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## EDUCATION

**Princeton University** **Princeton, NJ**
Ph.D. in Computer Science, June 1991; M.A. in Computer Science, February 1988. Awarded IBM Graduate Fellowship for academic years 1988-89, 1989-90; GTE Fellowship for Academic year 1987-88; NCR Fellowship for academic year 1986-87.

**Massachusetts Institute of Technology** **Cambridge, MA**
M.S. and B.S. in Computer Science and Engineering, September 1986.

## RESEARCH INTERESTS

Data privacy, particularly with respect to analysis of private data. This includes privacy-preserving data mining, data de-identification and anonymization, and limits on identifying individuals from data mining models. Data mining, including fairness issues in data mining, data mining of text and data mining techniques applied to interoperation of heterogeneous information sources. Fundamental data mining challenges posed by these applications include extracting knowledge from noisy data, identifying knowledge in highly skewed data (few examples of "interesting" behavior), and limits on learning. Database support for widely distributed and autonomously controlled information, particularly issues related to data privacy.

## PROFESSIONAL EXPERIENCE

**Purdue University** **August 2001 to Present**
Professor in the Department of Computer Sciences (Associate Professor to August 2013), interim head July 2023-June 2024, also Statistics (by courtesy) from 2011. Research on Data Mining and Database Management System Security. Taught graduate courses *Database Systems*, *Distributed Database Systems*, *Information Security*, *Advanced Information Assurance*, *Advanced Topics in Distributed Systems*; graduate seminars on *Data Mining and Security* and *Data Mining*; an undergraduate seminar *Introduction to Data Mining*; and the undergraduate courses *Introduction To Relational Database Systems*, *Web Information Search And Management*, *Data Mining And Machine Learning*, *Information Systems*, *Computer Architecture* and *Programming I*. Received 2009 College of Science Graduate Mentoring Award, 2010 College of Science Interdisciplinary Award, 2011, 2016 College of Science Team Award, 2011-2012 Teaching for Tomorrow Senior Faculty award, *Seeds for Success* awards in 2005, 2009, 2011.

**National Science Foundation** **September 2013 to June 2016**
Rotating program director in the Information & Intelligent Systems division of the Directorate for Computer & Information Science & Engineering.

**The MITRE Corporation** **September 1995 to August 2001**

Principal Scientist (promoted from Lead Scientist in 1999) in the Component Based Architectures & Data Management department of the Information Technology Center. Research on Database Management Systems for applications with loosely-structured data; in particular data mining for text and image databases. Director's Distinguished Accomplishment Award for Data Mining on Text and Imagery, August 1997; SPOT Recognition award for Knowledge Discovery in Text, September 1998; Program Recognition Award for GeoNODE, June 2000; Senior Vice President/General Manager's Award for Joint Battlespace Infosphere, February 2001.

**Northwestern University** **September 1991 to August 1995**
Assistant Professor in the Department of Electrical Engineering and Computer Science. Research on Database Management Systems for applications with loosely-structured data; in particular heterogeneous databases. Developed and taught a two quarter sequence *Software Project Management and Development*; also taught *Introduction to Computer Programming*, *Fundamentals of Computer System Software*, *Data Management and Information Processing*, *Introduction to Database Systems*, and a graduate seminar on *Heterogeneous Databases*.

**Matsushita Information Technology Laboratory** **June through August 1991**
Research on data management systems for office information.

**Princeton University** **September 1986 through June 1991**
Research on database support for multimedia. Thesis title: *HyperFile, a Database Manager for Documents* (Advisor: Professor Hector Garcia-Molina.) Teaching Assistant for *Introduction to Programming Systems* and *Database Systems*.

**Raritan Valley Community College** **January through May 1989**
Adjunct Faculty. Taught *Foundations of Computer Science*.

**Massachusetts Institute of Technology** **September 1985 through June 1986**
Thesis title: *Dynamic Load Balancing* (Advisors: Professor Nancy Lynch and Dr. Flaviu Cristian (IBM Almaden Research).) Teaching Assistant in the Department of Electrical Engineering and Computer Science: Recitation instructor for *Laboratory in Software Engineering*; Tutorial instructor for *Structure and Interpretation of Computer Programs*.

**I.B.M. Almaden Research** **Summers 1983 and 1984, January through August 1985**
Co-op student through the MIT VI-A program. Worked with a team of computer scientists studying fault tolerant computer systems using a cluster of processors. Responsible for creation of a system to prevent multiple management of a database given a communication failure, the development of a debugging system for programs spread across multiple processors, and the design and implementation of a dynamic load balancing system.

**Tektronix, Inc.** **September 1979 through August 1981, Summer 1982**
Software technician. Worked through a High school work-study program, as well as summers, as part of a team of 10 engineers responsible for development and maintenance of microprocessor cross-compilers on a CDC-175. Personally responsible for implementation and documentation, as well as partial development, of a microprocessor-based controller.

## BOOKS AND BOOK CHAPTERS

1. Algorithmic Bias Considerations Working Group, IEEE Std 7003™-2024 *IEEE Standard for Algorithmic Bias Considerations*, Software Systems Engineering Standards Committee of the IEEE Computer Society, 11 December 2024.
2. Chris Clifton, "Identity and Anonymity", Chapter 4 in *An Introduction to Privacy for Technology Professionals*, Travix Breaux, ed., International Association of Privacy Professionals, Inc., 2020 (revised 2024), pp. 149-175.
3. Mehmet Ercan Nergiz, Maurizio Atzori, and Chris Clifton, "$\delta$-Presence", chapter *Privacy metrics and data protection*, Sara Foresti, ed. in *Encyclopedia of Cryptography, Security and Privacy*, Sushil Jajodia, Pierangela Samarati, and Moti Yung, eds., Springer, 15 August 2021 (revised November 2024).
4. Christine Task and Chris Clifton, in "What should we protect? Defining differential privacy for social network analysis", *State of the Art Applications of Social Network Analysis*, Springer, 2014, pp. 139-161.
5. "Discovering Privacy", invited chapter in *Journeys to Data Mining: Experiences from 15 Renowned Researchers*, Mohamed Medhat Gaber, ed., Springer, 2012, pp. 51-59.
6. "Privacy-Preserving Data Mining", in *Encyclopedia of Database Systems*, Ling Liu and M. Tamer Ozsu, eds., Springer, 2009, pp. 1471-1472, 2137-2139, 2147-2150.
7. "Is Privacy Still an Issue for Data Mining?", Chris Clifton, Wei Jiang, Mummoorthy Murugesan, and M. Ercan Nergiz, Chapter 18 in *Next Generation of Data Mining*, Hillol Kargupta, Jiawei Han, Philip Yu, Rajeev Motwani, and Vipin Kumar (Eds.), CRC Press, 2008, pp. 359-376.
8. "Data Mining and Privacy: An Overview", Christopher W. Clifton, Deirdre K. Mulligan, and Raghu Ramakrishnan, in *Privacy and Technologies of Identity A Cross-Disciplinary Conversation*, Katherine Strandburg and Daniela Stan Raicu (Eds.), Springer-Verlag, 2006, pp. 191-208.
9. *Privacy-Preserving Data Mining*, Jaideep Vaidya, Michael Zhu, and Chris Clifton, Volume 19 in *Advances in Information Security*, Springer, 2005, 99p. (Also in Japanese, 2010.)
10. "Privacy-Preserving Data Mining", Chris Clifton, Murat Kantarcioglu and Jaideep Vaidya, in *Foundations and Advances in Data Mining*, Wesley Chu and T.Y. Lin, eds., Studies in Fuzziness and Soft Computing vol. 180, Springer-Verlag, 2005, pp. 309-340.
11. "Defining Privacy for Data Mining", Chris Clifton, Murat Kantarcioglu, and Jaideep Vaidya, in *Data Mining: Next Generation Challenges and Future Directions*, AAAI Press, 2004, pp. 255-272.
12. "Security and Privacy", Chapter 18 in *Handbook of Data Mining*, Lawrence Erlbaum Associates, Mahwah, NJ, April 2003, pp. 441-452.

## JOURNAL ARTICLES

13. Shalini Jangra, Durgi Toshniwal, and Chris Clifton, "Statistical Limitations of Sensitive Itemset Hiding Methods", *International Journal of Applied Intelligence* Springer Nature, Switzerland, July 2023.
14. Chris Clifton, Shawn Merrill, Eric Hanson, and Keith Merill, "Differentially Private k-Nearest Neighbor Missing Data Imputation", *ACM Transactons on Privacy and Security* 25(3): 1-23, August 2022.
15. "Support Vector Classification with l-diversity", Koray Mancuhan and Chris Clifton, *Computers & Security* 77:653-665, Elsevier, August 2018.
16. "Instance-Based Learning with l-diversity", Koray Mancuhan and Chris Clifton, *Transactions on Data Privacy* 10(3):203-235, December 2017.
17. "Anonymizing Transactional Datasets", Bechara al Bouna, Chris Clifton, and Qutaibah M. Malluhi, *Journal of Computer Security* 23(1):89-106, IOS Press, 2015.
18. "Combating Discrimination Using Bayesian Networks", Koray Mancuhan and Chris Clifton, *Artificial Intelligence and Law* 22(2):211-238 special issue on Computational Methods for Enforcing Privacy and Fair-

ness, Sergio Mascetti, Annarita Ricci, and Salvatore Ruggieri, eds., June 2014.

19. "On Syntactic Anonymity and Differential Privacy", Chris Clifton and Tamir Tassa, *Transactions on Data Privacy* 6(2):161-183, August 2013.
20. "t-Plausibility: Generalizing words to desensitize text", Balamurugan Anandan, Chris Clifton, Wei Jiang, Mummoorthy Murugesan, Pedro Pastrana-Camacho, and Luo Si, *Transactions on Data Privacy* 5(3):505-534, December 2012.
21. "Anonymous Search Histories Featuring Personalized Advertisement - Balancing Privacy with Economic Interests", Thorben Burghardt, Klemens Böhm, Achim Guttmann, and Chris Clifton, *Transactions on Data Privacy* 4(1):31-50, April 2011.
22. "Classifier Evaluation and Attribute Selection against Active Adversaries", Murat Kantarcioglu, Bowei Xi, and Chris Clifton, *Data Mining and Knowledge Discovery* 22(1-2):291-335, Springer, January 2011.
23. "Efficient Privacy-Preserving Similar Document Detection", Mummoorthy Murugesan, Wei Jiang, Chris Clifton, Luo Si, and Jaideep Vaidya, *The VLDB Journal* 19(4):457-475, August 2010.
24. "$\delta$-Presence Without Complete World Knowledge", M. Ercan Nergiz and Chris Clifton, *Transactions on Knowledge and Data Engineering* 22(6):868-883, IEEE Computer Society, Los Alamitos, CA, June 2010.
25. "MultiRelational k-Anonymity", Mehmet Ercan Nergiz, Chris Clifton, and Ahmet Erhan Nergiz, *Transactions on Knowledge and Data Engineering* 21(8):1104-1117, IEEE Computer Society, Los Alamitos, CA, August 2009.
26. "Privacy-Preserving Kth Element Score over Vertically Partitioned Data", Jaideep Vaidya and Chris Clifton, *Transactions on Knowledge and Data Engineering* 21(2):253-258, IEEE Computer Society, Los Alamitos, CA, February 2009.
27. "Privacy-Preserving Decision Trees over Vertically Partitioned Data", Jaideep Vaidya, Chris Clifton, Murat Kantarcioglu, and A. Scott Patterson, *ACM Transactions on Knowledge Discovery in Data* 2(3), October 2008. 27 pages.
28. "Privacy Preserving Naive Bayes Classification", Jaideep Vaidya, Murat Kantarcioglu, and Chris Clifton, *The VLDB Journal* 17(4):879-898, July 2008.
29. "Transforming Semi-Honest Protocols to Ensure Accountability", Wei Jiang, Chris Clifton, and Murat Kantarcioglu, *Data and Knowledge Engineering* 65(1):57-74 special section on "Privacy Aspects of Data Mining", Elsevier Science, Amsterdam, April 2008. Expanded version of PADM06 paper.
30. "An Approach to Identifying Beneficial Collaboration Securely in Decentralized Logistics Systems", Chris Clifton, Ananth Iyer, Richard Cho, Wei Jiang, Murat Kantarcioglu, and Jaideep Vaidya, *Manufacturing & Service Operations Management* 10(1):108-125, INFORMS, Linthicum, Maryland, Winter 2008.
31. "Thoughts on $k$-Anonymization", Mehmet Ercan Nergiz and Chris Clifton, *Data and Knowledge Engineering* 63(3):622-645, Elsevier Science, Amsterdam, December 2007. Invited article, expanded version of PDM06 paper.
32. "A Secure Distributed Framework for Achieving k-Anonymity", Wei Jiang and Chris Clifton, *The VLDB Journal* 15(4):316-333 Special Issue on Privacy-Preserving Data Management, November 2006.
33. "Secure Set Intersection Cardinality with Application to Association Rule Mining", Jaideep Vaidya and Chris Clifton, *Journal of Computer Security* 13(4):593-622, IOS Press, November 2005.
34. "Privacy Preserving Clustering with Distributed EM Mixture Modeling", Xiaodong Lin, Chris Clifton, and Michael Zhu, *Knowledge and Information Systems* 8(1):66-81, Springer-Verlag, London, July 2005.
35. "Privacy-Preserving Data Mining: Why, How, and What For?", Jaideep Vaidya and Chris Clifton, *IEEE Security & Privacy* 2(6):19-27, New York, NY, November/December 2004.
36. "Privacy Preserving Data Mining of Association Rules on Horizontally Partitioned Data", Murat Kantarcioglu and Chris Clifton, *IEEE Transactions on Knowledge and Data Engineering* 16(9):1026-1037, IEEE

Computer Society Press, Los Alamitos, CA, September 2004.

37. "TopCat: Data Mining for Topic Identification in a Text Corpus", Chris Clifton, Robert Cooley and Jason Rennie, *Transactions on Knowledge and Data Engineering* 16(8):949-964, IEEE Computer Society Press, Los Alamitos, CA, August 2004.

38. "Change Detection in Overhead Imagery using Neural Networks", *International Journal of Applied Intelligence* 18(2):215-234, Kluwer Academic Publishers, Dordrecht, The Netherlands, March 2003.

39. "Emerging Standards for Data Mining", Chris Clifton and Bhavani Thuraisingham, *Computer Standards and Interfaces* 23(3):187-193, Elsevier Science, Amsterdam, July 2001.

40. "Using Sample Size to Limit Exposure to Data Mining", invited article, *Journal of Computer Security* 8(4):281-307, IOS Press, November 2000. Expanded version of *Protecting Against Data Mining through Samples*.

41. "SEMINT: A Tool for Identifying Attribute Correspondences in Heterogeneous Databases Using Neural Networks", Wen-Syan Li and Chris Clifton, *Data and Knowledge Engineering* 33(1):49-84, Elsevier Science, Amsterdam, April 2000.

42. "Database Integration Using Neural Networks: Implementation and Experiences", Wen-Syan Li, Chris Clifton, and Shu-Yao Liu, *Knowledge and Information Systems* 2(1):73-96, Springer-Verlag, Singapore, February 2000.

43. "Multidatabase Query Processing with Uncertainty in Global Keys and Attribute Values", Peter Scheuermann, Wen-Syan Li, and Chris Clifton, *Journal of the American Society for Information Science* 49(3):283-301, John Wiley & Sons, Philadelphia, PA, March 1998.

44. "Dynamic Integration in Multidatabase Systems", Wen-Syan Li and Chris Clifton, *Journal of Database Management* 7(1):28-40, IDEA Group Publishing, Harrisburg, PA, Winter 1996.

45. "HyperFile: A Data and Query Model for Documents", Chris Clifton, Hector Garcia-Molina and David Bloom, *VLDB Journal* 4(1):100-141, The Boxwood Press, Pacific Grove, CA, March 1995.

**REFEREED CONFERENCES AND WORKSHOPS**

46. Chowdhury Mohammad Rakin Haider, Christopher W. Clifton, and Ming Yin, "Do Crowdsourced Fairness Preferences Correlate with Risk Perceptions?", *Proceedings of the 29th International Conference on Intelligent User Interfaces (IUI)*, Greenville, SC, March 18-21, 2024.

47. Yan Zhou, Murat Kantarcioglu, and Chris Clifton, "On Improving Fairness of AI Models with Synthetic Minority Oversampling Techniques", *SIAM International Conference on Data Mining (SDM23)*, Minneapolis, Minnesota, April 27 - 29, 2023.

48. Chowdhury Mohammad Rakin Haider, Chris Clifton, and Yan Zhou, "Unfair AI: It Isn't Just Biased Data", *22nd IEEE International Conference on Data Mining*, Orlando, Florida, November 28-December 1, 2022.

49. Chris Clifton and Farzad Zafarani, "Differentially Private Naive Bayes Using Smooth Sensitivity", *The 21st Privacy Enhancing Technologies Symposium*, online, July 12-16, 2021.

50. Chris Clifton, Eric Hanson, Keith Merrill, and Shawn Merrill, "A Partitioned Recoding Scheme for Privacy Preserving Data Publishing", *Privacy in Statistical Databases*, Tarragona, Catalonia, September 23-25, 2020.

51. Radhika Bhargava and Chris Clifton, "When is a Semi-Honest Secure Multiparty Computation Valuable?", *GameSec2019: The 10th Conference on Decision and Game Theory for Security*, Stockholm, Sweden, October 30-November 1, 2019.

52. "Anomaly Detection under Poisoning Attacks", Radhika Bhargava and Chris Clifton, *ODD v5.0: Outlier Detection De-constructed*, workshop held in conjunction with the *24th ACM SIGKDD international conference on Knowledge Discovery and Data Mining (KDD2018)*, London, UK, August 20, 2018.

53. "Differentially Private Feature Selection for Data Mining", Balamurugan Anandan and Chris Clifton, *4th ACM International Workshop on Security and Privacy Analytics (IWSPA 2018)* co-located with ACM CODASPY 2018, Tempe, Arizona, March 21, 2018.

54. "Privacy Preserving Distributed Weighted Bipartite Matching", Balamurugan Anandan and Chris Clifton, *2017 IEEE Conference on Dependable and Secure Computing*, Taipei, Taiwan, August 7-10, 2017.

55. "Towards a Framework for Developing Cyber Privacy Metrics: A Vision Paper", Bhavani M. Thuraisingham, Murat Kantarcioglu, Elisa Bertino, and Chris Clifton, *IEEE International Congress on Big Data*, Honolulu, Hawaii, June 25-30, 2017.

56. "Statistical Learning Theory Approach for Data Classification with l-Diversity", Koray Mancuhan and Chris Clifton, *2017 SIAM International Conference on Data Mining (SDM17)*, Houston, Texas, April 27-29, 2017.

57. "Differentially Private Significance Testing on Paired-Sample Data", Christine Task and Chris Clifton, *2016 SIAM International Conference on Data Mining (SDM16)*, Miami, Florida, May 5-7, 2016, pp. 153-161.

58. "Laplace noise generation for two-party computational differential privacy", Balamurugan Anandan and Chris Clifton, *Thirteen annual conference on Privacy, Security, and Trust (PST)*, July 21-23, 2015, Izmir, Turkey, pp. 54-61.

59. "Privacy-Integrated Graph Clustering Through Differential Privacy", Yvonne Mülle, Chris Clifton, and Klemens Böhm, *The 8th International Workshop on Privacy and Anonymity in the Information Society (PAIS)* collocated with EDBT/ICDT, March 27, 2015, Brussels, Belgium, pp. 247-254.

60. "Efficient Sanitization of Unsafe Data Correlations", Bechara al Bouna, Chris Clifton, and Qutaibah M. Malluhi, *The 8th International Workshop on Privacy and Anonymity in the Information Society (PAIS)* collocated with EDBT/ICDT, March 27, 2015, Brussels, Belgium, pp. 278-285.

61. "Realizable Rational Multiparty Cryptographic Protocols", with John Ross Wallrabenstein, *Conference on Decision and Game Theory for Security (GameSec 2014)*, Los Angeles, CA, November 6-7, 2014.

62. "Top-k frequent itemsets via differentially private FP-trees", with Jaewoo Lee, *20th ACM SIGKDD international conference on Knowledge discovery and data mining (KDD14)*, New York, August 24-27, 2014.

63. "Decision Tree Classification on Outsourced Data", with Koray Mancuhan *Workshop on Data Ethics* at the *20th ACM SIGKDD international conference on Knowledge discovery and data mining (KDD14)*, New York, August 24, 2014.

64. "Privacy Preserving Tatonnement; A Cryptographic Construction of an Incentive Compatible Market", with John Ross Wallrabenstein, *Financial Cryptography and Data Security (FC14)*, Barbados, March 3-7, 2014.

65. "Equilibrium Concepts for Rational Multiparty Computation", with John Ross Wallrabenstein, *Conference on Decision and Game Theory for Security (GameSec 2013)*, Fort Worth, TX, November 11-12, 2013.

66. "Maintaing Database Anonymity in the Presence of Queries", with Ryan Riley, Ahmet Erhan Nergiz, and Qutaibah Malluhi, 9th workshop on *Security and Trust Management* held in conjunction with *ESORICS 2013*, Egham, UK, September 12-13, 2013.

67. "Using Safety Constraint for Transactional Dataset Anonymization", with Bechara Al Bouna and Qutaibah Malluhi, *The 27th IFIP WG 11.3 Conference on Data and Applications Security and Privacy (DBSEC'13)*, Newark, New Jersey, July 15-17, 2013. Best Research Paper Award.

68. "Privacy through Uncertainty in Location-Based Services", with Shawn Merrill, Nilgün Basalp, Joachim Biskup, Erik Buchmann, Bart Kuijpers, Walied Othman, and Erkay Savas, *International Workshop on Privacy and Security for Moving Objects (PriSMO)* held in conjunction with *MDM 2013*, Milan, Italy, June 3, 2013, 6pp.

69. "On Syntactic Anonymity and Differential Privacy", with Tamir Tassa, *First Workshop on Privacy-Preserving Data Publication and Analysis* held at *ICDE 2013*, Brisbane, Australia, April 8-12, 2013, 6pp.

70. "Updating Outsourced Anatomized Private Databases", with Ahmet Erhan Nergiz and Qutaibah Malluhi, *16th International Conference on Extending Database Technology (EDBT)*, Genoa, Italy, March 18-22, 2013, 12pp.

71. "Discriminatory Decision Policy Aware Classification", Koray Mancuhan and Chris Clifton, *International Workshop on Discrimination and Privacy-Aware Data Mining (DPADM)* held at *ICDM 2012*, Brussels, Belgium, December 10, 2012, 8pp.

72. "A Guide to Differential Privacy Theory in Social Network Analysis", Christine Task and Chris Clifton, *The IEEE/ACM International Conference on Social Networks Analysis and Mining (ASONAM 2012)*, Istanbul, Turkey, August 26-29, 2012, 7pp.

73. "Differential Identifiability", Jaewoo Lee and Chris Clifton, *The 19th ACM SIGKDD Conference on Knowledge Discovery and Data Mining*, Beijing, China, August 12-16, 2012, 9pp.

74. "How much is enough? Choosing $\varepsilon$ for Differential Privacy", Jaewoo Lee and Chris Clifton, *The 14th Information Security Conference (ISC 2011)*, Xi'an, China, October 26-29, 2011, pp. 325-340.

75. "Significance of Term Relationships on Anonymization", Balamurugan Anandan and Chris Clifton *Web Intelligence for Information Security Workshop* in conjunction with *WI-IAT*, Lyon, France, August 22, 2011, pp. 253-256.

76. "Query Processing in Private Data Outsourcing Using Anonymization", Ahmet Erhan Nergiz and Chris Clifton, *The 25th IFIP WG 11.3 Conference on Data and Applications Security and Privacy (DBSEC-11)*, Richmond, Virginia, July 11-13, 2011, pp. 138-153.

77. "Search-Log Anonymization and Advertisement: Are They Mutually Exclusive?", Thorben Burghardt, Klemens Böhm, Achim Guttmann, and Chris Clifton, *The 19th ACM International Conference on Information and Knowledge Management (CIKM 2010)*, Toronto, Canada, October 26-30, 2010, pp. 1269-1272.

78. "Practical and Secure Integer Comparison and Interval Check", Ahmet Erhan Nergiz, Mehmet Ercan Nergiz, Thomas Pedersen, and Chris Clifton, *The 2010 IEEE International Conference on Privacy, Security, Risk and Trust (PASSAT2010)*, Minneapolis, Minnesota, August 20-22, 2010, pp. 791-799.

79. "t-Plausibility: Semantic Preserving Text Sanitization", Wei Jiang, Mummoorthy Murugesan, Chris Clifton, and Luo Si, *the 2009 IEEE International Conference on Privacy, Security, Risk and Trust (PASSAT-09)*, Vancouver, Canada, August 29-31, 2009, pp. 68-75.

80. "Providing Privacy through Plausibly Deniable Search", Mummoorthy Murugesan and Chris Clifton, *2009 SIAM International Conference on Data Mining (SDM09)*, Sparks, Nevada, April 30-May 2, 2009, pp. 768-779.

81. "Plausibly Deniable Search", Mummoorthy Murugesan and Chris Clifton, *Proceedings of the Workshop on Secure Knowledge Management (SKM 2008)*, Dallas, Texas, November 3-4, 2008.

82. "A Privacy Preserving Credentialing System for Health Care", Ahmet Erhan Nergiz and Chris Clifton, *Proceedings of the Workshop on Secure Knowledge Management (SKM 2008)*, Dallas, Texas, November 3-4, 2008.

83. "Similar Document Detection with Limited Information Disclosure", Wei Jiang, Mummoorthy Murugesan, Chris Clifton, and Luo Si, *Proceedings of the 24th International Conference on Data Engineering (ICDE 2008)*, Cancun, Mexico, April 7-12, 2008, pp. 735-743.

84. "Identifying Rare Classes with Sparse Training Data", Mingwu Zhang, Wei Jiang, Chris Clifton, and Sunil Prabhakar, *Proceedings of the 18th International Conference on Database and Expert Systems Applications*, Regensburg, Germany, September 4-7, 2007, pp. 751-760.

85. "Hiding the Presence of Individuals from Shared Databases", Mehmet Nergiz, Maurizio Atzori, and Chris

Clifton, *2007 ACM SIGMOD International Conference on Management of Data*, Beijing, China, June 11-14, 2007, pp. 665-676.

86. "AC-Framework for Privacy-Preserving Collaboration", Wei Jiang and Chris Clifton *2007 SIAM International Conference on Data Mining (SDM07)*, Minneapolis, Minnesota, April 26-28, 2007, pp. 47-56.

87. "MultiRelational k-Anonymity", Mehmet Ercan Nergiz and Ahmet Erhan Nergiz, *The 23rd IEEE International Conference on Data Engineering (ICDE 2007)*, Istanbul, Turkey, April 16-20, 2007, pp. 1417-1421.

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89. "Thoughts on k-Anonymization", Mehmet Ercan Nergiz and Chris Clifton, *The Second International Workshop on Privacy Data Management (PDM06)* held in conjunction with *The 22nd International Conference on Data Engineering*, Atlanta, Georgia, April 8, 2006, pp. 96-105.

90. "Privacy-Preserving Distributed k-Anonymity", Wei Jiang and Chris Clifton *The 19th Annual IFIP WG 11.3 Working Conference on Data and Applications Security*, August 7-10, 2005, Storrs, Connecticut, pp. 166-177.

91. "Security Issues in Querying Encrypted Data", Murat Kantarcioglu and Chris Clifton *The 19th Annual IFIP WG 11.3 Working Conference on Data and Applications Security*, August 7-10, 2005, Storrs, Connecticut, pp. 325-337.

92. "Privacy-Preserving Decision Trees over Vertically Partitioned Data", Jaideep Vaidya and Chris Clifton, *The 19th Annual IFIP WG 11.3 Working Conference on Data and Applications Security*, August 7-10, 2005, Storrs, Connecticut, pp. 139-152.

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96. "Privacy-Preserving Outlier Detection", Jaideep Vaidya and Chris Clifton, *The Fourth IEEE International Conference on Data Mining*, November 1-4, 2004, Brighton, UK, pp. 233-240.

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105. "Privacy Preserving Association Rule Mining in Vertically Partitioned Data", Jaideep Vaidya and Chris Clifton, *The Eighth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, July 23 - 26, 2002, Edmonton, Alberta, Canada, pp. 639-644.

106. "Privacy-preserving Distributed Mining of Association Rules on Horizontally Partitioned Data", Murat Kantarcioglu and Chris Clifton, *The ACM SIGMOD Workshop on Research Issues in Data Mining and Knowledge Discovery (DMKD'2002)*, June 2, 2002, Madison, Wisconsin, pp. 24-31.

107. "Coordinating Accessibility versus Restrictions in Distributed Object Systems", Arnon Rosenthal and Chris Clifton, *3rd International Symposium on Distributed Objects & Applications*, 17-20 September, 2001 Rome, Italy.

108. "Directions for Web and E-Commerce Applications Security", Bhavani Thuraisingham, Chris Clifton, Amar Gupta, Elisa Bertino, and Elena Ferrari, *Enabling Technologies: Infrastructure for Collaborative Enterprises, WET ICE 2001*, Cambridge, Massachusetts, June 20-22, 2001, pp. 200-204.

109. "Real-Time Data Mining of Multimedia Objects", Bhavani Thuraisingham, Chris Clifton, Marion G. Ceruti, and John Maurer, *Fourth IEEE International Symposium on Object-Oriented Real-Time Distributed Computing (ISORC 2001)*, Magdeburg, Germany, May 2-4, 2001, pp. 360-365.

110. "Developing Custom Intrusion Detection Filters Using Data Mining", Chris Clifton and Gary Gengo, *2000 Military Communications International Symposium (MILCOM2000)*, Los Angeles, California, October 22-25, 2000, pp. 440-443.

111. "TopCat: Data Mining for Topic Identification in a Text Corpus", Chris Clifton and Robert Cooley, *3rd European Conference on Principles and Practice of Knowledge Discovery in Databases*, Prague, Czech Republic, September 15-18, 1999, pp. 174-183.

112. "Protecting Against Data Mining through Samples", Chris Clifton, *Thirteenth Annual IFIP WG 11.3 Working Conference on Database Security*, July 26-28, 1999, Seattle, WA, pp. 193-207. Expanded version invited for submission to *Journal of Computer Security*, IOS Press (see above).

113. "Data Mining on Text", Chris Clifton and Rick Steinheiser, *Proceedings of the Twenty-Second Annual International Computer Software and Applications Conference*, Vienna, Austria, August 19-21, 1998, pp. 630-635.

114. "Query Flocks: A Generalization of Association Rule Mining", Dick Tsur, Jeffrey D. Ullman, Serge Abiteboul, Chris Clifton, Rajeev Motwani, Svetlozar Nestorov, and Arnon Rosenthal, *Proceedings of the 1998 ACM SIGMOD International Conference on Management of Data*, Seattle, WA, June 1-4, 1998, pp. 1-12.

115. "Knowledge Discovery in Text", Chris Clifton, Arnon Rosenthal, Rick Steinheiser, and Jeffrey D. Ullman, *First Federal Data Mining Symposium*, AFCEA, December 16-17, 1997, Washington, D.C. Revised version appeared in the *European Conference on Machine Learning Workshop on Text Mining*, April 24, 1998, Chemnitz, Germany.

116. "Experience with a Combined Approach to Attribute-Matching Across Heterogeneous Databases", Chris

Clifton, Ed Housman and Arnon Rosenthal, *7th IFIP 2.6 Working Conference on Database Semantics*, October 7-10, 1997, Leysin, Switzerland, pp. 428-451.

117. "Dynamic Integration and Query Processing with Ranked Role Sets", Peter Scheuermann, Wen-Syan Li, and Chris Clifton, *Proceedings of the First IFCIS International Conference on Cooperative Information Systems*, June 19-21, 1996, Brussels, Belgium, pp. 157-166.

118. "Security and Privacy Implications of Data Mining", Chris Clifton and Don Marks, *Proceedings of the ACM SIGMOD Workshop on Data Mining and Knowledge Discovery*, Montreal, Canada, June 2, 1996, pp. 15-19.

119. "Classifying Software Components Using Design Characteristics", Chris Clifton and Wen-Syan Li, *Proceedings of the Tenth Knowledge-Based Software Engineering Conference*, November 12-15, 1995, Boston, Massachusetts, pp. 139-146.

120. "Experiences with SEMINT: Automated Semantic Integration", Wen-Syan Li and Chris Clifton, *Proceedings of the International Conference on Advanced Science and Technology*, March 25, 1995, Chicago, IL, pp. 64-71. Student paper presentation award to Wen-Syan Li.

121. "Semantic Integration in Heterogeneous Databases using Neural Networks", Chris Clifton and Wen-Syan Li, *20th International Conference on Very Large Data Bases*, Santiago, Chile, September 12-15 1994, pp. 1-12.

122. "Compiling Local Test Formulas for Global Constraints in Distributed Databases", Herts Chen and Chris Clifton, *International Conference on Intelligent Information Management Systems*, Washington, D.C., June 1-3 1994.

123. "Information Brokers: Sharing Knowledge in a Heterogeneous Distributed System", Daniel Barbará and Chris Clifton, *Proceedings of the 4th International Conference on Database and Expert Systems Applications*, Prague, Czechoslovakia, September 6-8, 1993, pp. 90-91.

124. "Using Field Specifications to Determine Attribute Equivalence in Heterogeneous Databases", Wen-Syan Li and Chris Clifton, *Proceedings of RIDE-IMS'93: Third International Workshop* on Research Issues in Data Engineering" , Vienna, Austria, April 18-20, 1993, pp. 174-177.

125. "The Gold Mailer", Daniel Barbará, Chris Clifton, Fred Douglis, Hector Garcia-Molina, Stephen Johnson, Ben Kao, Sharad Mehrotra, Jens Tellefsen, and Rosemary Walsh, *Proceedings of the Ninth International Conference on Data Engineering*, Vienna, Austria, April 19-23, 1993, pp. 92-99.

126. "Distributed Processing of Filtering Queries in HyperFile", Chris Clifton and Hector Garcia-Molina, *Proceedings of the 11th International Conference on Distributed Computing Systems*, Arlington, TX, May 20-24 1991, pp. 54-64.

127. "Data Management with Massive Memory: A Summary", Hector Garcia-Molina, Robert Abbott, Chris Clifton, Carl Staelin, and Kenneth Salem, *Parallel Database Systems*, Pierre America, Editor, PRISMA Workshop Proceedings, Noordwijk, The Netherlands, September 1990, pp. 63-70.

128. "Indexing in a Hypertext Database", Chris Clifton and Hector Garcia-Molina, *Proceedings of the 1990 conference on Very Large Data Bases*, Brisbane, Australia, August 13-16 1990, pp. 36-49.

129. "The Design of a Document Database", Chris Clifton, Hector Garcia-Molina, and Robert Hagmann, *ACM Conference on Document Processing Systems*, Santa Fe, NM, December 5-9, 1988, pp. 125-134.

*Refereed System Demonstration Descriptions:*

130. "GeoNODE: An End-to-End System from Research Components", Chris Clifton, John Griffith, and Rod Holland, *The 17th International Conference on Data Engineering*, Heidelberg, Germany, April 2-6, 2001, 3pp.

131. "Natural Language Processing for News Analysis", Tom Bartee, Stanley Boykin, Chris Clifton, Thad Cooper, Shereif El-Sheikh, Jerry Fitzgerald, Joe Francoeur, John Gibson, John Griffith, Steve Hansen,

Lynette Hirschman, Rod Holland, Rob Hyland, Steve Janiak, Mark Maybury, Andy Merlino, Carsten Oertel, Marc Reichman, Marc Richards, Paul Silvey and Shane Steward, *Language Technology Joint Conference (ANLP-NAACL2000)*, April 29-May 40, 2000, Seattle, WA.

132. "Semint: A System Prototype for Semantic Integration in Heterogeneous Databases", Wen-Syan Li and Chris Clifton *Proceedings of the 1995 ACM SIGMOD International Conference on Management of Data*, May 23-25, 1995, San Jose, CA, pp. 484.

**INVITED ARTICLES (editor-refereed)**

133. "Challenges and Opportunities for Security with Differential Privacy", Chris Clifton and Balamurugan Anandan, *Ninth International Conference on Information Systems Security (ICISS 2013)*, ISI Kolkata, India, 16-20 December 2013.

134. "Collaborative Search and User Privacy - How Can They Be Reconciled?", Thorben Burghardt, Erik Buchmann, Klemens Böhm, and Chris Clifton, invited full paper at *The 4th International Conference on Collaborative Computing: Networking, Applications and Worksharing (CollaborateCom 2008)*, Orlando, Florida, November 13-16, 2008.

135. "What is Privacy? Critical Steps for Privacy-Preserving Data Mining", Chris Clifton, invited article at the workshop on *Privacy and Security Aspects of Data Mining* in conjunction with *The Fifth IEEE International Conference on Data Mining*, Houston, Texas, November 27, 2005.

136. "Tools for Privacy Preserving Distributed Data Mining", Chris Clifton, Murat Kantarcioglu, Jaideep Vaidya, Xiaodong Lin, and Michael Zhu, invited article in *ACM SIGKDD Explorations* 4(2):28-34, Johannes Gehrke, editor, December 2002.

137. "Using Unknowns to Prevent Discovery of Association Rules", Yücel Saygin, Vassilios S. Verykios, and Chris Clifton, invited article in *ACM SIGMOD Record* 30(4):45-54 Special Section on Data Mining for Intrusion Detection and Threat Analysis, Daniel Barbará, editor, December 2001.

**PATENTS**

1. Christopher Clifton, John Ross Wallrabenstein, and David Stork, *Secure search and retrieval*, US 8,904,171, December 2, 2014.

**SELECTED PRESENTATIONS**

1. "Machine Learning Induced Unfairness" keynote at the *2023 International Conference on Data Mining and Knowledge Discovery*, Chongqing, China, June 24-26, 2023.

2. Panelist on "Full Stack Artificial Intelligence: The missing piece", *The 22nd IEEE International Conference on Data Mining*, Orlando, Florida, November 30, 2022.

3. Chris Clifton, Eric Hanson, Keith Merrill, and Shawn Merrill, "Issues, and Solutions, to Providing Formal Privacy for ACS", *2021 ACS Data User's Conference*, May 19, 2021, online.

4. "Limitations on Malicious Secure Protocols" opening keynote at the *7th International Conference on Networking, Systems and Security*, December 22, 2020, Dhaka, Bangladesh.

5. "Secure Computing in Informatiics, IoT, and Enabling Technologies", keynote at the *IEEE International Conference on Informatics, IoT, and Enabling Technologies (ICIoT'20)*, February 2, 2020, Doha, Qatar.

6. "Real-world Differential Privacy: Issues and Smooth Sensitivity Solutions", keynote at *The First IEEE International Conference on Trust, Privacy and Security in Intelligent Systems, and Applications*, December 13, 2019. Los Angeles, California.

7. "When is a Semi-Honest Secure Multiparty Computation Valuable?", *GameSec2019: The 10th Conference on Decision and Game Theory for Security*, November 1, 2019, Stockholm, Sweden.

8. "Differential Privacy: Challenges on Moving Theory into Practice", keynote at the *17th International Conference on Privacy, Security, and Trust*, August 28, 2019, Fredericton, NB, Canada.

9. "Smooth Sensitivity for k-Nearest Neighbor", invited talk at the Simons Institute for the Theory of Computing workshop *Data Privacy: From Foundations to Applications*, March 4, 2019, Berkeley, California.
10. "Why did it do that? The (im?)possibility of deciphering actions of AI", *Dawn or Doom: Emerging Technology - Risks and Rewards*, November 6, 2018, West Lafayette, IN.
11. "Don't be a Headline: Fairness and Transparency in Machine Learning", *Indy Big Data*, September 26, 2018, Indianapolis, IN.
12. "Privacy Technology: What Can (and Can't) be Done", *International Conference on Law and the Digital Age*, Doha, Qatar, February 19-20, 2018.
13. "Dealing with Discriminatory Data Mining", keynote at the *International Conference on Applied Research in Computer Science and Engineering (ICAR'17)*, Beirut, Lebanon, June 23, 2017. Also presented at the Qatar Computing Research Institute, February 21, 2018.
14. "Anonymization: Myths, Reality, and Alternatives", invited talk at the *37th Great Lakes Biomedical Conference*, April 7, 2017, Milwaukee, Wisconsin.
15. "Distributed Differential Privacy", Distinguished Lecture, University of Kentucky, Lexington, Kentucky, November 18, 2016.
16. "Distributed Differential Privacy", keynote at the *XVI Brazilian Symposium on Information and Computational Systems Security (SBSeg16)*, Niter´{o}i, Brazil, November 8, 2016.
17. "Privacy: Beyond Confidentiality", keynote at the *21st ACM Conference on Computer and Communications Security*, Scottsdale, Arizona, November 6, 2014.
18. "Privacy without encrypting - Protect your data and use it too", keynote at the *The 28th IFIP WG 11.3 Conference on Data and Applications Security and Privacy (DBSEC'14)*, Vienna, Austria, July 14, 2014.
19. "Privacy-Preserving Technologies", *10th Annual Colloquium on ICT R&D: R&D on Big Data and Personal Data* Sponsored by the National Institute of Information and Communications Technology (NICT) of Japan, Washington, D.C., January 24th 2014.
20. "Challenges and Opportunities for Security with Differential Privacy", keynote at the *Ninth International Conference on Information Systems Security (ICISS 2013)*, ISI Kolkata, India, 16-20 December 2013.
21. Panelist on "Data Mining with Big Data", *IEEE International Conference on Data Mining (ICDM 2013)*, Dallas, Texas / December 7-10, 2013.
22. Panelist on "Security and Privacy: Are they Two Sides of the Same Coin?" *Annual Computer Security Applications Conference (ACSAC) 2012*, Orlando, Florida, December 6, 2012.
23. "Data Mining and Privacy", Qatar Computing Research Institute, Doha, Qatar, November 15, 2012.
24. "Privacy-Preserving Data Mining at 10: What's Next?", invited talk at the workshop on *Privacy Aspects of Data Mining* held at the *IEEE International Conference on Data Mining*, Vancouver, Canada, December 11, 2011.
25. "Privacy-Preserving Data Mining at 10: What's Next?", keynote at the *Ninth Australasian Data Mining Conference (AusDM 2011)*, Ballarat, Australia, December 1-2, 2011.
26. "Freeing Cloud Databases from Privacy Constraints", *Computer Science Seminar*, Australian National University, Canberra, Australia, November 28, 2011.
27. "Freeing Cloud Databases from Privacy Constraints", *Computer Science and Engineering Seminar*, Qatar University, Doha, Qatar, October 3, 2011.
28. "Privacy-Preserving Data Mining", invited talk at The Thomas M. Cooley Law Review Symposium *Data Mining: Who's Mining Your Business*, Lansing, Michigan, September 22, 2011.
29. "Privacy Issues with Machine Learning: Fears, Facts, and Opportunities", *Machine Learning Summer School @Purdue*, West Lafayette, Indiana, June 13, 2011.

30. "Privacy-Preserving Data Mining: Shared analysis without shared data", *Expert Workshop: Statistical and Epidemiological Issues in Active Medical Product Surveillance*, Brookings Institution, February 16, 2011.
31. "Private Computation for Confidential Outsourcing", Ricoh Technology Center, Shin-Yokohama, Japan, January 17, 2011.
32. "Plausibly Deniable Search", invited talk at the *Symposium 'In search of privacy'*, Radboud University, Nijmegen, The Netherlands, June 25, 2009.
33. "What an Information Technology Vendor Can (and Can't) Do For Your Client", invited presentation at the *Indiana Continuing Legal Education Forum on Privacy Law*, Indianapolis, IN, May 14, 2009.
34. "Measuring Privacy: A Risk-Based Approach", talk at SAP Research CEC Karlsruhe, Germany, December 8, 2008.
35. "Saleable Opportunities for Private and Secure Computation", FENS seminar at Sabanci University, December 5, 2008.
36. "Saleable Opportunities for Private and Secure Computation" Informatik-Kolloquium at Universität Karlsruhe, December 1, 2008.
37. "Opportunities for Private and Secure Machine Learning", keynote at the *2008 AISec Workshop* held in conjunction with the *15th ACM Conference on Computer and Communications Security (CCS)*, Alexandria, VA, October 27, 2008.
38. Panelist on "Technologies for Privacy-Protective Data Mining" at the Department of Homeland Security Privacy Office workshop on *Implementing Privacy Protections in Government Data Mining*, Washington, DC, July 24-25, 2008.
39. "Information metrics for privacy and anonymity in spatiotemporal data", invited talk at the *First Interdisciplinary Workshop on Mobility, Data Mining and Privacy: Preserving anonymity in geographically referenced data*, Rome, Italy, February 14 2008.
40. "Is Privacy Still an Issue for Data Mining?", invited talk at the *National Science Foundation Symposium on Next Generation of Data Mining and Cyber-Enabled Discovery for Innovation*, Baltimore, Maryland, October 10-12, 2007.
41. "Privacy and Anonymity in Text", Max-Planck-Institut for Informatik, Saarbrucken, Germany, August 31, 2007.
42. "Will Privacy Kill Ubiquitous Knowledge Discovery?", invited talk at the *KDUbiq Working Group on Privacy and Security* meeting, Berlin, Germany, September 19, 2006.
43. "Privacy Conflicts Inherent in Data Analysis", Institute for Software Research International Seminar, Carnegie-Mellon University, March 29, 2006.
44. "What is Privacy? Critical Steps for Privacy-Preserving Data Mining", Invited talk at the *Workshop on Privacy and Security Aspects of Data Mining* held in conjunction with the *IEEE International Conference on Data Mining*, November 27, 2005, New Orleans, Louisiana.
45. "Open Issues in Privacy-Preserving Data Mining", Maebashi Institute of Technology, April 4, 2005.
46. Panel: "Data Mining and Data Aggregation" at the Symposium on *Privacy and Identity: The Promise and Perils of a Technological Age*, DePaul University, October 14-15, 2004.
47. Panel: "Data Aggregation, Mining, and Privacy" at the *NSF Cybertrust PI Meeting*, Pittsburgh, Pennsylvania August 18-20, 2004.
48. "Knowledge Projection for Tele-Maintenance", Crane Naval Surface Warfare Center Distinguished Lecture Series, February 3, 2004.
49. "Turning Data into Knowledge Without Violating Privacy", Joint Biostatistics & Medical Informatics / Statistics / Computer Sciences Seminar, University of Wisconsin, January 29, 2004.

50. "Privacy-Enhanced Data Management for Next-Generation e-Commerce", with Irini Fundulaki, Richard Hull, Bharat Kumar, Daniel Lieuwen, and Arnaud Sahuguet, tutorial at the *29th International Conference on Very Large Data Bases*, September 9-12, 2003, Berlin, Germany.
51. "Privacy Preserving Data Mining", tutorial at *The Ninth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, August 24-27, 2003, Washington, D.C.
52. "Privacy Preservation to Enable Data Mining Across Enterprises", invited talk at the *IBM Almaden Institute Symposium on Privacy*, April 9-11, 2003, San Jose, California.
53. "Privacy Preserving Distributed Data Mining", data mining seminar at the University of Illinois, March 19, 2003.
54. "Defining Privacy for Data Mining", invited talk at the *National Science Foundation Workshop on Next Generation Data Mining*, November 1-3, 2002, Baltimore, MD.
55. "Privacy, Security, and Data Mining", tutorial given at the combined conference *13th European Conference on Machine Learning (ECML'02)* and *6th European Conference on Principles and Practice of Knowledge Discovery in Databases (PKDD'02)*, Helsinki, Finland, August 19, 2002.
56. "Developing Custom Intrusion Detection Filters Using Data Mining", Purdue Center for Education and Research in Information Assurance, December 10, 1999.
57. "Data Mining at MITRE" *Third Applied Database Technology Conference*, The MITRE Corporation, Bedford, MA, June 5 1997.
58. "Data Mining in Text", *Symposium on Advanced Information Processing and Analysis*, Tysons Corner, Virginia, March 26, 1997.
59. "Neural Networks for Semantic Integration" *Second Applied Database Technology Conference*, The MITRE Corporation, Bedford, MA, December 7, 1995.
60. "Component Based Software: How Database Technology Can Help", AT&T Bell Labs, Naperville, IL, June 3, 1994.
61. "Query Processing in HyperFile", New Jersey Institute of Technology, May 11, 1992.

## SOFTWARE DEVELOPED

**GeoNODE** (Geographic News On Demand Environment), developed while at the MITRE Corporation, combines research results from natural language, data mining, multimedia, and visualization into a system for analyzing news. News, in the context of GeoNODE, is anything from television broadcasts to focused email and newsgroups. GeoNODE was used as a concept evaluation prototype at several sites within the Department of Defense. Responsible for database development, as well as the text mining research component. See publications for more details.

## RESEARCH FUNDING

1. Chris Clifton (Lead PI), Dan Lin, Kannappan Palaniappan, Ming Yin, *Collaborative Research: SaTC: CORE: Medium: Broad-Spectrum Facial Image Protection with Provable Privacy Guarantees*, NSF Secure and Trustworthy Cyberspace, 10/1/21-09/30/24, $1,243,682 ($531,168 Purdue).
2. Brad Malin (Lead PI), Chris Clifton, Ramesh Raskar, Anna Oganyan, *Collaborative Research: Workshop to Develop a Roadmap for Greater Public Use of Privacy-Sensitive Government Data*, NSF Secure and Trustworthy Cyberspace, 5/1/21-4/30/22, $91,534 ($31,713 Purdue).
3. Chris Clifton (PI), Murat Kantarcioglu, Blase Ur, Lindsay Weinberg, and Christopher Yeomans, *FAI: Identifying, measuring, and mitigating fairness issues in AI*, NSF Program on Fairness in Artificial Intelligence in collaboration with Amazon, 1/1/20-12/31/21, $216,908 NSF, $128,092 Amazon.
4. Chris Clifton, *Measuring Adversarial Vulnerability for Anomaly Detection*, Northrop Grumman Corporation, 1/1/19-12/31/19, $64,367.

5. Chris Clifton (PI) and Keith Merrill, *Tools to Support Anonymization*, U. S. Census Bureau, 1/1/17-12/31/21, $572,766.

6. Chris Clifton, Daniel Kelly, and Kendall Roark, *Big Data Ethics: Detecting Bias in Data Collection, Algorithmic Discrimination and 'Informed Refusal'*, Andrew W. Mellon Foundation, 1/1/17-12/31/18, $142,511.

7. Qutaibah Malluhi (Lead at Qatar University), A. Erbad, K.Khan, R. Riley (Qatar University), M. Atallah and C. Clifton (Purdue University), *The Garbled Computer: Towards Computing without Seeing*, Qatar National Research Foundation, 3/1/16-9/1/19, $231,593 Purdue.

8. Chris Clifton, *Mining Anonymized Data*, Northrop Grumman Corporation, 1/1/16-12/31/16, $94,941.

9. Chris Clifton (PI), *Secure Printing from the Cloud*, Ricoh Co., 5/1/2011-3/31/2012, $89,585.

10. Chris Clifton (PI), Qutaibah Maluhi (Qatar University), and Khaled M. Khan (Qatar University), *Managing Private Data in the Cloud*, Qatar National Research Foundation, 12/1/2010-11/30/2013, $954,095 ($333,840 Purdue).

11. Chris Clifton (Lead PI), Luo Si, Chyi-Kong (Karen) Chang, Victor Raskin, Raquel L. Hill (PI Indiana U.), Stephanie Sanders, Wei Jiang (PI Missouri S&T), *Anonymizing Textual Data and its Impact on Utility*, NSF Trustworthy Computing, 9/1/2010-8/31/2016, $2,480,300 ($1,554,441 Purdue).

12. Chris Clifton (PI), Secure Multiparty Computation for Outsourcing Image Processing, Ricoh Co., 5/1/2010-3/31/2011, $78,792.

13. Tim Finin (PI, UMBC) et al. (19 co-PIs, 4 Purdue), *A Framework for Managing the Assured Information Sharing Lifecycle*, DoD Multidisplicinary University Research Initiative, 5/1/2008-4/30/2013, $4.35M base + 3M option years ($1.5M Purdue).

14. Elisa Bertino (PI) and Chris Clifton, *Identity Management and Trust Negotiation Services*, Department of Homeland Security / Institute for Information Infrastructure Protection, 4/1/2007-3/31/2009, $300,000.

15. David Ebert (Director), Alok Chaturvedi, William Cleveland, Chris Clifton, Ahmed Elmagarmid, and Marc Overhage, *Purdue University Regional Visualization and Analytics Center*, Department of Homeland Security, January 2006-December 2008, $517,000.

16. Ann Hendrich (Ascension Health, PI), Marilyn Chow (Kaiser Permanente), Nelson Lee (Rapid Modeling), William Cleveland, Chris Clifton, Jason Abrevaya, *A Multi-Site Study of How Medical Surgical Nurses Spend Their Time: A Baseline Study in Preparation for an Electronic Health Record and an Evidenced-based Nursing Unit Design*, Robert Wood Johnson Foundation, April 2005-August 2006. (Purdue CS portion $91,269).

17. Chris Clifton (PI), AnHai Doan (University of Illinois), Ahmed Elmagarmid, Gunther Schadow (Regenstrief Institute for Healthcare), and Dan Suciu (University of Washington), *Privacy-Preserving Data Integration and Sharing*, NSF ITR, September 2004-August 2008, $1,012,000.

18. Clement J. McDonald (PI) et al., Chris Clifton (Purdue PI) A Center of Excellence in Medical Informatics to Provide an Advanced Infrastructure for Human Research: A Catalyst for Indiana Research, Indiana 21st Century Fund, August 2004-August 2006, $3,832,196 (Lead: Regenstrief Institute for Healthcare; Purdue portion $50,000.)

19. Chris Clifton (PI) and Mikhail Atallah, *Collaborative Research: Distributed Data Mining to Protect Information Privacy*, NSF Small ITR, August 2003 - August 2006, $276,274. (Collaborative with Wenliang Du, Syracuse University - funded under separate award.)

20. Chris Clifton, Walid Aref, Ahmed Elmagarmid (PI), Arif Ghafoor, and Sunil Prabhakar, *Knowledge Projection for TeleMaintenance*, EG&G / Naval Surface Warfare Center, Crane Division, October 21, 2002 - September 30, 2005, $1,746,813.

21. Chris Clifton (PI), Ananth Iyer, and Reha Uzsoy, *A Prototype Integrated Transaction Data Analysis and Vi-*

*sualization Environment for the Transportation, Distribution and Logistics Sector*, e-Enterprise Center at Discovery Park, August 19, 2002 - May 10, 2003, $34,278.

22. Chris Clifton (PI), Pascal Meunier, and Gustavo Rodriguez-Rivera, *Secure Programming: Add-on Course Module and Short Course*, e-Enterprise Center at Discovery Park, August 19, 2002 - June 30, 2003, $19,344.
23. Chris Clifton (PI), *Privacy Preserving Data Mining*, Purdue Research Foundation, August 2002 through July 2004, $26,403.
24. Chris Clifton (PI), *Data Mining for Intrusion Detection*, U.S. Army CECOM Space and Terrestrial Communications Directorate, June 1999 through September 2001, ~$360,000.
25. Chris Clifton (PI), Arnon Rosenthal and Jeffrey Ullman (Stanford University), *Data Mining in Text*, Community Management Staff (Intelligence Community), September 1996 through June 2000, $589,913 (MITRE's portion $442,174).
26. Chris Clifton (PI), *Data Mining in Text and Images*, MITRE Sponsored Research, January 1996 through September 1999, $521,421.
27. Chris Clifton (PI), *Data Mining Security*, National Security Agency, October 1995 through September 1997, ~$120,000.
28. Chris Clifton (PI) *Shared Software Database*, NSF Research Initiation Award, September 1992 through August 1995, $90,000.

**PhD AND MS STUDENTS SUPERVISED**

1. Tao Li, funded on NSF grant from Fall 2021, Ph.D. expected 2024.

*Completed*

2. Farzad Zafarani, *Improving the Utility of Differentially Private Algorithms Using Data Characteristics*, Ph.D. December 2024.
3. Chowdhury Mohammad Rakin Haider, *Identifying Induced Bias in Machine Learning*, Ph.D. May 2024.
4. Shawn Merrill, *Privacy in Complex Sample Based Surveys*, Ph.D. December 2021. First employment: Postdoctoral position, University of Maryland.
5. Radhika Bhargava, *Adversarial Anomaly Detection*, Ph.D. August 2019. First employment: Twitter.
6. Koray Mancuhan, *Data Classification for l-Diversity*, Ph.D. December 2017. First employment: Apple Inc.
7. Balamurugan Anandan, *Privacy-Preserving Analysis with Applications to Textual Data*, Ph.D. May 2017.
8. Christine Task, Dissertation *Privacy-Preserving Social Network Analysis*, Ph.D. May 2015. First employment: Knexus Research.
9. John Ross Wallrabenstein, Dissertation *Rational Multiparty Computation*, Ph.D. December 2014. First employment: Sypris Electronics.
10. Jaewoo Lee, Dissertation *Achieving Practical Differential Privacy*, Ph.D. August 2014. First employment: Postdoctoral position, Pennsylvania State University.
11. Ahmet Erhan Nergiz, Dissertation *Private Data Outsourcing using Anonymization*, Ph.D. December 2012. First employment: Google, Inc.
12. Pedro J. Pastrana-Camacho, Thesis *Ontology Based Text Sanitization*, M.S. December 2012. First employment: GE Labs.
13. Mummoorthy Murugesan, Dissertation *Privacy Through Deniable Search*, Ph.D. August 2010. First employment: Teradata Corp.
14. Mehmet Ercan Nergiz, Dissertation *Anonymization-Based Privacy Protection*, Ph.D. December 2008. First

employment: Postdoc, Sabanci University, Turkey.

15. Wei Jiang, Dissertation *Incentive Driven and Privacy-Preserving Collaborative Computing*, Ph.D. August 2008. First employment: Missouri University of Science & Technology.
16. Yang Wang, correlation of high-dimensional data with time and motion study data, M.S. 2007.
17. Murat Kantarcioglu, Dissertation *Privacy Preserving Data Mining in Horizontally Partitioned Data*, Ph.D. August 2005. First employment: University of Texas at Dallas.
18. Jaideep S. Vaidya, Dissertation *Privacy Preserving Data Mining for Vertically Partitioned Data*, Ph.D. August 2004. Honorable Mention, Best Paper Competition at *The Ninth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining* for "Privacy-Preserving K-Means Clustering over Vertically Partitioned Data". First employment: Rutgers University.
19. Siddhartha K. Goel, thesis *Derived Access Control Specification for XML*, M.S. August 2003.
20. Wen-Syan Li, Dissertation *Semantic Integration in Heterogeneous Databases*, Ph.D. December 1995. *Using Field Specifications to Determine Attribute Equivalence in Heterogeneous Databases*, M.S. December 1992. First employment: Visiting faculty, Rutgers University.
21. Herts T. Chen, Dissertation *Concurrency Control Using Semantic Knowledge: A Proof Theoretic Basis*, Ph.D. December 1994. First employment: Research staff, National Taiwan University.
22. Robert Haddleton, *An Analysis of an Active Database as Applied to a Real-Time Application*, M.S. June 1994.
23. Shashidar Jasthi, *Application of Software Quality Models to Individual Evaluation*, M.S. December 1993.
24. Christopher Fernandes, *Determining Semantic Equivalence Using a Nucleatide Base Genetic Sequencing Algorithm*, M.S. December 1993.
25. Robert Milfajt, *A Comparison of Two Heterogeneous Database Schema Integration Methods*, M.S. June 1992.
26. Stephen Gene Jacobson, *Integrating DB Design and CASE Tools*, M.S. June 1992.

## TEACHING HIGHLIGHTS

**Purdue University** **August 2001 to Present**

| | | |
|---|---|---|
| GRAD50400 | Advanced AI Fundamentals For Technical Professional | *Spring 2025 (online)* |
| CS37300 | Data Mining & Machine Learning | *Spring 2017, 2020, 2023* |
| CS57100 | Artificial Intelligence | *Fall 2022* |
| CS57300 | Data Mining | *Spring 2022* |
| CS44800 | Introduction To Relational Database Systems | *Spring, Fall 2021* |
| CS47300 | Web Information Search And Management | *Fall 2017, 2018, 2019, 2020* |
| CS42600 | Computer Security | *Spring 2019* |
| CS34800 | Information Systems | *Fall 2016* |
| CS54701 | Information Retrieval | *Spring 2016* |
| CS626 | Advanced Information Assurance | *Fall 2009, Spring 2013* |
| CS541 | Database Systems | *Fall 2002, 2007, Spring 2012* |
| CS180 | Problem Solving And Object-Oriented Programming | *Spring 2010, 2011* |
| CS526 | Information Security | *Spring & Fall 2003, Fall 2004, 2010* |
| CS542 | Distributed Database Systems | *Spring 2009* |
| CSx97 | Honors Program | *2007-2008* |

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|---|---|---|
| CS250 | Computer Architecture | *Fall 2005, Spring 2007* |
| CS590D | Data Mining | *Spring 2005, 2006* |
| CS490D | Introduction to Data Mining | *Spring 2004* |
| CS390S | Secure Programming<br>(mini-course with Drs. Meunier, Rodriguez-Rivera) | *Fall 2002* |
| CS603 | Advanced Topics in Distributed Systems | *Spring 2002* |
| CS590M | Security Issues in Data Mining | *Fall 2001* |

*Independent Study Projects Supervised*

| | | |
|---|---|---|
| Abhishek Sharma | CS490: Sources of Algorithmic Bias | *Spring 2019* |
| Arjun Banerjee | CS490: Privacy in Public Databases | *Fall 2017* |
| Zhuo Chen | CS490: Machine Learning on Financial Markets | *Spring 2016* |
| Ryan Adams | CS497: Secure Similar Document Detection using KLDivergence | *Spring 2008* |
| John Horst | CS497: Secure Content Validation | *Spring 2007* |
| Brett Banich | CS490: Data Mining of Graphs | *Summer 2003* |
| Y.B. Lee | CS590: Information Security Certifications | *Summer 2003* |
| Hong Liang | CS590: Advanced Data Mining | *Summer 2003* |
| Kris Reyes | CS490: Exploit Analysis (Co-advised with Dr. Meunier) | *Fall 2002* |
| Wonjun Lee | CS590: Data Mining for Intrusion Detection | *Summer 2002* |
| Hong Liang | CS590: Multivariate Data Mining using PCA | *Summer 2002* |
| Mashrur Nabi and Halim Sandikin | CS490: Exploit Database (Co-advised with Dr. Meunier) | *Spring 2002* |

**Northwestern University** **September 1991 to August 1995**

Developed and taught a two quarter sequence *Software Project Management and Development*. Course included innovative collaboration with local industry as source of projects.

Taught *Fundamentals of Computer System Software*, *Introduction to Database Systems*, *Seminar: Heterogeneous Databases*.

**Raritan Valley Community College** **January through May 1989**

Taught *Foundations of Computer Science*.

## COMMITTEE MEMBERSHIPS

### Purdue University

*Departmental*

| | |
|---|---|
| Hiring Committee | *2006-2007, 2016-2018, Co-Chair 2021-2022* |
| AI Search | *2019-2020, Chair 2020-2021* |
| Undergraduate Committee | *2003-2004; Chair 2007-2009* |
| Graduate Committee | *2001-2003, 2010-2013, 2016; Chair 2004-2006, 2019-2020* |
| Graduate Admissions Committee | *2003-2004, 2009-2010* |
| Strategic Planning Committee | *2001-2002* |

*College of Science*

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|---|---|
| Computer Science Head Search | *Chair 2023* |
| Data Science Search | *Chair 2018-2019* |
| COALESCE Search | *2005-2007* |

*University*

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|---|---|
| University Senate (2018-19: Chair of Student Affairs Committee) | *2016-2019* |
| Graduate Council | *2010-2012* |
| Regenstrief Center for Healthcare Engineering Director Search | *2004-2005* |

**Northwestern University**

| | |
|---|---|
| School of Engineering Academic Standing Committee | *1992-1994* |
| Departmental Computer Committee | *1992-1994* |
| Departmental Graduate Committee | *1991-1992* |
| Departmental Graduate Admissions Committee | *1991-1992* |

## PROFESSIONAL ACTIVITIES

*Editorial Boards*

Inaugural Editor-in-Chief, *IEEE Transactions on Privacy*, IEEE Computer Society, Los Alamitos, CA, 2024-2026.

Editorial Board, *Applied Intelligence: The International Journal of Artificial Intelligence, Neural Networks, and Complex Problem-Solving Technologies*, Kluwer Academic Publishers, The Netherlands, 2008-2023 (Review Board 2000 - 2007).

Editorial Board, *Transactions on Data Privacy*, Barcelona, Spain, 2008 (Founding) - present.

Editorial Board, *Journal of Privacy Technology*, Pittsburgh, PA, 2004 (Founding) - present.

Editorial board, *Knowledge and Information Systems*, Springer-Verlag, London, 2000 - 2014.

Editorial board, *IEEE Transactions on Knowledge and Data Engineering*, IEEE Computer Society, Los Alamitos, CA, 2003 - 2007. Survey editor, 2007 - 2011.

Editorial board, *Proceedings of the VLDB Endowment* (the journal of the VLDB conference), 2008 (Founding) - 2010.

Co-editor, *Statistical Analysis and Data Mining: The ASA Data Science Journal* 5(1) Special Issue: Best Papers of SDM'11.

Guest editor, *The Edge* Data Mining Issue, The MITRE Corporation, April 2000.

*Conference and Workshop Leadership*

Vice-Chair, IEEE P7003 Working Group *Standard for Algorithmic Bias Considerations*.

Area chair, *23rd IEEE International Conference on Data Mining*, December 1-4, 2023, Shanghai, China.

Senior Program Committee, *The 23rd Privacy Enhancing Technologies Symposium (PETS 2023)*, July 10-15, 2023, Lausanne, Switzerland. (Journal-style multi-round review with multiple submission deadlines.)

Area chair, *22nd IEEE International Conference on Data Mining*, Nov. 28 Dec. 1, 2022, Orlando, FL, USA.

Senior Program Committee, *The 22nd Privacy Enhancing Technologies Symposium (PETS 2022)*, July 18-23, 2022, Sydney, Australia. (Journal-style multi-round review with multiple submission deadlines.)

Program Committee Co-Chair, *8th International Conference on Mathematics and Computing (ICMC 2022)*, Jan 6-8, 2022, Vellore, Tamil Nadu, India.

Senior Program Committee, *SIAM International Conference on Data Mining (SDM19)*, May 2-4, 2019, Calgary, Alberta, Canada.

Advisory board, Future of Privacy Forum workshop *Bridging Industry and Academia to Tackle Responsible Research and Privacy Practices*, November 2-3, 2017, New York.

Senior program committee, *The 19th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, August 11-14, 2013, Chicago, IL.

Program Committee vice-chair, *IEEE International Conference on Data Mining series (ICDM 2012)*, December 10-13, 2012, Brussels, Belgium. Also program committee of associated workshop *Privacy in Social Data*.

Co-organizer, Dagstuhl seminar *Mobility, Data Mining, and Privacy*, August 12-17, 2012, Dagstuhl, Germany.

Program Committee co-chair, *11th SIAM International Conference on Data Mining (SDM)*, April 28 - 30, 2011, Phoenix, AZ.

Senior program committee, *The 16th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, July 25 - 28, 2010, Washington, D.C.

Senior program committee, *The 15th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, June 28 - July 1, 2009, Paris, France.

Area chair for Privacy and Social Factors, *8th SIAM International Conference on Data Mining (SDM)*, April 24-26, 2008, Atlanta, GA.

General Co-Chair, *The Seventh IEEE International Conference on Data Mining*, October 28-31, 2007, Omaha, NE.

Senior program committee, *The 13th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, August 12-15, 2007, San Jose, CA.

Program Committee Co-Chair, *The Sixth IEEE International Conference on Data Mining*, December 18 - 22, 2006, Hong Kong.

Treasurer, *The Eleventh ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, August 21-24, 2005, Chicago, Illinois.

Program Committee Vice Chair, *The Third IEEE International Conference on Data Mining*, November 19 - 22, 2003, Melbourne, Florida, USA. Also co-organized associated workshop on *Privacy-Preserving Data Mining*.

Organizer and chair, workshop on "Privacy, Security, and Data Mining" held in conjunction with *The 2002 IEEE International Conference on Data Mining (ICDM '02)*.

Tutorials chair and member of program committee, *The 2001 IEEE International Conference on Data Mining (ICDM '01)*.

Local Arrangements Chair, Fourth International Conference on Foundations of Data Organization and Algorithms, October 13-15, 1993.

*Program Committees*

*USENIX Conference on Privacy Engineering Practice and Respect*, September 11-12, 2023, Santa Clara, California.

*Privacy in Statistical Databases*, September 14-16, 2022, Paris, France.

*Workshop on Privacy in the Electronic Society* held in association with the *10th ACM Conference on Computer and Communications Security*, November 15, 2021, online.

*The 21st Privacy Enhancing Technologies Symposium (PETS 2021)*, July 19-24, 2021, online. (Journal-style multi-round review with multiple submission deadlines.)

*The 11th ACM Conference on Data and Application Security and Privacy*, April 26- 8, 2021, Virtual

*Privacy in Statistical Databases*, September 23-25, 2020, Tarragona, Catalonia.

*The 19th Privacy Enhancing Technologies Symposium (PETS 2019)*, Stockholm, Sweden, 2019. (Journal-style multi-round review with multiple submission deadlines.)

*33rd AAAI Conference on Artificial Intelligence (AAAI 2019)*, January 27-February 1, 2019, Honolulu, Hawaii.

*IEEE International Conference on Data Mining series (ICDM 2018)*, November 17-20, 2018, Singapore.

*The 18th Privacy Enhancing Technologies Symposium (PETS 2018)*, Barcelona, Spain, July 24-27, 2018. (Journal-style multi-round review with multiple submission deadlines.)

*IJCAI 2017 Workshop: Abuse Preventive Data Mining 2017* held in conjunction with *The Twenty-sixth International Joint Conference on Artificial Intelligence (IJCAI-17)*, Melbourne, Australia, August 20, 2017.

*The 17th Privacy Enhancing Technologies Symposium (PETS 2017)*, Minneapolis, MN, July 18-21, 2017.

*IEEE/ACM International Workshop on Cybersecurity of Online Social Network* held in conjunction with *The IEEE/ACM International Conference on Social Networks Analysis and Mining (ASONAM 2012)*, Istanbul, Turkey, August 26, 2012.

*The 38th International Conference on Very Large Data Bases (VLDB 2012)*, August 2012, Istanbul.

*The 2012 ACM SIGMOD International Conference on Management of Data*, May 20-25, 2012, Scottsdale, Arizona.

*The 2011 International Workshop on Privacy Aspects of Data Mining* held in conjunction with ICDM'11, December 11, 2011, Vancouver, Canada.

*The 37th International Conference on Very Large Data Bases (VLDB 2011)*, August 2011, Seattle. (Inaugural year of pure journal-style review process.)

*The 19th ACM International Conference on Information and Knowledge Management (CIKM 2010)*, October 26 - 30, 2010, Toronto.

*European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML/PKDD 2010)*, September 20-24, 2010, Barcelona.

*ECML/PKDD Workshop on Privacy and Security Issues in Data Mining and Machine Learning (PSDML 2010)*, September 20-24, 2010, Barcelona.

*The 36th International Conference on Very Large Data Bases (VLDB 2010)*, September 13 - 17, 2010, Singapore.

*The 26th International Conference on Data Engineering (ICDE 2010)*, March 1-6, 2010, Long Beach, California.

*IEEE International Conference on Data Mining series (ICDM 2009)*, December 6-9, 2009, Miami, Florida.

*The 2009 International Workshop on Privacy Aspects of Data Mining* held in conjunction with ICDM'09, December 6, 2009, Miami, Florida.

*The 2009 IEEE International Conference on Information Privacy, Security, Risk and Trust*, August 29-13, Vancouver, Canada.

*The 23rd Annual IFIP WG 11.3 Working Conference on Data and Applications Security*, July 12-15, 2009, Montreal, Canada.

*International Workshop on Privacy-Preserving Data Analysis (PPDA)*, April 20, 2009, Brisbane, Australia.

*25th International Conference on Data Engineering*, March 29-April 4, 2009, Shanghai, China.

*The 2008 IEEE International Conference on Data Mining*, December 15-19, 2008, Pisa, Italy.

*3rd Workshop on Secure Knowledge Management*, November 3-4, 2008, Dallas, Texas.

*European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD 2008)*, September 15-19, 2008, Antwerp, Belgium.

*34th International Conference on Very Large Databases (VLDB'08)*, August 25-28, 2008, Auckland, New Zealand.

*2nd ACM SIGKDD International Workshop on Privacy, Security, and Trust in KDD (PinKDD'08)*, August 24-27, 2008, Las Vegas, Nevada.

*The 27th ACM SIGMOD International Conference on Management of Data*, June 9-12, 2008, Vancouver, Canada.

*The 24th International Conference on Data Engineering (ICDE 2008)*, April 7-12, 2008, Cancun, Mexico.

*18th International Conference on Database and Expert Systems Applications (DEXA '07)*, September 3-7, Regensburg, Germany.

*The 20th Annual IFIP WG 11.3 Working Conference on Data and Applications Security*, July 31-August 2, 2006, Sophia Antipolis, France.

*The 25th ACM SIGMOD International Conference on Management of Data*, June 26-29, 2006, Chicago, Illinois.

*The 22nd International Conference on Data Engineering (ICDE 2006)*, April 3-7, 2006, Atlanta, GA.

*The Fifth IEEE International Conference on Data Mining*, November 27-30, 2005, New Orleans, Louisiana.

*2005 SIAM International Conference on Data Mining*, April 21-23, 2005, Newport Beach, California, USA.

*International Workshop on Privacy Data Management* held in conjunction with *The 21st International Conference on Data Engineering (ICDE 2005)*, April 8-9, 2005, Tokyo, Japan.

*The Fourth IEEE International Conference on Data Mining*, November 1-4, 2004, Brighton, United Kingdom. Also served on program committee of the associated *Workshop on Privacy and Security Aspects of Data Mining* and *Workshop on Data Mining and the Grid*.

*The 8th European Conference on Principles and Practice of Knowledge Discovery in Databases (PKDD)*, September 20-24, 2004, Pisa, Italy. Also served on program committee of the associated workshop *International Workshop on Privacy and Security Issues in Data Mining*.

*The Tenth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, August 22-25, 2004, Seattle, Washington.

*2004 SIAM International Conference on Data Mining*, April 22-24, 2004, Lake Buena Vista, Florida, USA.

*The Ninth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, August 24-27, 2003, Washington, D.C. Also served on program committee for associated workshop *Data Cleaning, Record Linkage, and Object Consolidation*, and on panel *Privacy and Data Mining: Friends or Foes?*

*Workshop on Mining Data Across Multiple Customer Touchpoints for CRM* (in conjunction with PAKDD-02), May 6, 2002.

*Workshop on Data Mining for Security Applications* held in conjunction with the 8th ACM Conference on Computer Security, November 8, 2001.

The 2001 Symposium on Applications and the Internet (SAINT-2001).

Fifth IFCIS International Conference on Cooperative Information Systems (CoopIS'2000).

1999 IEEE Knowledge and Data Engineering Exchange Workshop (KDEX-99). Served on panel *Convergence of Technologies on the Web: the Case of Distributed Artificial Intelligence, Databases and Information Retrieval*, chaired session on *Data Mining*.

1999 IEEE Computer Systems and Applications Conference (COMPSAC-99).

ACM Digital Libraries Conference Workshop on Organizing Web Space (WOWS), August 14, 1999.

Planning committee, 1999 DARPA-sponsored workshop on novelty detection in documents.

1998 IEEE Knowledge and Data Engineering Exchange Workshop (KDEX-98).

Sixth International Workshop on Research Issues on Data Engineering: Interoperability of Nontraditional Database Systems. Chaired session on “Applications”.

1995 International Conference on Distributed Computing Systems. Organized and chaired panel “Fee-for-Service in Distributed Systems: Research and Policy Issues”.

Invited attendance, NSF Workshop on Hyperbase Systems, October 15-16, 1992, Washington DC.

*Awards and Honors*

2020 ACM CODASPY Research Award for lasting and innovative research contributions to the cybersecurity and privacy fields.

Best Research Paper Award for “Using Safety Constraint for Transactional Dataset Anonymization”, with Bechara Al Bouna and Qutaibah Malluhi, *The 27th IFIP WG 11.3 Conference on Data and Applications Security and Privacy (DBSEC’13)*, Newark, New Jersey, July 15-17, 2013.

2011 IEEE International Conference on Data Mining Outstanding Service Award.

Honorable Mention, Best Paper Competition, for “Privacy-Preserving K-Means Clustering over Vertically Partitioned Data”, with Jaideep Vaidya, *The Ninth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, August 24 - 27, 2003, Washington, D.C.

Fellow, IEEE; Distinguished member, ACM.