



## Professor Ravi Sandhu

University of Texas at San Antonio

*Executive Director and Founder, Institute for Cyber Security*

*Lutcher Brown Endowed Chair in Cyber Security*

*Professor of Computer Science, College of Sciences*

*Founding Director, NSF Center for Security and Privacy Enhanced Cloud Computing*

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## Contact

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## Degrees

Degree	Major	University	Year
Ph.D.	Computer Science	Rutgers University, New Jersey	1983
M.S.	Computer Science	Rutgers University, New Jersey	1980
M.Tech.	Computer Technology	Indian Institute of Technology, New Delhi	1976
B.Tech.	Electrical Engineering	Indian Institute of Technology, Bombay	1974

## Academic Career

- **Univ. of Texas at San Antonio, 2007 onwards:** Professor of Computer Science and Lutcher Brown Endowed Chair (Cyber Security). Executive Director, Institute for Cyber Security (2007-), Director NSF CREST Center for Security and Privacy Enhanced Cloud Computing (2017-).
- **George Mason University, 1995-2007:** Full Prof., 1989-1995: Assoc. Prof. (Info. & Software Engg.).
- **Ohio State University, 1983-1989:** Assistant Professor, 1982-1983: Instructor (Computer Science).

## Career Focus and Goals

My career has focused on high impact research, practice and education in cyber security starting with my doctoral thesis. Effective cyber security requires science, engineering, business, policy and people skills. My goal has been and is to instill this culture in the discipline and provide leadership in all elements.

## Professional Recognition

- **Citations and Impact.** (Based on current Google Scholar) 44,500+ citations, h-index 87.
- **Frequent Keynote and Invited Speaker.** See [www.profsandhu.com](http://www.profsandhu.com) for details.
- **National Academy of Inventors Fellow, 2021.**
- **IFIP TC 11 Kristian Beckman Award, 2019.** “In recognition of significant and long-term contribution to the field of information security in research, education and promotion.”
- **IEEE Innovation in Societal Infrastructure Award, 2018.** “For advancing the foundations and practice of information security through creation, development, and technology transfer of role-based access control (RBAC).”
- **IFIP WG 11.3 Outstanding Research Award, 2017.** “For outstanding research contributions to the field of data and applications security and privacy that have had lasting impact in furthering or understanding the theory or development of secure and private data applications.”
- **Society for Information Reuse and Integration Fellow, 2014:** For innovative work in computer and information security and outstanding service to SIRI.”
- **ACM SIGSAC Outstanding Innovation Award, 2012.** “For seminal contributions to the theory and practice of access control, notably including role-based access control.”
- **AAAS Fellow, 2008.** “For distinguished contributions to cyber security, including seminal role-based access control and usage control models, and for leadership in research journals and conferences.”
- **ACM SIGSAC Outstanding Contributions Award, 2008.**
- **IEEE Computer Society Technical Achievement Award, 2004.** “For outstanding and pioneering contributions to information security including innovation of the RBAC model and usage control.”

- **IEEE Fellow 2002.** “For contributions to the field of information and system security.”
- **ACM Fellow 2001.** “For technical contributions to the field of info. and system security, notably access control models and systems, and professional leadership in research journals and conferences.”
- **Best Paper Awards.** IEEE Conf. on Information Privacy, Security, Risk and Trust (PASSAT 2012). NIST/NSA National Computer Security Conference (1992 and 1998).
- **Test of Time Award.** ACM Symposium on Access Control Models and Technologies (SACMAT 2018 for SACMAT 2008 paper).

## University Recognition

- **University of Texas at San Antonio, 2015.** Charter member inductee of UTSA's Academy of Distinguished Researchers.
- **University of Texas at San Antonio, 2015.** Inductee of UTSA College of Science Academy for Outstanding Teaching Scholars.
- **University of Texas at San Antonio, 2007 onwards:** Lutcher Brown Endowed Chair in Cyber Security (Computer Science).
- **George Mason University 2001.** Outstanding research award.

## Highly Cited Papers at Google Scholar Include: Role-Based Access Control (RBAC)

- Role-Based Access Control Models, IEEE Comp., 29(2):38-47, 1996. 9500+ hits. #1 in access control.
- Proposed NIST Std. for RBAC. ACM TISSEC, 4(3):224-274, 2001. 3700+ hits. #2 in access control.
- The NIST Model for Role-Based Access Control. 5<sup>th</sup> ACM RBAC:47-63, 2000. 1300+ hits.
- The ARBAC97 Model for Role-Based Admin. of Roles. ACM TISSEC, 2(1):105-135, 1999. 900+ hits.
- Configuring RBAC to Enforce MAC and DAC. ACM TISSEC, 3(2):85-106, 2000. 900+ hits.
- Role-Based Authorization Constraints Specification. ACM TISSEC, 3(4):207-226, 2000. 600+ hits
- Framework for Role-Based Delegation Models. IEEE ACSAC:168-176, 2000. 400+ hits

## Usage Control

- The UCON<sub>ABC</sub> Usage Control Model, ACM TISSEC, 7(1):128-174, 2004. 1300+ hits.
- Towards Usage Control Models: Beyond Traditional Access Control. ACM SACMAT 2002. 550+ hits.

## Access Control Tutorials

- Access Control: Principles and Practice. IEEE Communications, 32(9): 40-48, 1994. 1750+ hits.
- Lattice-Based Access Control Models. IEEE Computer, 26(11): 9-19, 1993. 1000+ hits.
- Database Security: Concepts, Approaches and Challenges. IEEE TDSC, 2(1): 2-19, 2005. 550+ hits.

## Access Control Other Models

- A Unified Attribute-Based Access Control Model ... 26<sup>th</sup> IFIP Data/App. Sec.:262-275, 2012. 450+ hits
- Task-based Authorization Controls. 11<sup>th</sup> IFIP 11.3 Data and Application Sec.:262-275, 1997. 700+ hits.
- The Typed Access Matrix Model. 13<sup>th</sup> IEEE Security and Privacy (Oakland):122-136, 1992. 400+ hits.
- Toward a Multilevel Secure Relational Data Model, SIGMOD:50-59, 1991. 250+ hits.
- Transaction Control Expressions for Separation of Duties. 4<sup>th</sup> ACSAC:282-286, 1988. 200+ hits.
- Crypto. Implementation of a Tree Hierarchy for Access Control. IPL, 27(2):95-98, 1988. 300+ hits.
- The Schematic Protection Model, Journal of the ACM, 35(2):404-432, 1988. 200+ hits.

## Research Highlights

- **Statistics:** 300+ papers (with 100+ co-authors), 31 USA patents, 32 PhD graduates, 50+ research grants.
- **Sponsors:** include NSF, NSA, NRO, NRL, AFOSR, NIST, DARPA, ARDA, AFOSR, Sandia, State Dept., DOE, IRS, RADC, FAA, Intel, Northrop Grumman, Lockheed Martin, ITT, Verizon.
- **Ongoing research agenda:** Pursue world-leading research in both the scientific foundations of cyber security and their convergent applications in diverse 21<sup>st</sup> century cyber technology domains, including cloud computing, internet of things, autonomous vehicles, big data and blockchain. Current focus is on foundations and technology of convergent access control models that synergistically bring together attribute, role and relationship based approaches.

- **Research impact:** My seminal research on role-based access control has been instrumental in establishing it as the currently dominant form of access control, including acceptance as an ANSI/NIST standard in 2004. My research on numerous access control models remains influential and state-of-the-art. Newer models such as UCON, group-centric sharing and ABAC are gaining strong influence. I expect my ongoing work on convergence of access control models and security technologies to have considerable impact on researchers and practitioners in the 2020s.

### **Professional Leadership Includes**

- Editor-in-Chief, IEEE Transactions on Dependable and Secure Computing (TDSC), 2010-2013.
- Founding General Chair, ACM Conf. on Data and Applications Security and Privacy (CODASPY), 2011.
- Founding Editor-in-Chief, ACM Transactions on Information & Systems Security (TISSEC), 1997-2004.
- Chairman, ACM Special Interest Group on Security Audit and Control (SIGSAC), 1995-2003. Security Editor, IEEE Internet Computing, 1998-2004.
- Conference Founder: ACM CCS (1993), ACM SACMAT (1995), ACM CODASPY (2011).
- Conference Steering Committees: ACM CCS (1993-2003 Chair, 2003-2007 Member), ACM SACMAT (1995-2008 Chair, 2017 onwards member), IEEE CSF (1992-2008 Member), ACM CODASPY (2010 onwards member).
- Conference Program Chair: IEEE CSF (1991, 1992), ACM CCS (1993, 1994, 2002), ACM SACMAT (1995, 2017), ACSAC (1996), IFIP WG 11.3 (1996), ACM CSAW (2007), ACM AsiaCCS (2011), ACM CODASPY (2012), NSS (2013), ARES (2013), CRISIS (2013), IEEE IRI (2016).
- Conference Gen. Chair: IEEE: CSF (1993, 1994), ACM: CCS (1996), SACMAT (2001, 2002), CODASPY (2011, 2012, 2013, 2014).

### **Entrepreneurial and Consulting Career**

- TriCipher Inc., 2000-2010, Chief Scientist and Co-Founder (Acquired by VMware in 2010). Principal inventor on 28 issued patents that were vital to the valuation and viability of multiple VC deals through eventual acquisition.
- Consultant to numerous organizations including: McAfee, Trusted Information Systems, National Institute of Standards and Technology, Verizon, SETA Corporation, Argonne National Laboratory, Singapore Management University, Northrop Grumman, Integris Health.

### **Teaching Career**

- Currently teach popular advanced courses on “Cyber Security Foundations and Practice” at University of Texas at San Antonio.
- Major contributor to MS in Cyber Security Sciences degree at University of Texas at San Antonio.
- Principal architect of the MS and PhD in Information Security and Assurance at George Mason University, where I personally developed and taught the core courses and multiple electives.
- Presented short courses, tutorials and invited lectures all over the world including Asia, Australia, Europe, North America and South America.
- As part of the NSF Center for Security and Privacy Enhanced Cloud Computing, I am pursuing a sustained partnership with the Northside Independent School District, largest in San Antonio, to develop high-school curriculum for cyber security and recruit students to UTSA.

### **Personal**

- US Citizen, 1997. Born in India. Schooled at Doon School, IITs (Bombay and Delhi) and Rutgers University. Married with two sons.
- Fond of travel, diverse cultures, books and movies. Avid spectator of sports and current affairs.

### **Detailed Enumeration**

The rest of my CV gives a detailed enumeration of the following items: Sponsored Research Grants, PhD Advisees Completed, USA Patents and Refereed Publications. Additional information, copies of publications, patents and dissertations, various presentations, course syllabi and full CV are available at [www.profsandhu.com](http://www.profsandhu.com).