

BASIT SHAFIQ

ADDRESS AND PERSONAL DETAILS

Associate Professor
Department of Computer Science
School of Science and Engineering
Lahore University of Management Sciences
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EDUCATION

1/2002–8/2006 Ph.D. in Electrical and Computer Engineering, Purdue University, USA
8/1999–12/2001 M.S. in Electrical and Computer Engineering, Purdue University, USA
2/1995–2/1999 B.S. in Electronics Engineering, Ghulam Ishaq Khan Institute of Engineering Sciences and Technology, Topi, Pakistan.

RESEARCH INTERESTS

Information systems security, secure distributed and networking systems, databases, multimedia information systems, semantic Web, Web services, ontology, and software testing.

RESEARCH AND WORK EXPERIENCE

12/2015–present Associate Professor
Lahore University of Management Sciences, Lahore, Pakistan.
01/2011–11/2015 Assistant Professor
Lahore University of Management Sciences, Lahore, Pakistan.
9/2006–12/2010 Research Assistant Professor
Center for Information Management, Integration and Connectivity (CIMIC), Rutgers University, Newark NJ 07102
8/1999–5/2006 Graduate Research Assistant
Purdue University, School of Electrical and Computer Engineering, West Lafayette, IN 47906

RESEARCH FUNDING

Ongoing/completed Projects

- PI, “Codec: Composition and Management of e-Government Processes in the Cloud of Public Services,” Pakistan-US Science and Technology Cooperation Program, sponsored by USAID and HEC, \$197,419, November 2015 – October 2018.
- PI, “Information Sharing and Integration Framework for Emergency Management and Response, HEC National research program for Universities, PKR 3,278,705, November 2015 – October 2017.
- PI, “Codec: Composition and Management of e-Government Processes in the Cloud of Public Services,” LUMS Faculty Initiative Fund, Rs. 960,000, February 2015 – January 2016.
- PI, “A Privacy-preserving Framework for Collaborative Business Process Composition,” LUMS Faculty Initiative Fund, Rs. 450,000, July 2013 – June 2014.

- Co-PI, “Information Sharing across States’ Incident Management Systems using UICDS,” United States Army Armament Research, Development and Engineering Center (ARDEC), \$498,431, October 2009 - October 2011. (Vijay Atluri, PI)
- PI, “Workshop on Future Directions in Cyber-physical Systems Security,” Department of Homeland Security Science and Technology Directorate, \$77,592.80, July 2009.
- Co-PI, “information Technology for Emergency mAnageMent (iTEAM),” Rutgers University Academic Excellence Fund, \$40,000, July 2008 – June 2009. (Nabil R. Adam, PI)
- Co-PI, “Technology Transfer: A Context Sensitive Alert Management System,” NSF Supplement Grant extension to NSF Award IIS-0306838, \$50,000, June 2008 – May 2009. (Nabil R. Adam, PI)
- Co-PI, “Service-oriented Architecture Supporting Networks of Public Security,” SAP Germany, \$566,000, July 2007 – June 2009. (Nabil R. Adam, PI).
- Co-PI, “Secure Agency Interoperation for Effective Data Mining in Border Control and Homeland Security Applications,” NSF, September 2003 – August 2008, (Joined as Co-PI from September 2006) (Nabil R. Adam, PI)
- Co-PI, “Improving Business Knowledge Management and Analysis through the Use of Semantic Web Services and RFID Technology”, SAP Research Labs, \$100,000, January 2007 - June 2007. (Nabil R. Adam, PI).

Proposal submitted (under review)

- PI, “End-to-End Solution for Business Process Composition and Management,” Submitted to ICT-R&D fund in January 2014. Funding amount requested, Rs. 14.9 million.

PUBLICATIONS

BOOK CHAPTERS

1. H. Irshad, **B. Shafiq**, J. Vaidya , M. A. Bashir, H. S. Asif, S. Ghayyur, S. Shamail, and N. Adam, “A Privacy-Sensitive Collaborative Approach to Business Process Development,” *E-Business and Telecommunications*, Communications in Computer and Information Science Series, Mohammad S. Obaidat and Pascal Lorenz (eds.), Springer, 2016.
2. N. Adam, H. Lu, J. Vaidya, and **B. Shafiq**, “Statistical Databases,” Henk C.A. van Tilborg & Sushil Jajodia (eds.), *Encyclopedia of Cryptography and Security*, Springer, 2011.
3. W. Sheikh, **B. Shafiq**, and A. Ghafoor, “A QoS Framework for Multimedia Applications in a Mobile Ad Hoc Network,” IEC Comprehensive Report on broadband Services, Applications, and networks: Enabling technologies and Business Models (Summer 2004).

JOURNAL PAPERS

Published/Accepted

4. **B. Shafiq**, S. Ghayyur, A. Masood, Z. Pervaiz, A. Almutairi, F. Khan, and A. Ghafoor, “Composability Verification of Multi-service Workflows in a Policy-Driven Cloud Computing Environment,” accepted for publication in *IEEE Transactions on Dependable and Secure Computing*.
5. D. Lorenzi, S. Chun, J. Vaidya, **B. Shafiq**, V. Atluri, and N. Adam. "PEER: A Framework for Public Engagement in Emergency Response." *International Journal of E-Planning Research (IJEPR)*, Vol. 4, No. 3 (2015): 29-46.

6. J. Vaidya, **B. Shafiq**, W. Fan, D. Mehmood, and D. Lorenzi, "A Random Decision Tree Framework for Privacy-preserving Data Mining," *IEEE Transactions on Dependable and Secure Computing*, Vol.11, No.5, pp.399,411, Sept.-Oct. 2014.
7. D. Lorenzi, J. Vaidya, S. Chun, **B. Shafiq**, and V. Atluri, "Enhancing the Government Service Experience through QR Codes on Mobile Platforms," *Government Information Quarterly*, Volume 31, Issue 1, January 2014, Pages 6–16.
8. N. Adam and **B. Shafiq**, and Robin Staffin "Spatial Computing and Social Media in the Context of Disaster Management," *IEEE Intelligent Systems*, Nov/Dec 2012.
9. A. Paliwal, **B. Shafiq**, J. Vaidya, H. Xiong, and N. Adam, "Semantics Based Automated Service Discovery," *IEEE Transactions on Services Computing*, Vol. 5 No. 2, pp. 260-275, April/June 2012.
10. X. He, J. Vaidya, **B. Shafiq**, and N. Adam, "Structure-Aware Graph Anonymization," *Web Intelligence and Agent Systems: An International Journal*, Vol. 10 No. 2, pp. 193 - 208, April, 2012, IOS Press, NL.
11. **B. Shafiq**, V. Atluri, J. Vaidya, S. Chun, and G. Nabi, "Resource Sharing using UICDS Framework for Incident Management," *Transforming Government: People, Process and Policy*, Vol. 6, No. 1, pp. 41 - 61, 2012.
12. X. He, J. Vaidya, **B. Shafiq**, N. Adam, and T. White, "Privacy Preserving Integration of Health Care Data," *International Journal of Computational Models and Algorithms in Medicine*, Vol. 1, No. 2, April – June 2010, pp. 22-36.
13. W. Sheikh, **B. Shafiq**, S. Baqai, R. A. Paul, M. F. Khan, and H. Ghafoor, "A QoS Framework for Multimedia Applications in Mobile Ad Hoc Networks," *International Journal of Computer Systems Science and Engineering*, Vol. 22, No.3, 2007.
14. **B. Shafiq**, J. Joshi, E. Bertino, and A. Ghafoor, "Secure Interoperation in Multi-Domain Environment Employing RBAC Policies," *IEEE Transactions on Knowledge and Data Engineering*, Vol. 17, No. 11, November 2005, pp. 1557-1577.
15. R. Bhatti, **B. Shafiq**, J. Joshi, E. Bertino, and A. Ghafoor, "X-GTRBAC Admin: A Decentralized Administration Model for Enterprise Wide Access Control," *ACM Transactions on Information and System Security*, Vol. 8, No. 4, pp. 388-423.
16. R. Bhatti, **B. Shafiq**, M. Shehab, and A. Ghafoor, "Distributed Access Management in Multimedia IDCs," *IEEE Computer*, Vol. 38, No. 9, September 2005, pp. 60-69.
17. **B. Shafiq**, H. Fahmi, S. Baqai, A. Khokhar, and A. Ghafoor, "Wireless Network Resource Management for Web-Based Multimedia Document Services," *IEEE Communication Magazine*, Vol. 41, No. 3, March 2003, pp. 138-145.
18. J. Joshi, K. Li, H. Fahmi, **B. Shafiq**, and A. Ghafoor, "A Model for Secure Multimedia Document Database System in a Distributed Environment," *IEEE Transactions on Multimedia*, Vol. 4, No. 2, June 2002, pp. 215-234.
19. H. Fahmi, W. G. Aref, M. Latif, **B. Shafiq**, A. Ghafoor, P. Liu, and L. Hsu, "Distributed Web-based Framework for Real-time Multimedia Object Communication," *International Journal of Computer Systems Science and Engineering*, Vol. 16, No. 2, March 2001.

CONFERENCE AND WORKSHOP PAPERS

20. J. Vaidya, **B. Shafiq**, V. Atluri, and D. Lorenzi, "A Framework for Policy Similarity Evaluation and Migration based on Change Detection," *9th International Conference on Network and System Security (NSS 2015)*, November 3-5, 2015, New York City, USA.
21. H. Irshaad, **B. Shafiq**, J. Vaidya, S. Shamail, and N. Adam, "Preserving Privacy in Collaborative Business Process Composition," *12th International Conference on Security and Cryptography (SECRYPT 2015)*, Colmar, France, 20-22 July 2015. (Received best paper ward)

22. D. Lorenzi, J. Vaidya, **B. Shafiq**, S. Chun, N. Vegesna, Z. Alzamil, N. Adam, S. Werner, and V. Atluri, "Utilizing Social Media to Improve Local Government Responsiveness," *15th International Digital Government Research Conference (dg.o 2014)*.
23. J. Vaidya, A. Basu, **B. Shafiq**, and Yuan Hong, "Differentially Private Naive Bayes Classification," *Proceedings of the 2013 IEEE/WIC/ACM International Conference on Web Intelligence (WI 2013)*, 17-20 November 2013, Atlanta, GA, USA.
24. J. Vaidya, **B. Shafiq**, D. Lorenzi, and N. Badar. "Incorporating Privacy into the Undergraduate Curriculum," In Proceedings of the *2013 Information Security Curriculum Development Conference (InfoSecCD'13)*, ACM, 2013.
25. D. Lorenzi, J. Vaidya, S. Chun, **B. Shafiq**, V. Naik, V. Atluri and N. Adam, "Community Based Emergency Response," *14th International Digital Government Research Conference (dg.o 2013)*.
26. J. Vaidya, **B. Shafiq**, X. Jiang, and L. Ohno-Machado, "Identifying Inference Attacks against Healthcare Data Repositories," AMIA Summit on Clinical Research Informatics (CRI). March 20-22, 2013 San Francisco, USA. (won The Clinical Research Informatics (CRI) Distinguished Paper Award).
27. N. Badar, J. Vaidya, V. Atluri, and **B. Shafiq**, "Risk based Access Control using Classification," in Proceedings of the *5th Symposium on Configuration Analytics and Automation (SafeConfig 2012)*, October 3 - 4, 2012, Baltimore, MD, USA.
28. **B. Shafiq**, J. Vaidya, S. Chun, N. Badar, and N. Adam, "Secure Composition of Cascaded Web Services," in Proceedings of the *8th IEEE International Conference on Collaborative Computing: Networking, Applications and Worksharing (CollaborateCom 2012)*, October 14–17, 2012 Pittsburgh, Pennsylvania, USA.
29. X. He, J. Vaidya, **B. Shafiq**, and N. Adam, "Privacy Preserving Maximum-Flow Computation in Distributed Graphs," *IEEE International Conference on Information Privacy, Security, Risk and Trust (PASSAT 2012)*. Amsterdam, Netherlands. September 2012.
30. D. Mehmood, **B. Shafiq**, J. Vaidya, Y. Hong, N. Adam, and V. Atluri, "Privacy-preserving Subgraph Discovery", *26th Annual WG 11.3 Conference on Data and Applications Security and Privacy (DBSec)*, July 11-13, 2012, Institut Mines-Telecom, Paris, France.
31. **B. Shafiq**, J. Vaidya, A. Ghafoor, and E. Bertino, "A Framework for Verification and Optimal Reconfiguration of Event-driven Role Based Access Control Policies," *17th ACM Symposium on Access Control Models and Technologies (SACMAT)*, Newark, NJ, USA, 2012.
32. D. Lorenzi, J. Vaidya, S. Chun, **B. Shafiq**, G. Nabi, and V. Atluri, "Using QR Codes for Enhancing the Scope of Digital Government Services," *13th Annual International Conference on Digital Government Research (dg.o 2012)*, University of Maryland, College Park, MD, USA.
33. Y. Hong, J. Vaidya H. Lu, and **B. Shafiq**, "Privacy-preserving Tabu Search for Distributed Graph Coloring," in Proceedings of the *3RD IEEE International Conference on Information Privacy, Security, Risk and Trust (PASSAT '11)*, October 9-11, 2011, MIT, Boston, USA.
34. V. Atluri, **B. Shafiq**, S. Chun, G. Nabi, and J. Vaidya, "UICDS-based Information Sharing among Emergency Response Application Systems, " in Proceedings of the *12th Annual International Conference on Digital Government Research (dg.o 2011)*, June 12-15 2011, University of Maryland, College Park, MD, USA. (Demo Paper - Best Demo or Poster Award)
35. X. He, J. Vaidya, **B. Shafiq**, N. Adam, and X. Lin, "Reachability Analysis in Privacy-Preserving Perturbed Graphs," *Proceedings of the 2010 IEEE/WIC/ACM International Conference on Web Intelligence and Intelligent Agent Technology*.
36. J. Vaidya, V. Atluri, **B. Shafiq**, and N. Adam, "Privacy-preserving Trust Verification," ACM Symposium on Access Control Models and Technologies, 2010.
37. V. Atluri, **B. Shafiq**, J. Vaidya, S. Chun, M. Trocchia, N. Adam, C. Doyle and L. Skelly, "Information Sharing Infrastructure for Pharmaceutical Supply Chain Management in Emergency Response," in Proceedings of the *2010 IEEE International Conference on Technologies for Homeland Security*, 8-10 November 2010, Westin Hotel, Waltham, MA.

38. **B. Shafiq**, J. Vaidya, V. Atluri, and S. Chun, "UICDS Compliant Resource Management System for Emergency Response," *11th International Digital Government Research Conference (dg.o 2010)*.
39. V. Atluri, S. Chun, J. Ellenberger, **B. Shafiq**, and Jaideep Vaidya, "Integrated Resource and Logistics Management through Secure Information Sharing for Effective Emergency Response," *Workshop on Emergency Management: Incident, Resource, and Supply Chain Management (EMWS09)*, November 5-6, 2009.
40. X.He, J. Vaidya, **B. Shafiq**, N. Adam, and V. Atluri, "Preserving Privacy in Social Networks: A Structure-Aware Approach," *Proceedings of the 2009 IEEE/WIC/ACM International Conference on Web Intelligence*.
41. X. He, J. Vaidya, **B. Shafiq**, and N. Adam, "Efficient Privacy-Preserving Link Discovery," *13th Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD-09)*.
42. **B. Shafiq**, J. Vaidya, V. Atluri, N.Adam, S. Chun, and A. Lieb, "Ontology Driven Resource Management for Emergency Response," in *Proceedings of the Workshop on Secure Knowledge Management (SKM 2008)*, November 3-4, 2008
43. X. He, **B. Shafiq**, J. Vaidya, and N. Adam, "Privacy-Preserving Link Discovery," in *Proceedings of the 23rd Annual ACM Symposium on Applied Computing, Data Mining Track*, March 16-20, 2008, Fortaleza, Ceara, Brazil.
44. N. Adam, V. Atluri, S. Chun, J. Ellenberger, **B. Shafiq**, J. Vaidya, and H. Xiong, "Secure Information Sharing and Analysis for Effective Emergency Management," in *Proceedings of the 9th Annual International Conference on Digital Government Research*, Montreal, Canada, May 2008.
45. N. Adam, T. White, **B. Shafiq**, and J. Vaidya, "Privacy Preserving Integration of Health Care Data," AMIA 2007 Annual Symposium.
46. A. Paliwal, N. Adam and **B. Shafiq**, "Policy based Web Service Orchestration and Goal Reachability Analysis using HMSC and CP Nets," in *Proceedings of 9th IEEE Conference on E-Commerce Technology (CEC' 07) and the 4th IEEE Conference on Enterprise Computing, E-Commerce and E-Services (EEE ' 07)*, July 2007.
47. N. Adam, V. Janeja, A. Paliwal, **B. Shafiq**, C. Ulmer, V. Gersabeck, A. Hardy, Bornhoevd, and J. Schaper, "An Approach for discovering and handling crisis in a service-oriented environment," in *Proceedings of the IEEE International Conference on Intelligence and Security Informatics 2007 (ISI 2007)*, May 2007.
48. N. Adam, A. Kozanoglu, A. Paliwal, and **B. Shafiq**, "Secure Information Sharing in a Virtual Multi-agency Team Environment," in *Proceedings of the Second International Workshop on Security and Trust Management (STM'06)*, Hamburg, Germany, September 2006.
49. **B. Shafiq**, A. Samuel, E. Bertino, and A. Ghafoor, "A Technique for Optimal Adaptation of Time-Dependent Workflows with Security Constraints," in *Proceedings of the IEEE International Conference on Data Engineering*, Atlanta, GA, April 2006, (short paper).
50. **B. Shafiq**, A. Samuel, and H. Ghafoor, "A GTRBAC Based System for Dynamic Workflow Composition and Management," in *Proceedings of the IEEE International Symposium on Object Oriented Real-time Distributed Computing*, Seattle, WA, May 2005.
51. **B. Shafiq**, E. Bertino, and A. Ghafoor, "Access Control Management in a Distributed Environment Supporting Dynamic Collaboration," in *Proceedings of the ACM Workshop on Digital Identity Management*, Fairfax VA, November 2005.
52. **B. Shafiq**, A. Masood, J. Joshi, and A. Ghafoor, "A Role-based Access Control Policy Verification Framework for Real-Time Systems," in *Proceedings of the IEEE International Workshop on Object-oriented Real-Time Dependable Systems*, Sedona AZ, February 2005.
53. W. Sheikh, **B. Shafiq**, R. Paul, and A. Ghafoor, "Provision of Multimedia Services in a Mobile Ad Hoc Network," in *Proceedings of the IEEE International Workshop on Object-oriented Real-Time Dependable Systems*, October 2003, pp. 87-93.
54. J. Joshi, E. Bertino, **B. Shafiq**, and A. Ghafoor, "Dependencies and Separation of Duty Constraints in GTRBAC", in *Proceedings of the ACM Symposium on Access Control Models and Technologies*, Como, Italy, June 2-3, 2003.

55. H. Fahmi, M. Latif, **B. Shafiq**, R. Paul, and A. Ghafoor, “Real-time Resource Reservation for Synchronized Multimedia Object over Wireless LAN,” in *Proceedings of the IEEE International Symposium on Object Oriented Real-time Distributed Computing.*, April 29 – May 1, 2002, Washington DC.
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PROFESSIONAL SERVICES

Program Co-Chair

- 27th Annual IFIP WG 11.3 Working Conference on Data and Applications Security (DBSec 2013).

Journal Editorship

- Guest Editor – Journal of Computer Security (IOS Press), special issue of the DBSec 2013 best papers.
- Managing Editor / Associate Editor – International Journal on Digital Libraries (Springer).

Treasurer / Registrations Chair

- ACM Symposium on Access Control Models and Technologies (SACMAT), 2012, 2013, 2014, 2015, 2016

Workshop Organization/Report writing

- Local arrangements Chair for the DHS-S&T Workshop on Future Directions in Cyber-physical Systems Security, July 2009.
- Member of the core writing team for preparing report:
 - DHS-S&T: Workshop on Future Directions in Cyber-physical Systems Security, 2009.
 - DHS-S&T: Workshop on Emergency Management: Incident, Resource, and Supply Chain Management (EMWS09).

Technical Program Committee:

1. ACM Symposium on Access control Models and Technologies (SACMAT) 2015, 2014, 2013, 2012.
2. European Symposium on Research in Computer Security (ESORICS) 2015, 2014, 2011.
3. Annual IFIP WG 11.3 Working Conference on Data and Applications Security (DBSec) 2015, 2014, 2013, 2008, 2009.
4. Annual International Conference on Digital Government Research (dg.o) 2015, 2014, 2013, 2012, 2011, 2010, 2008.
5. 16th IEEE International Conference on Information Reuse and Integration (IRI) 2015.
6. The 16th International Multi Topic Conference (INMIC) 2013.
7. Second International Conference on Information Systems Security (ICISS 2006).
8. Workshop on Privacy in the Electronic Society (WPES) 2011.
9. Workshop on Emergency Management: Incident, Resource, and Supply Chain Management (EMWS09).
10. Third International Workshop on Information Assurance (WIA 2007).
11. Workshop on Trusted Collaboration, 2006 (TrustCol-2006).

Reviewer for:

1. IEEE Transactions on Knowledge and Data Engineering.
2. IEEE Transactions on Dependable and Secure Computing.
3. IEEE Transactions on Services Computing.

4. IEEE Transactions on Computers.
 5. IEEE Transactions on Systems, Man and Cybernetics.
 6. ACM Transactions on Information and System Security.
 7. ACM Journal on Multimedia Systems.
 8. Journal of Computer Security (JCS).
 9. International Journal on Digital Libraries.
 10. Journal of Systems and Software.
 11. International Journal of Computer Systems Science and Engineering.
 12. International Journal of Information Security.
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AWARDS

- Best paper award, 12th International Conference on Security and Cryptography, SECRIPT 2015.
 - Emerald Literati Network, Outstanding Paper Award 2013, “Resource Sharing using UICDS™ Framework for Incident Management,” *Transforming Government: People, Process and Policy*.
 - The Clinical Research Informatics (CRI) Distinguished Paper Award for the paper “Identifying Inference Attacks against Healthcare Data Repositories” at AMIA Joint Summit on Translational Science, 2013.
 - Best Poster or Demo Award, 12th Annual International Conference on Digital Government Research (dg.o 2011)
 - Finalist in the 2005 Dmitris N. Chorafas Foundation Award for best doctoral thesis.
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PATENT

- Christof Bornhoevd, Aabhas Paliwal, Nabil Adam, Basit Shafiq. “Service-based processes using policy-based model-to-model conversion and validation techniques.” Publication number: US8601432 B2.