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February 06, 2018

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EDUCATION

PhD	1987	University of Newcastle, Australia (Electrical and Computer Engineering)
ME	1982	Indian Institute of Science, Bangalore, India (Electrical Engineering)
BE	1979	Indian Institute of Science, Bangalore, India (Electrical Engineering)

RESEARCH INTERESTS

Information Assurance/Computer Security (intrusion detection, alert correlation, insider threat modeling, simulation); Wireless Networks Security; Web Security; Fault Tolerance and Dependability in Distributed Systems.

EMPLOYMENT HISTORY

2017 –	Associate Dean for Research and Graduate Education, School of Engineering and Applied Sciences (SEAS), University at Buffalo.
2015 – 2017	Associate Department Chair, Department of Computer Science and Engineering, University at Buffalo.
2008 – present	Professor, Department of Computer Science and Engineering, University at Buffalo.
2002 – present	Director, Center of Excellence in Information Systems Assurance Research and Education (CEISARE) certified by National Security Agency and Department of Homeland Security <http://www.cse.buffalo.edu/caeiae/>.
1998 – 2007	Associate Professor, Department of Computer Science and Engineering, University at Buffalo
2001 – 2002	National Research Council Faculty Fellow, AFRL (5/01 – 7/01, 5/02 – 7/02).
2000 – 2002	Consultant, IBM Corporation, Endicott, NY.
1999	Sr. Faculty Fellow, Naval Research Laboratory, Washington DC (5/99 – 7/99).
1998 – 1999	Research Associate, AFRL, Rome, NY (7/98 – 9/98, 7/99 – 9/99).
1998	Visiting Faculty, Intel Corporation, Folsom, CA (5/98 – 7/98).
1993 – 1998	Associate Professor, Department of Electrical and Computer Engineering, University at Buffalo; Director of Undergraduate Studies; Adjunct Associate Professor of Computer Science.
1995	Visiting Research Associate Professor, Department of Electrical and Computer Engineering, Univ. of Illinois, Urbana-Champaign, IL (1/95 – 7/95).

1986 – 1993	Assistant Professor, Department of Electrical and Computer Engineering, University at Buffalo.
1990	Consultant, EG &G Idaho, Inc., Idaho Falls, ID (5/90 – 7/90).
1986	Visiting Lecturer, Department of Electrical and Computer Engineering, University of Iowa, Iowa City, IA (1/86 – 8/86).

HONORS/AWARDS

- Research Initiation Award, NSF, 1989.
- Lilly Endowment Teaching Fellow, 1989.
- Certificate of Recognition of Service to IEEE Transactions on Reliability, 1997.
- IBM Faculty Partner Fellow in recognition of contribution to Fault Tolerance and VLSI Testing, 2000-01.
- Elected Senior Member of IEEE, 2001.
- National Research Council Faculty Fellow, 2001-02.
- Best Paper Award at *2nd IEEE International Swarm Intelligence & Other Forms of Malware Workshop (Malware'07),* New Orleans, LA, held in conjunction with IPCCC 2007, April 2007 (with M. Chandrasekaran and S. Vidyaraman). Award sponsored by RSA, The Security Division of EMC.
- Best Paper Award at *11th Annual New York State Cyber Security Conference*, Albany, NY, June 2008 (with B. Gilbert, R. Sharman, M. Gupta, H.R. Rao and K. Mortensen).
- Invited to participate in the Cyber Security Research Initiative sponsored by leading industries such as Intel, IBM, Lockheed Martin and Honeywell at Washington DC, April 2012. The purpose was to set the agenda for industry research in the area of cyber security.
- Tan Chin Tuan (TCT) Exchange Fellow, Singapore, 2013.
- Sustained Achievement Award – UB Exceptional Scholars, 2013.
- Best Paper Award *at 6th International Conference on Secure Knowledge Management in the Big Data Era*, Dubai, UAE, December 2014 (with R. Mehresh).
- SEAS Senior Teacher of the Year Award, 2015.
- Best Poster Award at *8th IEEE International Conference on Biometrics: Theory, Applications, and Systems (BTAS*), Niagara Falls, NY, September 2016 (with H. Ceker).

PROFESSIONAL ASSOCIATIONS

Senior Member, IEEE.

Member, IEEE Computer Society.

Member, IEEE Test Technology Technical Council (TTTC).

Member, IEEE Computer Society's Technical Committee on Fault Tolerant Computing.

PROFESSIONAL ACTIVITIES

EDITORIAL SERVICE

- *International Journal of Reliability, Quality, and Safety Engineering*, World Scientific Publishing Company, Member of the Editorial Board, 1997 – present.

- *IEEE Transactions on Computers*, Associate Editor, 2001 – 2006.
- *IEEE Transactions on Computers*, Special Issue co-Guest Editor, Feb. 2003.
- *IEEE Transactions on Systems, Man and Cybernetics, Part A*, Special Issue co-Guest Editor, May 2006.
- *Information Systems Frontier*, Guest Executive Editor, 2007, Coordinating Editor, 2010 – .
- *ICST Transactions on Security and Safety*, Founding Member of the Editorial Board, April 2009 – .
- *Information Systems Frontier*, Special Issue co-Guest Editor, June 2014.
- *IEEE Transactions on Emerging Topics in Computing*, Special Issue co-Guest Editor, July 2016.

ADVISORY BOARD/COMMITTEE MEMBERSHIP

- NSF/NIST Committee on Cyber Security Workforce Needs Assessment and Educational Innovation, Washington DC, August 2003.
- Application Communities Committee to assess research direction at DARPA, Washington DC, October 2004.
- Science Advisory Board, Griffiss Institute for Information Assurance, 2004 – 2006.
- Technical Working Group for Education and Training in Digital Evidence (TWGETDE), National Institute of Justice, March 2005 – January 2006.
- Advisory Panel, eWEEK, 2005 – 2007.
- 12th Annual Symposium on Information Assurance and Secure Knowledge Management, Albany, NY, June 2012.
- Information Assurance and Homeland Security Academy, Mahindra Special Services Group (MSSG), Mumbai, India, 2012 – .

CONFERENCE SERVICE

General Chair

- Symposium Chair, 28th IEEE Symposium on Reliable Distributed Systems, Niagara Falls, NY, September 2009.
- General Chair, 2nd International Symposium on Data, Privacy and E-Commerce, Buffalo/Niagara Falls, NY, September 2010.
- General Co-Chair, International Conference on Security in Computer Networks and Distributed Systems (SNDS 2012), Thiruvananthapuram, Kerala, India, October 2012.

Technical Program Chair

- Program Co-Chair, 5th IEEE/ACM Great Lakes Symp. on VLSI, Buffalo, NY, March 1995.
- Program Co-Chair, 19th IEEE Symposium on Reliable Distributed Systems, Nuernberg, Germany, October 2000.
- Program Chair, 1st New York State Cyber Security Symposium, Utica, NY, Feb. 2003.
- Program Vice-Chair, 12th IEEE North Atlantic Test Workshop, Montauk, NY, May 2003.
- Program Co-Chair, International Conference and Indo-US Bilateral Workshop on Cyber Security, Cybercrime and Cyber Forensics, August 19-21, 2009, Cochin, India.
- Program Co-Chair, 27th IEEE International Conference on Computer Communications and Networks (ICCCN 2018), August 2018, Hangzhou, China.

Publicity Chair

- IEEE Computer Performance and Dependability Symposium (IPDS'98), Durham, NC, 1998.
- IEEE North Atlantic Test Workshop, Gloucester, MA, 2001, 2002.

Conference and Workshop Organizer

- Organizing Committee Member, American Association of Artificial Intelligence (AAAI) Workshop on Reasoning about Function, Washington D.C., 1993.
- Organizing Committee Member, 1st Griffiss Institute Academic-Industry Symposium on Cyber Security, New Paltz, NY, November 2003.
- Organizing Committee Member, Secure Knowledge Management, Buffalo, NY, September 23-24, 2004.
- Organizing Committee Member, Joint Workshop on Cyber Security 2006, Buffalo, NY, March 31, 2006.
- Steering Committee Chair, 2nd Workshop on Secure Knowledge Management, Brooklyn, NY, September 21-22, 2006.
- Steering Committee Chair, 3rd Workshop on Secure Knowledge Mgmt., Dallas, TX, 2008.
- Steering Committee Chair, 4th Workshop on Secure Knowledge Management, Rutgers University, NJ, 2010.
- Steering Committee Member, 2nd International Workshop on Security in Cloud Computing (SCC'2010), San Diego, CA, 2010.
- Steering Committee Member, 2nd International Conference on Advances in Computing, Communications and Informatics (ICACCI-2012), Mysore, India, Aug. 2013.
- Steering Committee Member, 6th Conference on Secure Knowledge Management, Dubai, UAE, 2014.
- Steering Committee Member, 2nd Int. Conference on Security in Computer Networks and Distributed Systems (SNDS 2014), Thiruvananthapuram, Kerala, India, March 2014.
- Steering Committee Member, IEEE Symposium on Reliable Distributed Systems, Newport Beach, CA, 2012, Braga, Portugal, 2013, Nara, Japan, 2014, Montreal, Canada, 2015.
- Organizing Committee Member, International Program on Information Assurance and Management, Buffalo, NY, 2012, 2013, 2014, 2015, 2016.
- Organizing Committee Member, GenCyber Camp for Middle School and High School Students, Buffalo, NY, Summer 2015, Summer 2016.
- Organizing Committee Member, Cyber Security Camp for Middle School and High School Students, Buffalo, NY, Summer 2017.

Panel Organizer

- "Fault Tolerance and Security in Distributed Systems", 19th IEEE Symposium on Reliable Distributed Systems, Neurnberg, Germany, 2000.
- "Key Security Issues for Financial Institutions and What can be done to Mitigate Them?", 4th International Program on Information Assurance and Management, Niagara Falls, NY, Sept. 2015, 5th International Program on Information Assurance and Management, Niagara Falls, NY, Aug. 2016.

Keynote Speaker

- 2nd Annual Symposium on Information Assurance, Albany, NY, June 2007 (jointly with 10th Annual NYS Cyber Security Conference).
- DIMACS/DyDAn Workshop on Mathematical & Computational Methods for Information Security, Texas Southern University, Houston, Texas, December 7, 2007.
- International Symposium on Data, Information & Knowledge Spectrum (ISDIKS 2007), Dec 13 - 15, 2007, Amrita University, Kerala, India.
- 3rd ACM International Workshop on Security and Privacy Analytics (Co-located with ACM CODASPY 2017), March 24, 2017, Scottsdale, AZ.

Panelist

- IEEE Symposium on Defect and Fault Tolerance in VLSI Systems, Albuquerque, NM, November 1999.
- 2nd International Workshop on Mathematical Methods, Models and Architectures for Computer Networks Security, St. Petersburg, Russia, September 2003.
- 20th Annual Computer Security Applications Conference, Tucson, AZ, December 2004.
- 6th Annual Western New York Technology Forum Featuring Homeland Security and Bioinformatics, Niagara Falls, NY, October 2006.
- 4th International Workshop on Dependable Network Computing and Mobile Systems (DNCMS), Madrid, Spain, October 2011.
- 1st Workshop on Computer Security Research Institute, Washington DC, April 2012.

Tutorial/Short Course Presentation

- 3 hour tutorial on "Real-time Intrusion Detection" (with K. Kwiat), IEEE MILCOM 2002.
- Embedded tutorial on "Recent Advances in Internet Security", International Symposium on Data, Information & Knowledge Spectrum, Dec 13-15, 2007, Amrita University, Kerala, India.
- Short courses on "Intrusion Detection" and "Wireless Networks Security", Amrita University, Kerala, India, December 15-16, 2007.
- Three day course on "Cyber Security", January 17-19, 2012, C.R. Rao Advanced Institute of Mathematics, Statistics and Computer Science (AIMSCS), Hyderabad, India.
- 4 hour Coursera course on "Cyber Security in Manufacturing", June 12, 2017.

Program Committee Member

- IASTED Int. Conference on Reliability, Quality Control and Risk Assessment, Nov. 1992.
- 2nd International Conference on Reliability, Maintainability and Safety (ICRMS '94), Beijing, China, June, 1994.
- ISSAT International Conference on Reliability and Quality in Design, (1st) Seattle, WA, 1994, (3rd) Anaheim, CA, 1997, (4th) Seattle, WA, 1998.
- IEEE/ACM Annual Simulation Symposium, (27th) La Jolla, CA, April 1994; (28th) Phoenix, AZ, April 1995; (30th) Atlanta, GA, April 1997; (33rd) Washington DC, April 2000; (34th) Seattle, WA, April 2001; (35th) San Diego, CA, April 2002; (36th) Orlando, FL, April 2003; (37th) Washington DC, April 2004; (38th) San Diego, CA, April 2005; (39th) Huntsville, AL, April 2006; (40th) Norfolk, VA, March 2007, (41st) Ottawa, Canada, April 2008.
- IEEE International Symposium on Defect and Fault Tolerance in VLSI Systems, (12th) Paris, France, 1997; (13th) Austin, TX, 1998; (14th) Albuquerque, NM, 1999; (15th) Mt. Fuji, Japan,

2000; (16th) San Francisco, CA, October 2001; (17th) Vancouver, Canada, October 2002; (18th) Boston, MA October 2003; (19th) Cannes, France, October 2004; (21st) Arlington, VA, 2006.

- 27th IEEE International Symposium on Fault Tolerant Computing, Seattle, WA, June 1997; 29th Madison, WI, June 1999.
- IEEE North Atlantic Test Workshop (NATW), (9th) Gloucester, MA, May 2000; (13th) Essex Junction, VT, May 2004; (16th) Boxborough, MA, May 2007; (17th)
- 12th Great Lakes Symposium on VLSI, New York City, April 2002.
- 3rd IEEE International Information Assurance Workshop, Washington DC, March 2005.
- Dependable Computing and Communications Symposium of IEEE DSN-2005.
- 6th and 8th Annual IEEE Information Assurance Workshop, West Point, NY, June 2005; June 2007.
- International Workshop on Mathematical Methods, Models and Architectures for Computer Networks Security (MMM-ACNS-2005), St. Petersburg, Russia, (3rd in Sept. 2005, 4th in Sept. 2007, 5th in Sept. 2010), Warsaw, Poland (7th in August 2017).
- Annual Symposium on Information Assurance, in conjunction with 9th Annual New York State Cyber Security Conference, June 2006; in conjunction with 10th Annual Conference, June 2007, in conjunction with 12th Annual Conference, June 2009, in conjunction with 13th Annual Conference, June 2010.
- IEEE Symposium on Reliable Distributed Systems (SRDS), (17th), West Lafayette, IN, 1998; (18th) Lausanne, Switzerland (1999); (19th) Nuernberg, Germany (2000); (20th) New Orleans, LA, 2001; (25th) Leeds, UK, 2006; (26th) Beijing, China, Oct. 2007; (27th) Napoli, Italy, Oct. 2008, (29th) New Delhi, India, Nov. 2010; (31st) Newport Beach, CA, Oct. 2012.
- 2nd International Swarm Intelligence & Other Forms of Malware Workshop (Malware 2007), New Orleans, LA, April 2007, (3rd) Fairfax, VA, October 2008, (4th) Montreal, Quebec, October 2009.
- The 2007 IEEE International Symposium on Ubisafe Computing (UbiSafe-07), Niagara Falls, Ontario, Canada, May 2007; UbiSafe-09, Chengdu, China, December 2009.
- IEEE First International Symposium on Data, Privacy, & E-Commerce (ISDPE 2007), Chengdu, China, November 2007.
- Second Workshop on Intelligent Networks: Adaptation, Communication & Reconfiguration (IAMCOM 2008) held in conjunction with 3rd International Conference on COMmunication System softWAre and MiddlewaRE (COMSWARE 2008), Bangalore, India, Jan. 2008.
- International Conference on Emerging Security Information, Systems and Technologies (SECURWARE), (1st) Valencia, Spain, 2007, (2nd) Cap Esterel, France, Aug. 2008, (3rd) Athens, Greece, June 2009, (4th) Venice, Italy, July 2010, (5th) French Riviera, Nice/Saint Laurent du Var, France, August 2011, (6th) Rome, Italy, August 2012.
- 3rd International Conference on Information Security and Assurance (ISA-09), Korea University, Seoul, Korea, June 2009.
- Euromicro International Conference on Parallel, Distributed and Network-based Processing (PDP 2009) Special Session on "Security in Networked and Distributed Systems", Weimar, Germany, February 2009; PDP 2010, Pisa, Italy, February 2010; Ayia Napa, Cyprus, February 2011; Garching, Germany, February 2012; Turku, Finland, March 2015.

- IEEE Symposium on Computational Intelligence in Cyber Security (CICS 2009), Nashville, TN, March 2009.
- The 9th International Symposium on Autonomous Decentralized Systems (ISADS 2009) Athens, Greece, March 2009.
- International Workshop on Managing Insider Security Threats (MIST 2009), West Lafayette, IN, June 2009 (1st), Morioka, Iwate, Japan, June 2010 (2nd), Fukuoka, Japan, Nov. 2012 (4th), Pukyong National University, Busan, Korea, Oct. 2013 (5th), Republic of Korea, Nov. 2014 (6th), Denver, CO, Oct. 2015 (7th), Vienna, Austria, Oct. 2016 (8th).
- International Conference on Information Security and Privacy, sponsored by International Society for Research in Science and Technology (ISRST), Orlando, Florida, July 2009.
- 25th IEEE International Conference on Advanced Information Networking and Applications (AINA), Distributed and Parallel Systems Track, Biopolis, Singapore, March 2011.
- 4th Secure Knowledge Management Workshop, Rutgers University, October 2010.
- IEEE MILCOM 2010, San Jose, CA, October 2010.
- The Colloquium for Information Systems Security Education (CISSE), (13th) Seattle, WA; (14th) Baltimore, MD, June 2010, (15th) Fairborn, OH, June 2011.
- The 8th International Conference on Mobile Web Information Systems (MobiWIS), Niagara Falls, Ontario, Canada, Sept. 2011; (9th) Niagara Falls, Ontario, Canada, Aug. 2012.
- 30th International Performance Computing and Communications Conference (IPCCC 2011), Orlando, Florida, November 2011.
- 7th International Conference on Information Warfare (ICIW 2012), Seattle, WA, March 2012.
- 1st International Conference on Cloud Security Management (ICCSM-2013), Seattle, WA, October 2013.
- 2nd International Conference on Security in Computer Networks and Distributed Systems (SNDS 2014), Thiruvananthapuram, Kerala, India, March 2014.
- 10th International Conference on Cyber Warfare and Security ICCWS-2015, Kruger National Park, South Africa, March 2015.
- 24th International Conference on Computer Communications and Networks (ICCCN), Las Vegas, NV, Aug. 2015.
- 8th ACM Conference on Data and Application Security and Privacy (CODASPY), Tempe, AZ, March 2018.

Session Chair

- 5th ISMM International Conference on Parallel and Distributed Computing and Systems, Pittsburgh, PA, October 1992.
- IASTED International Conference on Reliability, Quality Control and Risk Assessment, November 1992, Boston, MA, October 1993.
- 27th IEEE/ACM Annual Simulation Symposium, La Jolla, CA, April 1994.
- 3rd ISSAT Int. Conf. on Reliability and Quality in Design, Anaheim, CA, March 1997.
- IEEE Computer Performance and Dependability Symposium (IPDS'98), Durham, NC, 1998.
- 1st New York State Cyber Security Symposium, Utica, New York, Feb. 2003.
- 2nd International Workshop on Mathematical Methods, Models and Architectures for Computer Networks Security, St. Petersburg, Russia, September 2003.
- 13th IEEE North Atlantic Test Workshop, Essex Junction, VT, May 2004.

- 5th Annual IEEE Information Assurance Workshop, West Point, NY, June 2004.
- Dependable Computing and Communications Symposium of IEEE DSN-2005, Yokohama, Japan, June 2005.
- IEEE International Conference on Communications, Istanbul, Turkey, June 2006.
- 4th Annual IFIP WG 11.9 International Conference on Digital Forensics, Kyoto, Japan, January 2008.
- 27th IEEE Symposium on Reliable Distributed Systems (SRDS 2008), Naples, Italy, October 2008.
- 3rd Secure Knowledge Management (SKM 2008) Workshop, Dallas, TX, November 2008.
- 15th Annual Colloquium for Information Systems Security Education, Fairborn, OH, June 2011.
- Security Applications and Management Conference (SAM), Las Vegas, NV, July 2011.
- 16th Annual Colloquium for Information Systems Security Education, Orlando, FL June 2012.
- 32nd IEEE Symposium on Reliable Distributed Systems, Braga, Portugal, October 2013.
- 6th International Conference on Information-Warfare & Security, Washington DC, March 2011, 10th at Kruger National Park, South Africa, March 2015.
- IEEE MILCOM 2015, Tampa, FL, October 2015.
- IEEE International Conference on Identity, Security and Behavioral Analysis (ISBA), New Delhi, India, February 2017.

REFEREEING/EVALUATIONS

Academic Programs

- CIS Program Review at Genesee Community College, NY, 2004.
- External Reviewer for the Higher Diploma in Information Security Engineering Technology Program (HDISET), Abu Dhabi Polytechnic, UAE, 2012.
- Panel Chair to evaluate a Master of Science degree in Information Assurance in Ontario, Canada to be offered by Northeastern University, February 2015.
- Panel Member to evaluate a Master of Science degree in Information Security, United Arab Emirates University, Al Ain, UAE, 2017.

Proposals

- National Science Foundation, Panel, ad hoc and mail-in reviewer.
- U.S. Civilian Research and Development Foundation for Qatar's National Priorities Research Program (NPRP).
- American Association for the Advancement of Science (AAAS) for King Abdulaziz City for Science and Technology (KACST) at Saudi Arabia.
- Interdisciplinary Research and Creative Activities Funds Program (UB).

Books

Springer

Prentice Hall

Thomson Delmar Learning

McGraw-Hill

Journals

IEEE Transactions on Dependable and Secure Computing, IEEE Transactions on Computers, IEEE Transactions on Parallel and Distributed Computing, IEEE Transactions on Circuits and Systems I, II, IEEE Transactions on Software Engineering, IEEE Transactions on Computer Aided Design of ICs and Systems, IEEE Transactions on VLSI Systems, IEEE Transactions on Reliability, Parallel Computing, Software: Practice and Experience, IEEE Computer, Journal of Parallel and Distributed Computing, Simulation Practice and Theory (Elsevier), The Computer Journal, ACM Transactions on Design Automation, ACM Transactions on Computer Education, VLDB Journal, Journal of Electronic Testing: Theory and Applications (JETTA), VLSI Journal, IEE Proceedings on Computer and Digital Techniques, Microelectronics Journal, ETRI Journal (Korea), International Journal of Communication Networks and Distributed Systems (IJCNDS).

Conferences/Workshops

IEEE International Symposium on Fault Tolerant Computing, IEEE International Conference on Dependable Systems and Networks, IEEE International Conference of Computer Design, IEEE International Computer Performance and Dependability Symposium, IEEE International Symposium on Reliable Distributed Systems, IEEE International Test Conference, IEEE International Symposium on Circuits and Systems, IEEE Computer Software and Applications Conference, IEEE VLSI Design Conference, IEEE Great Lakes Symposium on VLSI, IEEE Asia Test Symposium, IASTED Conference on Reliability, Quality Control and Risk Assessment, International Simulation Symposium, ISMM Conference on Parallel and Distributed Computing Systems, IEEE Symposium on Defect and Fault Tolerance of VLSI Systems, IEEE North Atlantic Test Workshop, IFIP Conference on Digital Forensics, IEEE Malware, IEEE MILCOM, International Workshop on Managing Insider Security Threat (MIST), Parallel, Distributed and Network-Based Processing (PDP), International Conference on Computer Communications and Networks (ICCCN).

UNIVERSITY SERVICE

UNIVERSITY-WIDE

- Representative of the SUNY Cyber Security Task Force, 2002-06.
- Mentor, SUNY LSAMP Minority Summer Research Internship Program, 2003-04.
- Director, Center of Excellence in Information Assurance Research and Education, 2002 – .
- Member, Information Security Risk and Policy Advisory Group (ISRP), 2007 – .
- Mentor, Ronald E. McNair Post-Baccalaureate Achievement Program, 2011.

FACULTY-WIDE

- Mentor, Minority Students Mentor Program, 1993 – 1997.
- Mentor, Presidential Honors Mentor Program, 1993 – 1997.
- Member, Chair Search Committee, CSE department, 2002, 2001.
- Mentor, Minority Students Mentor Program, 2003.
- Member, Tenure Committee, 2007-09.
- Associate Dean for Research and Graduate Education, 2017 –

DEPARTMENT-WIDE

- Member of the Computer Engineering Committee, to make recommendations on equipments and other general needs of the CE Group, ECE Dept., 1988 – 1997.
- Coordinator of VLSI/Image Processing Laboratory, 1988 – 1989.

- Member of the Design Credits Evaluation Committee, ECE Dept., 1992.
- Member of the Income Fund Reimbursable (IFR) Committee, ECE Dept., 1992.
- Coordinator for Graduate Colloquium, ECE Dept., Spring 1993.
- Director of Undergraduate Studies, ECE Dept., Fall 1993 – Spring 1998.
- Coordinator of ABET preparation during the 1996 visit, ECE Dept.
- Founding Director of Computer Engineering program, Fall 1997 – Spring 1999.
- Member of Faculty Recruiting Committee, 1996, 1997, 1999, 2000.
- Member of the Executive Committee, CSE Dept., 1998.
- Director of IBM sponsored Electronic Test Design Automation Lab, 1999 – 2004.
- Internship Coordinator, CSE Dept., Fall 2002 – 2005.
- Member of Graduate Affairs Committee, CSE Dept., Fall 2001 – 2007.
- Member of Graduate Admissions Committee, CSE Dept., 2006 – 2007.
- Internship Coordinator, CSE Dept., Fall 2009 – Fall 2011.
- Chair, Recruiting Committee, CSE Dept., 2010, 2011, 2013.
- Chair, ACM Dissertation Nomination Committee, 2011.
- Internship Coordinator, CSE Dept., Fall 2012 – Summer 2017.
- Associate Department Chair, 2015 – Summer 2017.

COMMUNITY-WIDE

- Participated (by invitation) in the NSF and the American Association of Community Colleges (AACC) sponsored first workshop "Broadening Impact: NSF-funded Projects at Two-Year Colleges" at Washington DC, 16-17, June 2011.
- Participated (by invitation) in the NSF sponsored Working group meeting on "Information Assurance Education in Two and Four-Year Institutions" during the ACM ITiCSE Conference at Darmstadt, Germany, 24-29, June 2011.
- Participated (by invitation) in the "New York State Cyber Security Roundtable for Healthcare Industry", Roswell Park, NY, August 2015.
- Talk on "Cybersecurity Simplified" North Presbyterian Church, Williamsville, NY, January 2018.

TEACHING

COURSES TAUGHT AT UNDERGRADUATE LEVEL

1. ECE 202 – Circuit Analysis.
2. CSE 341 – Computer Organization (revised and restructured): to include both hardware and software aspects. Offered 13 times since fall 1999, last taught in spring 2016.
3. CSE 452/552 – VLSI Testing (new): offered first time in spring 1992, utilizing the Tektronix LV512 Hardware Chip Tester. The Tektronix tester was later replaced by ELVIS Tester from National Instruments. Facilities include Cadence software tools, last taught in spring 2009.
4. ECE 487 – Information Structures for Computer Engineers (revised and restructured): this course became one of the most popular electives of the ECE department, drawing students from other Engineering departments as well, last offered in 1996.
5. ECE 479: Microprocessors and Applications.

COURSES TAUGHT AT GRADUATE LEVEL

1. CSE 561 – Performance Analysis of Computer Systems (revised and restructured): this course utilized numerous software tools for performance evaluation. Offered in fall 1998 and Spring 2002.
2. CSE 561AM – Wireless Communications and Security: this course was offered to students at Amrita University, India as part of the joint MS in Embedded Systems program. Offered in July 2013, December 2013 and June 2016.
3. ECE 576 – Fault Diagnosis (revised and restructured): this course has been a popular graduate level course, also drawing students from other departments. Last offered in fall 1997.
4. CSE 565 – Computer Security (new) offered in fall semesters of 2002, 2003, 2004, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016 and 2017.
5. CSE 566 – Wireless Networks Security (new), in spring semesters of 2005, 2006, 2007, 2010, 2013 and 2015.
6. ECE 604 – Fault Tolerant Computing (new), offered three times since 1988.
7. CSE 713 – Topics in Computer System Security offered in spring 2000.
8. CSE 704 – Hardware-based Approach to Wireless Networks Security in spring 2008.
9. CSE 735 – Wireless Networks Security in spring 2011.
10. CSE 727 –Wireless Networks Security—Principles and Practices in spring 2014.
11. CSE 713 – Wireless Networks Security—Principles and Practices in spring 2016, spring 2017.

LABORATORY DEVELOPMENT

1. A new lab called SPIDER (Security, PrIvacy and DEpendability Research) has been created in 2001 to consolidate the research efforts on fault tolerance, security and Testing. This lab has Sun Workstations and PCs. In mid-2003, this lab was expanded through funds from DARPA and NSA/ARDA. In 2005, a component on wireless networks and security has been added through funds from NSF and Cisco. This lab is now in 338 Bell Hall.
2. A separate lab on Information Assurance was created jointly with the School of Management in 2003 to support the teaching of Information Assurance Methods course. This lab was funded by a grant from the Department of Defense.
3. The VLSI program, especially the Testing aspects, was initiated in 1989 with funding from Lilly Foundation. More funding was obtained from IEEE/ACM Design Automation in 1996, National Science Foundation in 1996, and IBM Corporation in 1999. The IBM partnership supports a Test Design and Automation Lab. The lab has a RS6000 server and 4 workstations and a variety of tools that includes TestBench, BooleDozer and HiaSynth. More than 25 students, both undergrads and grads receive experience on industry-grade VLSI tools in their course CSE452/552: VLSI Testing. This lab has been expanded to include 10 more workstations and a new server and has moved into a larger space. CircuitBench, a circuit level design and simulation tool has been installed and the existing TestBench tool has been updated. The lab has been used in CSE341: Computer Organization as well. (The lab has been decommissioned in 2005 due to lack of maintenance from Cadence.)

THESIS AND DISSERTATION SUPERVISION

MS STUDENTS

1. Kerr R., “An Expert System for the Selection of an Optimal BIST Design of PLAs”, May 1988, first appointment at Eastman Kodak, Rochester, NY.

2. Thodiyil J., “Implementation and Analysis of BIST Design of PLAs” Feb. 1990, first appointment at LSI Logic Inc., Milpitas, CA.
3. Sehgal A., “Design and Implementation of a Line Monitoring and Control System for Circuit Board Manufacture Using Surface Mount Technology”, June 1990, first appointment at Southwestern Bell Communications, Austin, TX.
4. Dakwala N., “A Heuristically Aided Probing Strategy for Troubleshooting Electronic Systems”, Feb. 1991, first appointment at Motorola, Austin, TX.
5. Ranganathan A., “Performance Analysis of Rollback Recovery Techniques”, May 1991, Continued into PhD.
6. Chen X., “Circuit Partitioning for the Testable Design of Large and Complex Systems”, Sept. 1991.
7. Francis C.S., “Software Design Using ADA – A Data Link Monitor Application”, Dec. 1991, appointed at Sierra Research, Buffalo, NY.
8. Chen L.C., “On-chip Test Generation for Combinational Circuits by LFSR Modification”, May 1993, joined Univ. of Southern California as a Ph.D student in Fall 1993.
9. Vidyaranya, “Parallel Implementation of Viterbi Algorithm for Solving Word Recognition Problems Using Hidden Markov Model”, July 1993, M.S., first appointment at Salomon Brothers Inc, NJ.
10. Babu K.J., “Detection and Diagnosis of Faults in Analog VLSI Circuits Using Specification-BIST (S-BIST)”, July 1994, M.S., first appointment at Ford Motor Company, Detroit, MI.
11. Reuse R.J., “A New Approach to Random testing of sequential circuits”, January 1997.
12. Terrill T., “A Software-Implemented Error Detection Scheme Designed for Run-time Monitoring of Pipelined Superscalar Processors", June 1997, first appointment at Lockheed-Martin, Maryland.
13. Lu M., “3-D height occultation algorithm for radar navigation simulation system”, February 1998, supported as RA, first appointment at Azerty Inc., Orchard Park, NY, as Programmer/Analyst.
14. Nissar A., “Fault Diagnosis of Mixed Signal VLSI Systems Using Neuromorphic Analyzers”, July 1998, first appointment at Intel Corporation, Portland, OR.
15. Unnikrishnan N., “Reconfiguration of Field Programmable Gate Array (FPGA) Logic Blocks for Testability”, September 1998, first appointment at LSI Logic, San Jose, CA.
16. Mantha K., “Concurrent Intrusion Detection in Distributed Systems”, July 2000, first appointment at Deloitte & Touche Consulting, New York City, NY.
17. Nagaraj P., “Defect Analysis and Realistic Fault Model Extensions in Multiport Memories”, June 2001, first appointment at Qualcomm, San Diego, CA.
18. Jafari R., “Enhancements to Testability Analysis and a Novel Method for Test-Point Insertion in Digital Circuits”, January 2002, joined Ph.D. program at University of California at Los Angeles, LA in Spring 2002.
19. Gummadidala, R., “A Geographic Leash Based Routing Protocol With Wormhole Defense for Mobile Ad Hoc Networks”, January 2004, first appointment at Qualcomm, San Diego, CA.
20. Challapalli H., “A New Framework for a Secure Federated Patient Healthcare System”, January 2004.
21. Sundararaman K., “Design for Manufacturability – Fault Model Extensions for RF Circuits with an Economic Perspective for Manufacturability, May 2004, first appointment at Qualcomm, San Diego, CA.

22. Chandrasekaran M., "Fast Online Reasoning Technique (FORT) Using Sequential Hypothesis Testing for Reasoning about Intrusions", August 2004, continued into Ph.D. at SUNY at Buffalo.
23. Muthukrishnan A., "Job Centric User Level Anomaly Detection", August 2004, first appointment at Frontier Science & Technology Research Foundation, Amherst, NY, currently at Bloomberg.
24. Tong M., "Twitter Structure and Formation Process from Information Propagation and Security Perspectives", December 2013, first appointment at Amazon Inc.

PHD STUDENTS

1. Chen Y.Y., "Fault Tolerant Design of Large Area Array Processors by Multiple Level Redundancy", August 1991; first employed a faculty member in Chung-Hua Polytechnic Institute, Hsinchu, Taiwan.
2. Ranganathan A., "Techniques and Models for Rollback Recovery in Distributed Systems", December 1993; first employed by Sun Microsystems, Mountain View, CA.
3. Kumar A., "A Framework for Function in Model Based Diagnosis", March 1994; currently a Professor at Ramapo College, NJ.
4. Demjanenko M., "Yield Enhancement by Inherent Component Redundancy", January 1995; first employed by VoCal Technology, Buffalo, NY.
5. Spina R., "A Framework for the Testing and Fault Diagnosis of Analog and Mixed-Signal Circuits Using Artificial Neural Networks", Aug. 1996; first employed by NBX Corporation, Boston, MA.
6. Goldberg, S., "Toward a Practical Realization of Fault-Tolerant Processing Arrays"; January 1997, currently an Associate Professor at Buffalo State College.
7. Ramamurthy B., "Hardware-Assisted Rollback Recovery in Distributed Systems", January 1997; currently working as a Teaching Associate Professor in CSE Department, SUNY at Buffalo.
8. Zarrineh K., "Architecture and Design of a Memory Test Synthesis Framework", May 1999; currently working at Advanced Micro Devices (AMD), Boston, MA.
9. Wu H., "Commonality Architecture: A New Interactive Video-on-Demand Systems Paradigm", September 2001; currently a faculty member in Taiwan.
10. Tien T.C., "Adaptive Routing in Dynamic Wireless Mobile Ad Hoc Networks", January 2003.
11. Zhao D., "An Integrated Framework for Concurrent Test and Wireless Control in Complex SoCs", December 2003; currently at University of Louisiana, Lafayette, LA, Associate Professor.
12. Chinchani R., "Job-Centric User-Level Intrusion Detection", May 2005; First job at Cisco Systems as Software Engineer.
13. Garg A., "A Modeling and Simulation Framework for Evaluation of Intrusion Detection Systems", August 2006; ArcSight Inc. as Senior Software Engineer.
14. Pramanik S., "Adaptive End-to-End Dependability for Generic Applications in a Network Environment", August 2007; ArcSight Inc. as Senior Software Engineer.
15. Vidyaraman S., "GUST: Game theoretic User-centered Security design Techniques", February 2008; Microsoft as Program Manager.
16. Virendra M., "Secure, Robust and Trusted Communications in Wireless Networks", May 2008; Brocade Communication Systems, Inc., Software Engineer.
17. Jadliwala M., "Security and Robustness of Localization Techniques for Emergency Sensor Networks", May 2008; currently at Wichita State University, Wichita, KS, Assistant Professor.
18. Chadrasekaran M., "An Introspective Behavior Based Methodology to Mitigate Internet Attacks", May 2009; Amazon Inc., Engineer.

19. Mathew S., "Techniques for Cyber-Attack Comprehension through Analysis of Application Level Data", July 2009; Amazon Inc., Engineer.
20. Mehresh R., "Schemes for Surviving Advanced Persistent Threats", September 2013, EMC Corporation, Software Engineer.
21. Sanzgiri A., "A Comprehensive Threat Assessment Framework for Securing Emerging Technologies", December 2013, Intel Corporation, Santa Clara, CA.
22. Ceker H., "Keystroke Dynamics for Enhanced User Recognition in Active Authentication", May 2017, Amazon Inc., Engineer.
23. Sun Y., "Shared Keystroke Data for Continuous Authentication – Generation and Analysis", January 2018, Bloomburg, Engineer.

HONORS TO PHD STUDENTS

- Kumar A., Presidential Fellowship, *State University of New York at Buffalo*, 1987-90.
- Tien T.C., Best Student Paper Award in the *1st IEEE IWoRC Conference*, Buffalo, NY, April 2000.
- Zhao D., Best Student Paper Award, *12th IEEE North Atlantic Test Workshop*, Montauk, NY, May 2003.
- Zhao D., NSF Career Award, Aug. 2009.
- Nataraj P. and Nagarajaiah H., Best Student Paper Award in the *4th Secure Knowledge Management Workshop*, Rutgers University, October 2010.

GRANTS AND CONTRACTS

1987-89	RADC & AFOSR	Co-PI, Versatile Maintenance Expert System, with S. Shapiro (PI) and S. Srihari (co-PI) (joined as co-PI in the ongoing project to investigate fault diagnosis)	$756,992
1987 – 99	NYS/UUP	Travel to various Conferences	$4,730
1988-89	Lilly Foundation	PI, Development of an Interactive Laboratory for Undergraduate Instruction in Electrical & Computer Eng., with R. Acharya (co-PI) and R. Sridhar (co-PI)	$8,000
1988-91	NSF	PI, Error Detection and Recovery Issues in Real-time Computer Systems (Research Initiation Award + REU Supplement)	$66,610
1990	ACM SIGDA	Travel to IEEE Design Automation Conference	$500
1991-92	IEEE/ACM	Honorable Mention Scholarship Grant (SIGDA)	$1,000
1992-98	NSF	Fabrication of VLSI Testing Project Chips at MOSIS	$38,420
1996-99	NSF	Co-PI, Instrumentation and Laboratory Improvement Program (ILI), with R. Sridhar (PI) ($41,000 in matching funds from UB)	$39,000
6/96-10/96	BCG, Buffalo	PI, Global Marine Distress Safety System Radio Telex Modem Simulator Development (L. Warnock, co-PI)	$12,651
1/97-10/97	BCG, Buffalo	PI, Marine Radar/Navigation Simulator Development (with L. Warnock, co-PI)	$58,260
1997-98	IEEE/ACM	PI, A Design for Test Perspective on Memory Synthesis	$12,000
1998-99	Kristal	PI, Gaitway Instrumented Treadmill Systems Software	$52,071

	Systems	Development (with S. White and T. Mattulke, co-PIs)	
1999	IBM Corporation	Electronic Test Design Automation Laboratory (on loan basis, worth more than $0.5 million)	-
1999-00	AFOSR	PI, A Distributed Concurrent Intrusion Detection and Recovery Scheme Based on Assertions	$25,000
2000	Motorola Foundation	Computer Engineering Education	$2,500
2000-01	IBM Corporation	PI, Built-In Self-Test of Sequential Circuits Using the Hold Method (Faculty Partnership Award)	$82,285
2000-04	AFRL/AFOSR	PI, A Comprehensive Reasoning Framework for Information Survivability ($36,907 subcontracted to Colorado State Univ.)	$305,000
2001	UB EdTech	PI, Upgrade of the Test Design Automation Laboratory	$8,000
3/01-9/01	Telcordia Technologies	PI, Prevention of Attacks in Computer Networks (administered as a gift to UB)	$20,000
2001-02	IBM Corp.	PI, Enhancements to TestBench	$32,165
2002-04	NYSTAR	PI, A New Embedded Built-In Self-Test Module for Future Systems-on-Chip (subcontract from Univ. of Rochester)	$45,000
2002-04	DoD/NSA	PI, Information Assurance Scholarship Program and Capacity Building in IA, with H.R. Rao (co-PI)	$271,579
2003	UB VP for Research	PI, Securing the Cyberspace – A Planning Proposal, with H.R. Rao (co-PI)	$10,000
2003-04	Vocal Technologies	A New Embedded Built-In Self-Test Module for Future Systems-on-Chip	$2,500
2003-06	Semiconductor Research Corporation	PI, Non-intrusive Signal Analysis of Embedded Multi-GHz RF Circuits (subcontract from Univ. of Rochester with M. Margala, $300,000; the other subcontractor is P.R. Mukund, RIT)	$80,000
2003-04	DARPA	PI, User Intent Encapsulation and Reasoning About Intrusion: Implementation and Performance Assessment	$315,000
2003-05	NSA/ARDA	PI, Protecting Documents from Insider Threat – A Multi-Phase Approach	$226,620
2003-04	DoD/NSA	Information Assurance Scholarship Program and Capacity Building in IA, with H.R. Rao (co-PI)	$243,284
2003-04	NSA/ARDA	PI, Event Correlation for Cyber Attack Recognition System, with J. Llinas, co-PI (subcontract from Alion Science and Technology, administered through Calspan-UB Research Center)	$157,000
2004	UB EdTech	Co-PI, HIPAA Compliant Medical Data Repository for Teaching (with R. Sharman, PI and H. Rao, co-PI)	$8,000
2004-05	NSF	PI, Secure Knowledge Management, A Workshop, with H.R. Rao (co-PI)	$8,000
2004-06	DARPA	PI, Mitigating the Insider Threat using High Dimensional	$255,862

		Search and Modeling, with Hung Ngo, co-PI (subcontract from Telcordia Technologies, with E. Van Den Berg, $1,292,295; the other subcontractor is R. Maxion, CMU)	
2004-06	NSF	PI, Federal Cyber Service: Expanding Capacity in Information Assurance Curriculum, with H.R. Rao (co-PI) ($50,000 subcontracted to Genesee Community College)	$299,699
2004-06	NSF	Co-PI, Women and Cyber Security: Gendered Tasks and Inequitable Outcomes, with H.R. Rao (PI) and S. Bagchi-Sen (co-PI)	$297,021
2004-05	AFRL	PI, Secure Knowledge Management – A Workshop, with H.R. Rao (co-PI)	$5,000
2004-07	NSF	PI, Information Systems Security Curriculum Development, with H.R. Rao (co-PI) (subcontract from Erie Community College, with Donna Kaputa, $450,000, under the ATE Projects)	$157,926
2004-05	DoD/NSA	PI, Information Assurance Scholarship Program and Research on Intrusion Detection and Response, with H.R. Rao (co-PI)	$185,191
2005-06	DoD/NSA	PI, Information Assurance Scholarship Program, with H.R. Rao (co-PI)	$100,925
2005-06	Cisco	PI, Equipment Donation (Computer Security Lab), with H.R. Rao (co-PI), Chunming Qiao (co-PI), Xin Wang (co-PI), R. Sharman (co-PI), David Murray (co-PI), Mathew Stock (co-PI)	$131,333
2006-07	UB VP for Research	Co-PI, Analyzing Emergency Response Management Systems in the Context of the Katrina and Rita Disasters – A First Responder Focus, with H.R. Rao (PI), R. Sharman (co-PI), C. Cook-Cottone (co-PI)	$22,082
2006-07	ITT Industries	PI, Inferring the Loss of Service Quality in a Disadvantaged Network – A Game Theoretic Perspective	$35,000
2006-07	NSF	Co-PI, SGER: The October 2006 Federal Disaster in Buffalo, NY: An Investigation of First and Second Responder Operations, with H.R. Rao (PI), R. Sharman (co-PI), C. Cook-Cottone (co-PI)	$29,977
2006-07	ITT Industries	PI, A Framework for Trusted and Reliable Cyber Interactions in Wireless Networks	$50,000
2007-09	NSF	PI, SFS (Capacity Building Track): Faculty Development to Promote Computer Forensics in the IA Curriculum, with H.R. Rao (co-PI), ($37,500 subcontract to Hilbert College)	$150,000
2007-08	DoD/NSA	PI, Information Assurance Scholarship Program and Capacity Building in Information Security, with H.R. Rao (co-PI)	$128,583
2008-11	NSF	PI, Computer Security and Investigations: An Integrative Approach to Curriculum Development in Digital Forensics, with H.R. Rao (co-PI) (subcontract from Erie	$149,631

		Community College, with Donna Kaputa, $449,662, under the ATE Projects)	
2008-09	Intel Corp.	Accelerating Techniques for Rapid Mitigation of Phishing and Spam Emails	$29,000
2008-09	DoD/NSA	PI, Information Assurance Scholarship Program, with H.R. Rao (co-PI)	$69,152
2008-12	NSF	PI, SFS (Scholarship Track): An Interdisciplinary Information Assurance Curriculum, with H.R. Rao (co-PI), T. Cusick (co-PI) and M. Bartholomew (co-PI)	$868,037
2009-10	ITT Industries	PI, Secure Proactive Recovery	$77,267
2009-10	NSF	Co-PI, U.S.-India Workshop on Security and Privacy in Global Information Systems, with H.R. Rao (PI)	$15,246
2009-10	Intel Corp.	PI, Accelerating Techniques for Rapid Mitigation of Phishing and Spam Emails – A Research Extension	$25,000
2009-10	Intel Corp.	Co-PI, Two Media/Content Processing Applications on Atom: Mobile 3D Graphics and Event Correlation for Cyber Attack Recognition, with Chang Wen Chen (PI)	$29,000
2009-12	NSF	Co-PI, TC: Small: Online Privacy and Senior Citizens: A Socio-Technical Multi-Perspective Framework for Trustworthy Operations, with H.R. Rao (PI), S. Bagchi-Sen (Co-PI)	$454,771
2010-10	Harris Comm.	Formal Methods-Based Common Criteria Certification Framework for a Separation Kernel, Phase 1	$34,566
2010-11	DoD/NSA	PI, Information Assurance Scholarship Program, with H.R. Rao (co-PI)	$77,552
2010-11	Harris Comm.	Formal Methods-Based Common Criteria Certification Framework for a Separation Kernel, Phase 2	$85,000
2011-12	DoD/NSA	PI, Information Assurance Scholarship Program, with H.R. Rao (co-PI)	$89,353
2012-13	DoD/NSA	PI, Information Assurance Scholarship Program, with H.R. Rao (co-PI)	$44,442
2012-17	NSF	PI, SFS: An Interdisciplinary Information Assurance Curriculum, with H.R. Rao (co-PI), T. Cusick (co-PI) and M. Bartholomew (co-PI)	$1,762,559
2013-16	NSF	Co-PI, TWC: Medium: Collaborative: Long-term Active User Authentication Using Multi-modal Profiles, with V. Govindaraju (PI), Ifeoma Nwogu (co-PI)	$849,718
2014-18	NSF	Co-PI, TWC: Medium: Collaborative: Data is Social: Exploiting Data Relationships to Detect Insider Attacks, with H. Ngo (PI), O. Kennedy (Co-PI), V. Chandola (Co-PI)	$959,999
2015-16	NSF	PI, GenCyber: Educating and Preparing Young Adults for a Cyber-driven World, with H.R. Rao (Co-PI)	$86,393
2015-17	NSF	Co-PI, EDU: Collaborative: Cybersecurity for Middle School Students at Museums: An Informal Learning Approach, with H.R. Rao (PI)	$199,759
2016-17	NSA	PI, Buffalo GenCyber Camp 2016, with H.R. Rao (Co-PI), D.J. Murray (Co-PI), L. Amo (Co-PI)	$99,169
2016-17	DMDII, UI	Co-PI, Digital Manufacturing & Design Specialization,	$385,489

	Labs, Chicago	K. Lewis (PI), Grant through UB TCIE	
2016-17	Peeva LLC, Buffalo	PI, Pet Tracking Software Development, with W. Xu (Co-PI), Grant through UB TCIE	$54,725
2017-20	NSF	Co-PI, SaTC: CORE: Small: Collaborative: Cardiac Password: Exploring a Non-Contact and Continuous Approach to Secure User Authentication, with W. Xu (PI)	$294,582
2017	NSF	Co-PI, NSF Student Travel Grant for 2017 Secure Knowledge Management Workshop (SKM), with H.R. Rao (PI), R. Santanam (Co-PI), M. Agrawal (Co-PI), R. Krishnan (Co-PI)	$12,142

Notes: 1) NYSTAR is New York State Science and Technology for Academic Research Agency.

2) NYS/UUP is the New York State United University Professionals Committee which offers competitive travel grants on the basis of proposal submissions.

PATENTS

- "Smart Device Enabled Secure Access to Multiple Entities", Invention Disclosure filed on May 4, 2012.
- "Method for Rendering Usable a Defective Raw Programmable Logic Array", U.S. Patent No. 4,920,497, April 1990.

PUBLICATIONS

Total number of refereed publications: 285; Google Scholar Citations: 4,844; h-index: 33

EDITED BOOKS

1. Upadhyaya S., K. Kwiat, A. Chaudhuri and M. Weiser (eds.), Mobile Computing: Implementing Pervasive Information and Communication Technologies, *Kluwer Academic Publishers Book Series on Interfaces in Operations Research and Computer Science*, June 2002.
2. Rao H.R., M. Gupta and S. Upadhyaya (eds), Managing Information Assurance in Financial Services, *Idea Group Inc.*, May 2007.
3. Rao H.R. and S. Upadhyaya (eds), Annals of Emerging Research in Information Assurance, Security and Privacy Services, *Elsevier*, 2009.

EDITED JOURNAL ISSUES

1. Upadhyaya S. and A. Bondavalli, Guest Editors, Special Issue on Reliable Distributed Systems, *IEEE Transactions on Computers*, Feb. 2003.
2. Rao, H.R. and S. Upadhyaya, Guest Editors, Part 1: Special Issue on Secure Knowledge Management, *IEEE Transactions on Systems, Man and Cybernetics, Part A*, May 2006.
3. Park, I., J.K. Lee, S. Upadhyaya and H.R. Rao, Part 2: Emerging Issues for Secure Knowledge Management – Results of a Delphi Study, *IEEE Transactions on Systems, Man and Cybernetics, Part A*, May 2006.
4. Kermani M,, E. Savaş and S. Upadhyaya, Guest Editors, Special Issue on Emerging Security Trends for Deeply-Embedded Computing Systems, *IEEE Transactions on Emerging Topics in Computing*, Vol. 4, No. 3, July 2016, pp. 318-320.

REFEREED JOURNAL ARTICLES

1. Goel P.S., V.K. Agarwal, A. Krishnan and S.J. Upadhyaya, "Auto reconfiguration of reaction wheels in IRS", *IEEE Transactions on Aerospace and Electronics Systems*, Vol. AES-21, No. 1, pp. 160-163, Jan. 1985.
2. Upadhyaya S.J. and K.K. Saluja, "A watchdog processor based general rollback technique with multiple retries", *IEEE Transactions on Software Engineering* Special Issue on Software Reliability (Amrit Goel, Guest Editor), Vol. SE-12, No. 1, pp. 87-95, Jan. 1986.
3. Upadhyaya S.J. and K.K. Saluja, "A new approach to the design of built-in self testing PLA's for high fault coverage", *IEEE Transactions on Computer Aided Design of Integrated Circuits and Systems*, Special Issue on Testable and Maintainable Design (E.J. McCluskey, Guest Editor), Vol. 7, No. 1, pp. 60-67, Jan. 1988[1].
4. Upadhyaya S.J. and K.K. Saluja, "An experimental study to determine task size for rollback recovery systems", *IEEE Transactions on Computers*, Vol. 37, No. 7, pp. 872-877, July 1988.
5. Pham H. and S.J. Upadhyaya, "The efficiency of computing the reliability of k-out-of-n systems", *IEEE Transactions on Reliability*, Vol. 37, No. 5, pp. 521-523, Dec. 1988.
6. Pham H. and S.J. Upadhyaya, "Reliability analysis of a class of fault tolerant systems", *IEEE Transactions on Reliability*, Vol. 38, No. 3, pp. 333-337, Aug. 1989.
7. Demjanenko M. and S.J. Upadhyaya, "Yield enhancement of field programmable logic arrays by inherent component redundancy", *IEEE Transactions on Computer Aided Design of ICs and Systems*, Vol. 9, No. 8, pp. 876-884, Aug. 1990.
8. Pham H. and S.J. Upadhyaya, "Optimal design of RAFT based fault tolerant distributed systems", *IEEE Transactions on Reliability*, Vol. 40, No. 3, pp. 375-379, Aug. 1991.
9. Kumar A. and S.J. Upadhyaya, "Focusing candidate generation", *Artificial Intelligence in Engineering*, Vol. 6, No. 3, pp. 156-159, July 1991.
10. Upadhyaya S.J. and S. Chakravarty, "Analysis of a fault-tolerant scheme for processor ensembles", *IEEE Transactions on Reliability*, Vol. 41, No. 2, pp. 294-302, June 1992.
11. Upadhyaya S.J. and H. Pham, "Optimal design of *k-to-l-out-of-n* systems", *International Journal of Modelling and Simulation*, Vol. 12, No. 3, pp. 69-72, Sept. 1992.
12. Upadhyaya S.J. and H. Pham, "Analysis of noncoherent systems and an architecture for the computation of the system reliability", *IEEE Transactions on Computers*, Vol. 42, No. 4, pp. 484-493, Apr. 1993.
13. Chen Y.Y. and S.J. Upadhyaya, "Reliability, reconfiguration and spare allocation issues in binary tree architecture based on multiple level redundancy", *IEEE Transactions on Computers*, Vol. 42, No. 6, pp. 713-723, June 1993.
14. Ranganathan A and S.J. Upadhyaya, "Performance evaluation of rollback recovery techniques in computer programs", *IEEE Transactions on Reliability*, Special Issue on Software Fault Tolerance (J.F. Meyer and H. Pham, Guest Editors),Vol.42, No. 2, pp. 220-226, June 1993.
15. Chen Y.Y. and S.J. Upadhyaya, "Yield analysis of reconfigurable array processors based on hierarchical redundancy", *IEEE Transactions on Computers*, Vol. 42, No. 9, pp. 1136-1141, Sept. 1993.

[1] The technique included as a section in the textbook on "Digital Systems Testing and Testable Design", by M. Abramovici, M. Breuer and A.D. Friedman, Computer Science Press, 1990.

16. Upadhyaya S.J. and B. Ramamurthy, "Concurrent process monitoring with no reference signatures", *IEEE Transactions on Computers*, Vol. 43, No. 4, pp. 475-480, Apr. 1994.
17. Chen Y.Y. and S.J. Upadhyaya, "A new approach to modeling the performance of a class of fault tolerant VLSI/WSI systems based on multiple-level redundancy", *IEEE Transactions on Computers*, Vol. 43, No. 6, pp. 737-748, June 1994.
18. Kumar A. and S.J. Upadhyaya, "Function based candidate discrimination during model based diagnosis", *Applied Artificial Intelligence, An International Journal*, Vol. 9, No. 1, pp. 65-80, Jan. 1995.
19. Upadhyaya S.J. and I.S. Hwang, "Design of a multi-level fault-tolerant mesh (MFTM) for high reliability applications", *International Journal of Reliability, Quality, and Safety Engineering, World Scientific*, Vol. 2, No. 4, pp. 419-429, December 1995.
20. Spina R. and S.J. Upadhyaya, "Linear circuit fault diagnosis using neuromorphic analyzers", *IEEE Transactions on Circuits and Systems-II*, Vol. 43, No. 3, pp. 188-196, March 1997.
21. Chen Y.Y., S.J. Upadhyaya and C.W. Cheng, "A comprehensive reconfiguration scheme for fault-tolerant VLSI/WSI array processors", *IEEE Transactions on Computers*, Vol. 46, No. 12, pp. 1363-1370, December 1997.
22. Kumar A. and S.J. Upadhyaya, "Component ontological representation of function for reasoning about devices", *Artificial Intelligence in Engineering Journal*, Vol. 12, No. 4, pp. 399-415, June 1998.
23. Nachman L., K.K. Saluja, S.J. Upadhyaya and R. Reuse, "A novel approach to random pattern testing of sequential circuits", *IEEE Transactions on Computers*, Special Issue on Dependability of Computing Systems (K. Kanoun and I. Pomerantz, Guest Editors), Vol. 47, No. 1, pp. 129-134, Jan. 1998.
24. Goldberg S. and S.J. Upadhyaya, "Implementing degradable processing arrays", *IEEE Micro*, Vol. 18, No. 1, pp. 64-74, Jan/Feb, 1998.
25. Ramamurthy B., S.J. Upadhyaya and B. Bhargava, "Design and analysis of an integrated checkpointing and recovery scheme for distributed applications", *IEEE Transactions on Knowledge and Data Engineering*, Special Issue on Reliable Distributed Systems, Vol. 12, No. 2, pp. 174-186, March/April 2000.
26. Zarrineh, K., S.J. Upadhyaya and V. Chickermane, "System-on-Chip testability using LSSD scan structures", *IEEE Design and Test of Computers*, Vol. 18, No. 3, pp. 83-97, May-June 2001.
27. Agarwal M., R. Kishore, H.R. Rao and S. Upadhyaya, "Towards a test bed for modelling application service provider (ASP)", *Vision, The Journal of Business Perspective*, Vol. 5, No. 1, pp. 13-23, January-June, 2001.
28. Zarrineh K., S.J. Upadhyaya and S. Chakravarty, "Automatic Generation and Compaction of March Tests for Memory Arrays", *IEEE Transactions on VLSI Systems*, Vol. 9, No. 6, pp. 845-857, December 2001.
29. Zhao D. and S. Upadhyaya, "A Generic Resource Distribution and Test Scheduling Scheme for Embedded Core-Based SoCs", *IEEE Transactions on Instrumentation and Measurement*, Vol. 53, No. 2, pp. 318-329, April 2004.
30. Gupta M., H.R. Rao and S. Upadhyaya, "Electronic Banking and Information Assurance Issues: Survey and Synthesis", *Journal of Organizational and End User Computing*, Special Issue on Information Assurance and Security, IDEA Group Publishing, Vol. 16, No. 3, pp. 1-21, July-September 2004.
31. Goldberg S., S. Upadhyaya and W.K. Fuchs, "Recovery Schemes for Mesh Arrays Utilizing Dedicated Spares", *IEEE Transactions on Reliability*, Vol. 53, No. 4, pp. 445-451, Dec. 2004.

32. Tanna G., M. Gupta, H.R. Rao and S. Upadhyaya, "Transaction and Workflow Analysis of Electronic Bill Payment and Presentation Systems – An Information Assurance Perspective", *Journal of Decision Support Systems,* Elsevier, Vol. 41, No. 1, pp. 242-261, November 2005.
33. Chinchani R., Duc Ha, Anusha Iyer, Hung Q. Ngo, and Shambhu Upadhyaya, "On the Hardness of Approximating the MIN-HACK Problem", *Journal of Combinatorial Optimization*, Springer, Vol. 9, No. 3, pp. 295-311, May 2005.
34. Zhao D. and S. Upadhyaya, "Dynamically Partitioned Test Scheduling with Adaptive TAM Configuration for Power-Constrained SoC Testing", *IEEE Transactions on Computer-Aided Design of ICs and Systems*, Vol. 24, No. 6, pp. 956-965, June 2005.
35. Lee J.K., S. Upadhyaya, H.R. Rao and R. Sharman, "Secure Knowledge Management and the Semantic Web", *Communications of the ACM*, Special Section on Semantic E-Business Vision, Vol. 48, No. 12, pp. 48-54, December 2005.
36. Chai S., S. Bagchi-Sen, C. Morrell, H. Raghav Rao, and S. Upadhyaya, "Role of Perceived Importance of Information Security: An Exploratory Study of Middle School Children's Information Security Behavior", *The Journal of Issues in Informing Science and Information Technology*, Information Science Institute, Vol. 3, pp. 127-136, 2006.
37. Zhao D., S. Upadhyaya and M. Margala, "Design of a Wireless Test Control Network with Radio-on-Chip Technology for Nanometer System-on-Chip", *IEEE Transactions on Computer-Aided Design of ICs and System (TCAD)*, pp. 1411-1418, Vol.25, No.7, July 2006.
38. Ghosh D., R. Sharman, H.R. Rao and S. Upadhyaya, "Self-Healing Systems – Survey and Synthesis", *Journal of Decision Support Systems,* Elsevier, 42 (January 2007) 2164-2185.
39. Jadliwala M., Qi Duan, Jinhui Xu and Shambhu Upadhyaya. "On Extracting Consistent Graphs in Wireless Sensor Networks", *International Journal of Sensor Networks (IJSNET):* Special Issue on Theoretical and Algorithmic Aspects in Sensor Networks, Vol. 2, Nos 3/4, pp. 149-162, 2007.
40. Park I., R. Sharman, H.R. Rao and S. Upadhyaya, "Short Term and Total Life Impact Analysis of Email Worms in Computer Systems", *Decision Support Systems,* 43 (April 2007) 827-841.
41. Chen R., R. Sharman, H.R. Rao and S. Upadhyaya, "Design Principles for Emergency Response Systems", *Special Issue on Security Informatics, Information Systems and e-Business Management,* Springer, Vol. 5, No. 3, June 2007.
42. Park I., R. Sharman, H.R. Rao and S. Upadhyaya, "The Effect of SPAM and Privacy Concerns on email Users' Behavior", *Journal of Information System Security,* Vol. 3, No. 1, pp. 37-63, 2007.
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POSTERS (Refereed and non-refereed)

1. Ramamurthy B. and S.J. Upadhyaya, "A controllable signature checkpointing scheme for transient error detection", *Phoenix Conference on Computers and Communications*, Scottsdale, Arizona, pp. 899-900, Mar. 1990 (refereed).
2. Upadhyaya S., "Attack recognition in distributed systems by assertion checking", poster presentation, *Information Institute-SAB reception*, Rome Labs, Rome, NY, Dec. 6, 1999.
3. Upadhyaya S., "Attack recognition and shielding in distributed information systems", poster presentation, Information *Institute-SAB reception*, Rome Labs, Rome, NY, Nov. 5, 2001.
4. Upadhyaya S., "A Tamper-Resistant Framework for Unambiguous Detection of Attacks in User Space Using Process Monitors", *1st New York State Cyber Security Conference*, Utica, NY, Feb. 2003.

5. Upadhyaya S., R. Chinchani and K. Kwiat, "New methods for attack detection", *AFRL Information Institute Workshop*, Rome, NY, June 2003.
6. Virendra M., S. Upadhyaya and X. Wang, " GSWLAN: A New Architecture Model for a Generic and Secure Wireless LAN System", *Proc. of the 2004 IEEE Workshop on Information Assurance*, West Point, NY, pp. 434-435, June 2004 (refereed).
7. Sharman, R., H. Challapalli, H.R. Rao and S. Upadhyaya, "A Framework for a Secure Federated Patient Healthcare System," *Proceedings of Symposium on Intelligence and Security Informatics*, Springer-Verlag Lecture Notes in *Computer Science*, June 2004 (refereed).
8. Virendra M. and S. Upadhyaya, "Ensuring Secure Information Management in 802.11 Networks after a Central Authority Failure", *NSF/ARFL Sponsored Workshop on Secure Knowledge Management*, Buffalo, NY, pp. 255-256, September 2004 (refereed).
9. Ha, D., S. Pramanik, H. Ngo and S. Upadhyaya, "A System for Assessment, Detection and Analysis of Insider Threats", *Insider Threat Seminar, United States Secret Services*, Center for the Arts, University at Buffalo, March, 2006.
10. Kumaraguru P., S. Upadhyaya and H.R. Rao, "Protecting Senior Citizens from Cyber Security Attacks in the e-Health Scenario: An International Perspective", *6th Annual Cyber Security and Information Intelligence Research Workshop (CSIIRW)*, Oakridge, TN, April 2010 (refereed).
11. Chen R., H.R. Rao, R. Sharman, S. Upadhyaya and C. Cook-Cottone, "Examination of Emergency Response from Knowledge and Psychology Perspectives", *7th International Conference on Information Systems for Crisis Response and Management*, Seattle, WA, May 2010 (refereed).
12. Keshavamurthy V., S. Upadhyaya and V. Gopal, "Accelerated Processing of Secure Email by Exploiting Built-in Security Features on the Intel EP80579 Integrated Processor with Intel QuickAssist Technology", *2011 Intel Embedded Research & Education Summit*, Chandler, AZ, Feb. 2011.
13. Crawford C. and S. Upadhyaya, "Implementing a Black Hole Attack in Open 802.11s – A Computer Security Project Experience", *15th Colloquium for Information Systems Security Education*, Fairborn, OH, June 2011 (refereed).
14. Kaputa D., S. Upadhyaya and H.R. Rao, "Computer Security and Investigations: An Integrative Approach to Curriculum Development in Digital Forensics", *Broadening Impact: NSF-funded Projects at Two-Year Colleges Conference*, Washington, D.C., June 16-17, 2011.
15. Chandola V., O. Kennedy, H.Q. Ngo and S. Upadhyaya, "Data is Social: Exploiting Data Relationships to Detect Insider Attacks", *Secure and Trustworthy Cyberspace PI Meeting*, Washington DC, January 2015.
16. Kisekka V., R. Sharman, H.R. Rao, S. Upadhyaya and N. Gerber, "Investigating the Antecedents of Healthcare Workers' Perceptions of Organizational Resilience in Hospitals", *International Conference on Information Systems (ICIS)*, Fort Worth, TX, December 2015 (refereed).
17. Spaulding J., S. Upadhyaya and A. Mohaisen, "You've Been Tricked! A User Study of the Effectiveness of Typosquatting Techniques", *37th IEEE International Conference on Distributed Computing Systems (ICDCS 2017*), Atlanta, GA, June 2017 (refereed).

TECHNICAL REPORTS AND EDUCATIONAL CONFERENCES

1. Upadhyaya S.J., R. Sridhar and R. Acharya, "Development of an interactive facility for VLSI and image processing instruction", *Proceedings of the Conference on Innovations in Instructional Computing*, Saratoga Springs, NY, pp. 107-111, Apr. 1989.

2. Chen J., J. Choi, J. Geller, A.Kumar, M.R. Taie, S.C. Shapiro, S.N. Srihari and S.J. Upadhyaya, "VMES: A Versatile Maintenance Expert System", *Technical Report 90-06*, Dept. of Computer Science, SUNY/Buffalo, April 1990.
3. Kumar A. and S.J. Upadhyaya, "Framework for Function Based Diagnosis", Technical *Report 92-19*, Dept. of Computer Science, SUNY/Buffalo, August 1992.
4. Upadhyaya S. and R. Reuse, "A New Test Generation Methodology for Built-In Self-Test of Sequential Circuits", *Workshop on Academic Electronics in New York State*, Syracuse, New York, pp. 185-190, June 13-14, 1996.
5. Goldberg S. and S. Upadhyaya, "Reconfiguration Scheme for Fault-Tolerant Processing Arrays Packaged in Multichip Modules", *Workshop on Academic Electronics in New York State*, Syracuse, New York, pp. 265-269, June 13-14, 1996.

INVITED TALKS

AT CONFERENCES AND RESEARCH MEETINGS

1. "Artificial Intelligence Techniques in Electronics Systems Diagnosis", *NAIC Meeting*, University of Massachusetts, Amherst, Massachusetts, November 1989.
2. "Research on Concurrent Intrusion Detection in Distributed Systems", *Information Institute Workshop* sponsored by U.S. Air Force Research Laboratory, Blue Mountain Lake, NY, June 2000.
3. "Encapsulation of Owner's Intent for Intrusion Detection", *Air Force Research Laboratory*, Rome, NY, May 2002.
4. "Test Scheduling in SoCs", 1st *Annual New York State Conference on Microelectronics Design*, Columbia University, January 2002.
5. "Recent Results in Scheduling of Tests in SoCs", *2nd Annual New York State Conference on Microelectronics Design*, University of Rochester, January 2003.
6. "Overview of Security Research at UB", *1st New York State Cyber Security Symposium*, Utica, NY, Feb. 2003.
7. "Real-time Intrusion Detection with Emphasis on Insider Attacks", *2nd International Workshop on Mathematical Methods, Models and Architectures for Computer Networks Security*, St. Petersburg, Russia, September 2003.
8. "Distributed Test Controller Architecture Using Radio-on-Chip Technology", *3rd Annual Microelectronics Design Conference*, Columbia University, January 2004.
9. "Wireless Security Initiative at UB", *Joint Workshop on Cyber Security 2006*, Buffalo, NY, March 2006.
10. "Assessment, Detection and Analysis of Insider Threats", Information Security Meeting, Stony Brook Manhattan Facility, April 2006.
11. "ICMAP: An Information centric Modeling Tool for Insider Threat Analysis", *3rd Annual IFIP WG 11.9 International Conference in Digital Forensics*, Orlando, FL, Jan. 2007.
12. "Understanding Multistage Attacks in the Cyberspace to Address the Grand Challenges in Security", Keynote Talk, *2nd Annual Symposium on Information Assurance, jointly with the 10th Anniversary New York State Cyber Security Conference, Albany*, NY, June 2007.
13. "Fighting the Scourge on the Internet: Addressing Security Threats to Contemporary Users", *DARPA Tech 2007*, Sidebar Presentation, Anaheim, CA, August 2007.

14. "Security Research at UB", *Information Assurance Scholarship Program, NSA Principal's Meeting*, Albuquerque, NM, October 2007.
15. "Information Assurance Activities at UB", *Information Assurance Scholarship Program, NSA Principal's Meeting*, Phoenix, AZ, October 2008.
16. "Secure and Privacy-Preserving Document Management", *Data and Applications Security, NSF Workshop*, Washington DC, February 2009.
17. "Challenges in Mitigating Phishing and Spam e-mails", *Indo-US Workshop on Cyber Security, Cyber Crime and Cyber Forensics*, Kochi, India, August 2009.
18. "Challenges in Mitigating Phishing and Spam e-mails", *Graduate Education and Research in Information Security*", Binghamton University, October 2009.
19. "Cyber Attack Scenario Detection and Statistical Signature Generation Through Heterogeneous Event Stream Analysis", *Indo-US Workshop on Infrastructure Security*, Bangalore, India, Jan. 2010.
20. "Tamper-resistant Monitoring of User Space Components", Featured presentation in the Secured/Protected Networks and Systems session, *MILCOM 2011*, Baltimore, MD, Nov. 2011.
21. "Insider Threat in Financial Institutions – An Analysis and Countermeasures," distinguished invited talk in the *1st International Symposium on Cyber Security*, Nanyang Technological University, Singapore, January 2013.
22. "Insider Threat – Analysis and Countermeasures," *Institute for Infocomm Research (I2R)*, Singapore, Aug. 2013.
23. "Insider Threat – Analysis and Countermeasures," *DIMACS/RUCIA Workshop on Information Assurance in the Era of Big Data*, Rutgers University, February 2014.
24. "Injecting Cyber Security through Certificate Programs", *NSA Centers of Academic Excellence (CAE) Community Meeting*, Columbia, MD, November 2014.
25. "Surviving Advanced Persistent Threats: A Framework and Analysis", *Regional Symposium on Graduate Education and Research in Information Security (GERIS 16)*, Binghamton University, Binghamton, NY, March 2016.
26. "Key Security Issues for Financial Institutions and What can be done to Mitigate Them?", *5th International Program on Information Assurance and Management*, Niagara Falls, NY, Aug. 2016.
27. "Continuous Authentication Using Behavioral Biometrics", *3rd ACM International Workshop on Security and Privacy Analytics* (Co-located with ACM CODASPY 2017), Scottsdale, AZ, March 2017.

UNIVERSITY COLLOQUIA AND INDUSTRY TALKS

1. "Error Detection and Recovery Issues in Real-time Systems", *Department of Electrical Computer Engineering, University of Wisconsin at Madison*, WI, November 1990.
2. "Rollback Recovery Techniques in Computer Systems", *Microprocessor Applications Laboratory, Indian Institute of Science*, Bangalore, India, May 1991.
3. "Fault-tolerant Design of Large Area Array Processors", *Indian Space Research Organization, Bangalore*, India, May 1991.
4. "Watchdog Processor Assisted Checkpointing in Distributed Computer Systems", *Coordinated Sciences Laboratory, University of Illinois at Urbana-Champaign*, Urbana, IL, April 1995.
5. "Watchdog Processor Assisted Checkpointing in Distributed Computer Systems", *Department of Electrical Computer Engineering, University of Wisconsin at Madison*, WI, April 1995.

6. "Test Generation in BIST Environment", IEEE Computer Society Talk, D*ept. of Electrical Engineering, Washington University*, St. Louis, MO, July 1995.
7. "Fault Tolerance and Fault Testing in Multiprocessor Systems – A New Perspective", D*ept. of Electrical Engineering, University of Texas at San Antonio*, May 1996.
8. "A Novel Approach to Testing Sequential Blocks", Microprocessor Products Group, *Intel Corporation*, Folsom, CA, July 1998.
9. "Overview of VLSI Testing Research at SUNY-Buffalo", *IBM Corporation*, Endicott, NY, Jan. 1999.
10. "Concurrent Intrusion Detection in Distributed Systems", *Naval Research Laboratory*, Washington, DC, June 1999.
11. "University at Buffalo - IBM Partnership Overview", *IBM Corporation,* Endicott, NY, September 2000.
12. "Towards an Integrated Real-Time Intrusion Assessment and Recovery Framework for Network Management", *Department of Mathematics, SUNY at Geneseo*, October 2000.
13. "A Tamper-resistant Monitoring Framework for Anomaly Detection in Computer Systems", *Brock University*, Ontario, Canada, Feb. 2003.
14. "Real-time Intrusion Detection with Emphasis on Insider Attacks", *Polytechnic University*, Brooklyn, NY, October 2003.
15. "Information Assurance and Computer Security", *Communication-Electronics Research Development & Engineering Center (CERDEC)*, U.S. Army, Ft. Monmouth, NJ, June 2006.
16. "How to Deal with Insider Threats?", *Rutgers University*, Piscataway, NJ, March 2008.
17. "Accelerating Techniques for Rapid Mitigation of Phishing and Spam Emails", *Embedded Systems and Communications Academic Summit, Intel Corporation*, Chandler, AZ, Feb. 2009.
18. "Trends and Directions in Computer Security at UB", *Alumni Symposium, University at Buffalo*, Buffalo, NY, April 2009.
19. "Higher Education in Computer Security", *KVG College of Engineering*, Sullia, India, August 2009.
20. "Trends in Cyber Security at UB", *Amrita University*, Amritapuri, India, August 2009.
21. "Cyber Security: Challenges for the Future", *Western New York Science and Technology Forum*, University at Buffalo, October 2009.
22. "Cyber-Crime Data Center Issues", *Indraprastha Institute of Information Technology (IIIT)* Delhi, India, July 2010.
23. "Data De-Duplication for Computer Security Applications", *IBM Research Lab*, Delhi, India, July 2010.
24. "Data De-Duplication for Computer Security Applications", *Amrita University*, Ettimadai, India, July 2010.
25. "Inferring Source of Information Leak in Document Management Systems", *Adobe India Research Lab*, Bangalore, India, July 2010.
26. "Data De-Duplication for Computer Security Applications", *Department of Industrial and Systems Engineering, Rutgers University*, October 2010.
27. "Cyber Security: Fundamentals and Challenges for the Future", *C.R.Rao Advanced Institute of Mathematics, Statistics and Computer Science (AIMSCS)*, Hyderabad, India, January 2012.

28. "Mitigating Insider Threats and Information Leak in High Value Systems", *C.R.Rao Advanced Institute of Mathematics, Statistics and Computer Science (AIMSCS)*, Hyderabad, India, January 2012.
29. "Protecting Security Systems from Subversion Attacks on the Internet", *C.R.Rao Advanced Institute of Mathematics, Statistics and Computer Science (AIMSCS)*, Hyderabad, India, January 2012.
30. "Cyber Security: Fundamentals and Challenges for the Future", *Indian Institute of Technology, Bhubaneswar, India,* January 2012.
31. "Mitigating Insider Threats and Information Leak in High Value Systems", *Indian Institute of Technology, Bhubaneswar, India,* January 2012.
32. "Data De-Duplication for Computer Security Applications", *Indian Institute of Technology, Bhubaneswar, India,* January 2012.
33. "Software Security and Secure Programming Practices – An Overview", *Indian Institute of Technology, Bhubaneswar, India,* January 2012.
34. "Insider Threats in Financial Organizations – An Analysis and Countermeasures", *Institute for Development and Research in Banking Technology*, Hyderabad, India, May 2012. (Skype Presentation)
35. "Insider Threat – Analysis and Countermeasures," *Infocomm Centre of Excellence*, Nanyang Technological University, Singapore, July 2013.
36. Situation Awareness and Cyber Early Warning – A Look into Attack Semantics and Data Dimensionality," *Infocomm Center of Excellence, Nanyang Technological University*, Singapore, Aug. 2013 (Co-organized by IEEE Communications Singapore Chapter).
37. Insider Threat – Analysis and Countermeasures," *Birla Institute of Technology and Science*, Pilani, Rajasthan, India, December 2013.

RESEARCH IN THE NEWS

NewScientist	October 2002	"Software Predicts User Behavior to Stop Attacks"
Scientific American	December 2002	"Keyboard Cops", News Scan Brief on Computer Security.
Washington Post	January 2003	"Mission: Find Intruders Instantly", Associated Press article on 1/23/2003, page E09.
USA Today	January 2003	"Profiling Software Provides New Security Against Hackers", 1/20/2003.
San Francisco Chronicle	January 2003	"Anti-hacking Software", 1/21/2003.
Times Union, Albany	January 2003	"Anti-hacker Profiling Shows Promise", 1/20/2003.
Yahoo.com, MSNBC.com	January 2003	"Profiling the Hackers", 1/20/2003.
Computer Crime Research Center	January 2003	"Profiling Software Ferrets out Hackers", 1/20/2003.

CBSNEWS.com	January 2003	"Getting a Handle on Hack Attacks", 1/21/2003.
Wired News	January 2003	"How to Foil Data Thieves, Hackers", 1/20/2003.
SecurityFOCUS	January 2003	"New Software Aims to Snare Computer Intruders in Real-time", 1/20/2003.
AFMC Public Affairs	October 2003	"AFRL Computer Security Research Improves Insider Attack Detection."
Buffalo News	October 2012	"Training cyber defenders," October 28, 2012.
Infosecurity Magazine	March, 2013	"Hack to the Future," March 5, 2013.
NBC News Channel 2	November 2013	"Countermeasures to Power Facility Cyber Attacks," November 14, 2013.
NBC News Channel 2	November 2013	"Training Cyber Warriors," November 23, 2013.
CBS News Channel 4	April 2017	"Cyber Attacks on Nuclear Facilities," April 27, 2017.
Fox News	May 2017	"WannaCry Ransomware Attack: How Average Computer Users Contributed to Global Spread of Malware," May 15, 2017.
Buffalo Business First	June 2017	"University at Buffalo Expert on Changing World of Cybersecurity," June 2, 2017.