Transactions on Knowledge Discovery from Data (TKDD)

Awards and Honors (since 2002)

- 2002 **The Outstanding Contribution Award (IEEE)**, at 2002 Int. Conf. on Data Mining
2002-2005 **IBM Faculty Awards**, for three consecutive years (2002-2003, 2003-2004, 2004-2005)
2004 **Fellow of ACM**
2004 **ACM SIGKDD Innovations Award**
2005 **IEEE Computer Society 2004 Technical Achievement Award**

Other Synergistic Activities

- **Serving on program committees** for more than 50 international conferences or workshops, including (1) *ACM SIGKDD Curriculum Committee Chairman* (2003-), *ACM SIGKDD Award Chairman* (1998-1999), *ACM SIGKDD Supervisory Committee member* (1998-2001), (2) *ACM SIGMOD Int. Conf's on Management of Data (SIGMOD'03, SIGMOD'02, SIGMOD'00-demo chairman)*, (3) *Int. Conf.'s on Knowledge Discovery and Data Mining (KDD'02-Student Award chairman, KDD'01-Best Paper Award chairman, KDD'98-Tutorial chairman, KDD'96-PC co-chairman)*, (4) *SIAM Int. Conf.'s on Data Mining (SDM'02 and SDM'01 PC co-chairman)*, (5) *Int. Conf.'s on Data Engineering (ICDE'04, ICDE'02 and ICDE'95 PC vice-chairman)*, (6) *Int. Conf.'s on Data Mining (ICDM'05 PC co-chairman)*, (7) *Int. Conf.'s on Very Large Databases (VLDB'06: Americas chairman)*, (8) *Int. Symp. Scientific & Statistical Database Management Systems (SSDBMS'01-04)*, etc.
- **Tutorials and invited speeches (since 2000)**: (1) (*tutorial*) for PAKDD'04, KDD'03, KDD'01, PAKDD'01, etc., (2) (*Data Mining course tutor*) for UCLA Extension (1998-2002), Univ. of Pisa (2001), NASA Jet Propulsion Lab (2000), (3) (*invited speaker*) for ICDM'02, British Nat. Conf. Databases (BNCOD'02), 2001 Int. Conf. on Case-Based Reasoning (ICBR'01), 2001 Conf. of (German) Society on Classification, etc. (4) *invited speaker* in universities and industry: IBM T. J. Watson Research Center (U.S.A.) (2002-2004), Univ. Technology, Sydney (2004), Univ. New South Wales (2004), Univ. Victoria (2004), Univ. Queensland (2004), Univ. Texas-Austin (2003), Rutgers Univ. (2003), Ohio State Univ. (2003), Purdue Uni. (2002), Univ. of Maryland (2002), Univ. of Illinois at Chicago (2002), etc.
- **Graduate students supervision**: Graduated 11 Ph.D.'s and over 30 Masters, supervising 14 Ph.D. students.

B. Selected Peer-Reviewed Publications since Year 2000 (in chronological order):

Books and (Edited) Conference Proceedings

1. J. Han and M. Kamber, *Data Mining: Concepts and Techniques*, (Foreword by Jim Gray), Morgan Kaufmann, 2001.
2. H. J. Miller and J. Han (eds.), *Geographic Data Mining and Knowledge Discovery*, Taylor & Francis, 2001
3. R. L. Grossman, J. Han, and V. Kumar (eds.), *Proceedings of the 1st SIAM Int. Conf. on Data Mining (SDM-2001)*, SIAM, Philadelphia, 2001.
4. R. L. Grossman, J. Han, V. Kumar, H. Mannila, and R. Motwani (eds.), *Proceedings of the 2nd SIAM Int. Conf. on Data Mining (SDM-2002)*, SIAM, Philadelphia, 2002.

Selected Articles in Refereed Journals since 2000

1. N. Stefanovic, J. Han, and K. Koperski, "Object-Based Selective Materialization for Efficient Implementation of Spatial Data Cubes," *IEEE Trans. Knowledge and Data Engineering*, 12(6):938-958, 2000.
2. H. Lu, L. Feng, and J. Han, "Beyond Intra-Transaction Association Analysis: Mining Multi-Dimensional Inter-Transaction Association Rules", *ACM Trans. Information Systems*, 18(4):423-454, 2000.
3. D. Cheung, C. Hwang, A. Fu, and J. Han, "Efficient Rule-Based Attributed-Oriented Induction for Data Mining", *Journal of Intelligent Information Systems*, 15(2): 175-200, 2000.
4. J. Han and K. C.-C. Chang, "Data Mining for Web Intelligence", *COMPUTER*, 35(11):64-70, 2002.
5. L. Feng, J. X. Yu, H. Lu, and J. Han, "A Template Model Multidimensional Inter-transactional Association Rules", *VLDB Journal*, 11(2):153-175, 2002.
6. J. Han, R. B. Altman, V. Kumar, H. Mannila and D. Pregibon, "Emerging Scientific Applications in Data Mining", *Communications of ACM*, 45(8):54-58, 2002.
7. A. K. H. Tung, H. Lu, J. Han, and L. Feng, "Breaking the Barrier of Transactions: Mining InterTransaction Association Rules", *IEEE Trans. Knowledge and Data Engineering*, 15(1): 43-56, 2003.
8. K. Wang, Y. He and J. Han, "Pushing Support Constraints into Association Mining", *IEEE Trans. Knowledge and Data Engineering*, 15(3): 642-658, 2003.
9. Y. Lu and J. Han, "Cancer classification using gene expression data", *Information Systems (Special Issue on Data Management in Bioinformatics)*, 28(4): 243-268, 2003.
10. A. Doan, Y. Lu, Y. Lee, and J. Han, "Profile-Based Object Matching for Information Integration", *IEEE Intelligent System*, 18(5):54-59, 2003.
11. J. Pei, J. Han, and L. V. S. Lakshmanan, "Pushing Convertible Constraints in Frequent Itemset Mining", *Data Mining and Knowledge Discovery*, 8(3):227-252, 2004
12. G. Dong, J. Han, J. Lam, J. Pei, K. Wang, and W. Zou, "Mining Constrained Gradients in Multi-Dimensional Databases", *IEEE Transactions on Knowledge and Data Engineering*, 16(5):922-938, 2004.
13. H. Yu, J. Han, K. C.-C. Chang, "PEBL: Web Page Classification Without Negative Examples", *IEEE Transactions on Knowledge and Data Engineering (Special Issue on Mining and Searching the Web)*, 16(1):70-81, 2004.
14. J. Han, J. Pei, and X. Yan, "From Sequential Pattern Mining to Structured Pattern Mining: A Pattern-Growth Approach", *Journal of Computer Science and Technology*, 19(3):257-279, 2004.
15. J. Han, J. Pei, Y. Yin and R. Mao, "Mining Frequent Patterns without Candidate Generation: A Frequent-Pattern Tree Approach", *Data Mining and Knowledge Discovery*, 8(1):53-87, 2004.
16. J. Pei, G. Dong, W. Zou, and J. Han, Mining Condensed Frequent Pattern Bases, *Knowledge and Information Systems*, 6(5):570-594, 2004.
17. J. Pei, J. Han, B. Mortazavi-Asl, J. Wang, H. Pinto, Q. Chen, U. Dayal, and M.-C. Hsu, "Mining Sequential Patterns by Pattern-Growth: The PrefixSpan Approach", *IEEE Trans. Knowledge and Data Engineering*, 16(11):1424-1440, 2004.
18. K. Wang, Y. Jiang, J. X. Yu, G. Dong, and J. Han, "Divide-and-Approximate: A Novel Constraint Push Strategy for Iceberg Cube Mining", *IEEE Trans. Knowledge and Data Engineering*, 17(3):354-368, 2005.
19. J. Wang, J. Han, Y. Lu, and P. Tzvetkov, "TFP: An Efficient Algorithm for Mining Top-K Frequent Closed Itemsets", *IEEE Trans. Knowledge and Data Engineering*, 17(5):652-664, 2005.
20. H. Hu, X. Yan, Yu, J. Han and X. J. Zhou, "Mining Coherent Dense Subgraphs across Massive Biological Networks for Functional Discovery", *Bioinformatics*, 2005. (Also, Proc. 2005 Int. Conf. on Intelligent Systems for Molecular Biology (ISMB 2005), Ann Arbor, MI, June 2005.)

Selected Papers in Refereed Conf. Proceedings and Books since 2000 (Other Pubs omitted for lack of space)

1. J. Han, J. Pei, and Y. Yin, "Mining Frequent Patterns without Candidate Generation", Proc. 2000 ACM-SIGMOD Int. Conf. on Management of Data (SIGMOD'00), Dallas, TX, May 2000, pp. 1-12.
2. K. Wang, Y. He and J. Han, "Mining Frequent Itemsets Using Support Constraints", Proc. 2000 Int. Conf. on Very Large Data Bases (VLDB'00), Cairo, Egypt, pp. 43-52.
3. J. Han, A. K. H. Tung, and J. He, "SPARC: Spatial Association Rule-based Classification", R. L. Grossman, et al. (eds.), *Data Mining for Scientific and Engineering Applications*, Kluwer Academic Publishers, 2001, pp. 461-486.
4. K. H. Tung, J. Han, L. V. S. Lakshmanan, and R. T. Ng, "Constraint-Based Clustering in Large Databases", Proc. 2001 Int. Conf. on Database Theory (ICDT'01), London, U.K., Jan. 2001, pp. 405-419.

5. K. H. Tung, J. Hou, and J. Han, "Spatial Clustering in the Presence of Obstacles", Proc. 2001 Int. Conf. on Data Engineering (ICDE'01), Heidelberg, Germany, April 2001, pp. 359-367.
6. J. Pei, J. Han, and L. V. S. Lakshmanan, "Mining Frequent Itemsets with Convertible Constraints", Proc. 2001 Int. Conf. on Data Engineering (ICDE'01), Heidelberg, Germany, April 2001, pp. 433-332.
7. J. Han, J. Pei, G. Dong, and K. Wang, "Efficient Computation of Iceberg Cubes with Complex Measures", Proc. 2001 ACM-SIGMOD Int. Conf. on Management of Data (SIGMOD'01), Santa Barbara, CA, May 2001, pp. 1-12.
8. L. V. S. Lakshmanan, J. Pei, and J. Han, "Quotient Cube: How to Summarize the Semantics of a Data Cube", Proc. 2002 Int. Conf. on Very Large Data Bases (VLDB'02), Hong Kong, China, Aug. 2001.
9. W. Jin, K.H. Tung and J. Han, "Mining Top-n Local Outliers in Large Databases", Proc. 2001 Int. Conf. on Knowledge Discovery in Databases (KDD'01), San Fransisco, California, Aug. 2001, pp. 293-298.
10. G. Dong, J. Han, J. Lam, J. Pei, and K. Wang, "Mining Multi-Dimensional Constrained Gradients in Data Cubes", Proc. 2001 Int. Conf. on Very Large Data Bases (VLDB'01), Rome, Italy, Sept. 2001, pp. 321-330.
11. W. Li, J. Han, and J. Pei, "CMAR: Accurate and Efficient Classification Based on Multiple Class Association Rules", Proc. 2001 Int. Conf. on Data Mining (ICDM'01), San Jose, CA, Nov. 2001.
12. J. Pei, J. Han, H. Lu, S. Nishio, S. Tang, and D. Yang, "H-Mine: Hyper-Structure Mining of Frequent Patterns in Large Databases", Proc. 2001 Int. Conf. on Data Mining (ICDM'01), San Jose, CA, Nov. 2001.
13. K. Wang, S. Zhou, and J. Han, "Profit Mining: From Patterns to Actions", Proc. 2002 Int. Conf. on Extending Data Base Technology (EDBT'02), Prague, Czech, March 2002.
14. J. Yang, P. Yu, W. Wang, and J. Han, "Mining Long Sequential Patterns in a Noisy Environment", Proc. 2002 ACM-SIGMOD Int. Conf. on Management of Data (SIGMOD'02), Madison, WI, June 2002.
15. H. Yu, J. Han, and K. C.-C. Chang, "*PEBL: Positive Example Based Learning for Web Page Classification Using SVM*", Proc. 2002 Int. Conf. on Knowledge Discovery in Databases (KDD'02), Edmonton, Canada, July 2002.
16. J. Liu, Y. Pan, K. Wang, and J. Han, "*Mining Frequent Item Sets by Opportunistic Projection* ", Proc. 2002 Int. Conf. on Knowledge Discovery in Databases (KDD'02), Edmonton, Canada, July 2002.
17. L. V. S. Lakshmanan, J. Pei, and J. Han, "Quotient Cube: How to Summarize the Semantics of a Data Cube", Proc. 2002 Int. Conf. on Very Large Data Bases (VLDB'02), Hong Kong, China, Aug. 2002.
18. J. Pei, J. Han, and W. Wang, "Mining Sequential Patterns with Constraints in Large Databases", Proc. 2002 Int. Conf. on Information and Knowledge Management (CIKM'02), McLean, VA, Nov. 2002, pp.18-25.
19. X. Yan and J. Han, "gSpan: Graph-Based Substructure Pattern Mining", Proc. 2002 Int. Conf. on Data Mining (ICDM'02), Maebashi, Japan, Dec. 2002, pp. 721-724.
20. J. Han, J. Wang, Y. Lu, and P. Tzvetkov, "Mining Top-K Frequent Closed Patterns without Minimum Support", Proc. 2002 Int. Conf. on Data Mining (ICDM'02), Maebashi, Japan, Dec. 2002, pp. 211-218.
21. K. Wang, Y. Jiang, J. X. Yu, G. Dong, and J. Han, "Pushing Aggregate Constraints by Divide-and-Approximate", Proc. 2003 Int. Conf. on Data Engineering (ICDE'03), Bangalore, India, March 2003.
22. X. Yan, J. Han, and R. Afshar, "CloSpan: Mining Closed Sequential Patterns in Large Datasets", Proc. 2003 SIAM Int. Conf. on Data Mining (SDM'03), San Fransisco, CA, May 2003, pp. 166-177.
23. X. Yin and J. Han, "CPAR: Classification based on Predictive Association Rules", Proc. 2003 SIAM Int. Conf. on Data Mining (SDM'03), San Fransisco, CA, May 2003, pp. 331-335.
24. X. Yan and J. Han, "CloseGraph: Mining Closed Frequent Graph Patterns", Proc. 2003 ACM SIGKDD Int. Conf. on Knowledge Discovery and Data Mining (KDD'03), Washington, D.C., Aug. 2003, pp. 286-295.
25. H. Yu, J. Yang, and J. Han, "Classifying Large Data Sets Using SVM with Hierarchical Clusters", Proc. 2003 ACM SIGKDD Int. Conf. on Knowledge Discovery and Data Mining (KDD'03), Washington, D.C., Aug. 2003, pp. 306-315.
26. J. Wang, J. Han, and J. Pei, "CLOSET+: Searching for the Best Strategies for Mining Frequent Closed Itemsets", Proc. 2003 ACM SIGKDD Int. Conf. on Knowledge Discovery and Data Mining (KDD'03), Washington, D.C., Aug. 2003, pp. 236-245.
27. H. Wang, W. Fan, P. S. Yu, and J. Han, "Mining Concept-Drifting Data Streams using Ensemble Classifiers", Proc. ACM SIGKDD Int. Conf. Knowledge Discovery and Data Mining (KDD'03), Washington, D.C., Aug. 2003, pp. 226-235.
28. H. Yu, J. Yang, W. Wang, and J. Han, "Discovering Compact and Highly Discriminative Features or Feature Combinations of Drug Activities Using Support Vector Machine", Proc. 2003 IEEE Computer Society Bioinformatics Conf. (CSB'03), Stanford, California, Aug. 2003, pp. 220-228.
29. C. Aggarwal, J. Han, J. Wang, and P. S. Yu, "A Framework for Clustering Evolving Data Streams", Proc. 2003 Int. Conf. on Very Large Data Bases (VLDB'03), Berlin, Germany, Sept. 2003, pp. 81-92.
30. D. Xin, J. Han, X. Li, and B. W. Wah, "Star-Cubing: Computing Iceberg Cubes by Top-Down and Bottom-Up Integration", Proc. 2003 Int. Conf. on Very Large Data Bases (VLDB'03), Berlin, Germany, Sept. 2003, pp. 476-487.
31. P. Bajcsy, J. Han, L. Liu, J. Yang, "Survey of Bio-Data Analysis from Data Mining Perspective", Chapter 2 of D. Shasha, et al. (eds.), *Data Mining in Bioinformatics*, Springer Verlag, 2004, pp. 9-39.
32. H. Yu, A. Doan, and J. Han, "Mining for Information Discovery on the Web: Overview and Illustrative Research", N. Zhong and J. Liu (eds.), *Intelligent Technologies for Information Analysis*, Springer Verlag, 2004, pp. 131-163.

33. C. Giannella, J. Han, J. Pei, X. Yan and P.S. Yu, "Mining Frequent Patterns in Data Streams at Multiple Time Granularities", H. Kargupta, A. Joshi, K. Sivakumar, and Y. Yesha (eds.), Data Mining: Next Generation Challenges and Future Directions, AAAI/MIT Press, 2004.
34. X. Yin, J. Han, J. Yang, and P. S. Yu, "CrossMine: Efficient Classification across Multiple Database Relations", Proc. 2004 Int. Conf. on Data Engineering (ICDE'04), Boston, MA, March 2004, pp. 399-410.
35. J. Wang and J. Han, "BIDE: Efficient Mining of Frequent Closed Sequences", Proc. 2004 Int. Conf. on Data Engineering (ICDE'04), Boston, MA, March 2004, pp. 79-90.
36. Z. Shao, J. Han, and D. Xin, "MM-Cubing: Computing Iceberg Cubes by Factorizing the Lattice Space", Proc. 2004 Int. Conf. Scientific and Statistical Database Management (SSDBM'04), Santorini, Greece, June 2004, pp. 213-222.
37. Y. Li, J. Yang, and J. Han, "Continuous K-Nearest Neighbor Search for Moving Objects", Proc. 2004 Int. Conf. Scientific and Statistical Database Management (SSDBM'04), Santorini, Greece, June 2004, pp. 123-126.
38. X. Yan, P. S. Yu, and J. Han, "Graph Indexing: A Frequent Structure-based Approach", Proc. 2004 ACM-SIGMOD Int. Conf. on Management of Data (SIGMOD'04), Paris, France, June 2004, pp. 335-346.
39. X. Li, J. Han, and H. Gonzalez, "High-Dimensional OLAP: A Minimal Cubing Approach", Proc. 2004 Int. Conf. on Very Large Data Bases (VLDB'04), Toronto, Canada, Aug. 2004, pp. 528-539.
40. C. Aggarwal, J. Han, J. Wang, and P. S. Yu, "A Framework for Projected Clustering of High Dimensional Data Streams" Proc. 2004 Int. Conf. on Very Large Data Bases (VLDB'04), Toronto, Canada, Aug. 2004, pp. 852-863.
41. B. He, K. C.-C. Chang, and J. Han, "Discovering Complex Matchings across Web Query Interfaces: A Correlation Mining Approach", Proc. 2004 Int. Conf. on Knowledge Discovery and Data Mining (KDD'04), pp. 148-157.
42. C. Aggarwal, J. Han, J. Wang, and P. S. Yu. "On Demand Classification of Data Streams", Proc. 2004 Int. Conf. on Knowledge Discovery and Data Mining (KDD'04), Seattle, WA, Aug. 2004, pp. 503-508.
43. Y. Li, J. Han, and J. Yang. "Clustering Moving Objects", Proc. 2004 Int. Conf. on Knowledge Discovery and Data Mining (KDD'04), Seattle, WA, Aug. 2004, pp. 617-622.
44. A. Wu, M. Garland, and J. Han, "Mining Scale-Free Networks using Geodesic Clustering", Proc. 2004 Int. Conf. on Knowledge Discovery and Data Mining (KDD'04), Seattle, WA, Aug. 2004, pp. 719-724.
45. H. Cheng, X. Yan, and J. Han, "IncSpan: Incremental Mining of Sequential Patterns in Large Database", Proc. 2004 Int. Conf. on Knowledge Discovery and Data Mining (KDD'04), Seattle, WA, Aug. 2004, pp. 527-532.
46. W. Jin, J. Han, and M. Ester, "Mining Thick Skylines over Large Databases", Proc. 2004 European Conf. on Principles of Principles and Practice of Knowledge Discovery in Databases (PKDD), Pisa, Italy, Sept. 2004, pp. 255-266
47. X. Yan, X. J. Zhou, J. Han, "Mining Closed Relational Graphs with Connectivity Constraints", Proc. 2005 Int. Conf. on Data Engineering (ICDE'05), Tokyo, Japan, April 2005.
48. X. Li, J. Han, X. Yin, and D. Xin, "Mining Evolving Customer-Product Relationships in Multi-Dimensional Space", Proc. 2005 Int. Conf. on Data Engineering (ICDE'05), Tokyo, Japan, April 2005.
49. X. Yan, P. S. Yu, and J. Han, "Substructure Similarity Search in Graph Databases", Proc. 2005 ACM-SIGMOD Int. Conf. on Management of Data (SIGMOD'05), Baltimore, Maryland, June 2005.
50. D. Xin, J. Han, X. Yan and H. Cheng, "Mining Compressed Frequent-Pattern Sets", Proc. 2005 Int. Conf. on Very Large Data Bases (VLDB'05), Trondheim, Norway, Aug. 2005.
51. X. Yan, X. J. Zhou, and J. Han, "Mining Closed Relational Graphs with Connectivity Constraints", Proc. 2005 Int. Conf. on Knowledge Discovery and Data Mining (KDD'05), Chicago, IL, Aug. 2005.
52. X. Yan, H. Cheng, J. Han, and D. Xin, "Summarizing Itemset Patterns: A Profile-Based Approach", Proc. 2005 Int. Conf. on Knowledge Discovery and Data Mining (KDD'05), Chicago, IL, Aug. 2005.
53. X. Yin, J. Han, and P.S. Yu, "Cross-Relational Clustering with User's Guidance", Proc. 2005 Int. Conf. on Knowledge Discovery and Data Mining (KDD'05), Chicago, IL, Aug. 2005.
54. S. Cong, J. Han, and D. Padua, "Parallel Mining of Closed Sequential Patterns", Proc. 2005 Int. Conf. on Knowledge Discovery and Data Mining (KDD'05), Chicago, IL, Aug. 2005.
55. C. Liu, X. Yan, L. Fei, J. Han, and S. Midkiff, "SOBER: Statistical Model-based Bug Localization", Proc. 2005 ACM SIGSOFT Symp. on the Foundations of Software Engineering (FSE 2005), Lisbon, Portugal, Sept. 2005.

B. Research Support

Current Research Support

1. NSF IIS-02-9199, Han (PI), July 2002—June 2005, "**Mining Sequential and Structured Patterns: Scalability, Flexibility, Extensibility and Applicability**".
2. NSF IIS-03-8215, Han (PI), Sept. 2003—Sept. 2006, "**Mining Dynamics of Data Streams in Multi-Dimensional Space**".
3. NSF ITR-03-25603, Torrellas (PI), Han (co-PI), Sept. 2003—Aug. 2008, "**ITR: Automatic On-the-fly Detection, Characterization, Recovery, and Correction of Software Bugs in Production Runs**".

Completed Research Support (Canadian Research Grants are Omitted for lack of space)

1. ONR, Han(co-investigator), July 2003—Aug. 2004, "**Mining Changes and Alarming Events in Streaming Data**"