WILLIAM H. SANDERS

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Brief Biography

William H. Sanders is the Dr. William D. and Nancy W. Strecker Dean of the College of Engineering at Carnegie Mellon University. He is a tenured Full Professor in the Dept. of Electrical and Computer Engineering and holds courtesy Professor appointments in the Computer Science Department in School of Computer Science and the Heinz College of Information Systems, Public Policy, and Management. Previously, he was the founding Director of the Discovery Partners Institute in the University of Illinois System and the Herman M. Dieckamp Endowed Chair in Engineering at the University of Illinois at Urbana-Champaign. He was also the Head of the Dept. of Electrical and Computer Engineering (2014-2019), the Director of the Coordinated Science Laboratory (2010-2014), and the founding Director of the Information Trust Institute (2004-2011), all during his 25-year tenure as a professor at the University of Illinois at Urbana-Champaign.

A recognized leader in his field, Dean Sanders was elected to the National Academy of Engineering (NAE) in 2023, one of the highest professional distinctions accorded to an engineer, for his contributions to cybersecurity and resiliency technologies for critical infrastructures. Sanders is also an elected Fellow of the Institute of Electrical and Electronics Engineers (IEEE), the Association for Computing Machinery (ACM) and the American Association for the Advancement of Science (AAAS); a past Chair of the IEEE Technical Committee on Fault-Tolerant Computing; and past Vice-Chair of the IFIP Working Group 10.4 on Dependable Computing. Among many honors, he was the 2016 recipient of the IEEE Technical Field Award, Innovation in Societal Infrastructure, for “assessment-driven design of trustworthy cyber infrastructures for societal-scale systems.”

Sanders’s research interests include secure and dependable computing and security and dependability metrics and evaluation, with a focus on critical infrastructures. He has published more than 300 technical papers in those areas. He was one of the first people (in the 1990s) to work on intrusion-tolerant systems, now known as cyber resilient systems, showing quantitatively that ideas from fault-tolerant computing could be extended to make computer systems resilient to attacks. His *UltraSAN* and Möbius tools incorporated his series of fundamental results on practical numerical solutions for large Markov processes and have had a significant impact on industry; More than 2,700 licenses for the tools have been issued to universities, companies, and NASA for evaluating the performance, dependability, and security of a variety of systems.

Sanders is one of the very earliest innovators in what is now called smart-grid cybersecurity/resiliency. He served as the Director and PI of the TCIP and TCIPG (Trustworthy Cyber Infrastructure for the Power Grid) (TCIPG) Centers, an academic/industry/government partnership that conducted research at the forefront of national efforts to make the U.S. power grid smart and resilient. His technical innovations (2005-pres.) in the area of cyber security and resiliency for the power grid, through sustained contributions to NERC/CIP control network security, smart meter security, and PMU data collection security have changed how the power industry approaches cyber security. His NP-View software (commercialized through Network Perception, Inc., which he co-founded) has become the de facto firewall auditing solution for the electric industry. Network Perception had a successful exit in 2024, being acquired by Dragos, Inc.

Citizenship: United States

Education

Degrees	Field	Institution	Date Awarded
Ph.D.	Computer Science and Engineering	University of Michigan	1988
M.S.E.	Computer, Information and Control Engineering	University of Michigan	1985
B.S.	Computer Engineering	University of Michigan	1983

Academic Positions Held

Dr. William D. and Nancy W. Strecker Dean, College of Engineering; Professor, Electrical and Computer Engineering; Courtesy Appointment, Computer Science Department, School of Computer Science; Courtesy Appointment, Heinz College of Information Systems, Public Policy, and Management, 2020-Present.

Dean of the College of Engineering at Carnegie Mellon University, which is top-ranked among its peers and is known for its intentional commitment to cross-disciplinary collaboration in research and excellence and in graduate and undergraduate education. The college has ~5000 students, including ~1900 undergraduates, ~2,000 MS students, and ~800 Ph.D. students; ~850 faculty and staff; 10 academic degree granting departments; 3 major interdisciplinary institutes; 3 major research facilities; and 3 campus locations (Pittsburgh, Silicon Valley, and Africa). The college offers graduate and/or undergraduate degree programs in biomedical engineering, chemical engineering, civil and environmental engineering, electrical and computer engineering, engineering and public policy, information networking, materials science and engineering, mechanical engineering, engineering and technology innovation management, and energy science, technology and policy.

Founding (Interim) Director, Discovery Partners Institute (DPI), University of Illinois System, 2018-2019.

Founding director for DPI, which is a joint education, research, and innovation institute led by the University of Illinois System (U of I System) and its three universities and is backed by a $500M appropriation from the State of Illinois. DPI's mission is to establish collaborative partnerships that address 21st century societal grand challenges, promote entrepreneurship, and educate the next-generation workforce. Its primary goal is to conduct purpose-driven research and education that create actionable results that will have tangible results throughout the economy, including those for the underserved. As DPI's first full-time director, Sanders moved the institute from vision to reality while engaging a diverse set of stakeholders. During the time that he served as director, Sanders 1) built strong faculty support and engagement (including ~1000 faculty across our three system universities), 2) built strong support and engagement with the Chicago business and tech community, 3) opened a 20,000 sq. ft. facility for the institute in downtown Chicago, and 4) announced and/or built relationships with 5 non-UI system DPI academic partners.

Herman M. Dieckamp Endowed Chair Emeritus in Engineering, UIUC, 2020-Present.
Herman M. Dieckamp Endowed Chair in Engineering, UIUC, 2019-2020.

This named professorship was given to Sanders in 2019 for his contributions related to trustworthy systems, particularly those that protect critical infrastructure.

Head, Department of Electrical and Computer Engineering, UIUC, 2014-2019 (on leave as of Aug. 2018).
Interim Head, Department of Electrical and Computer Engineering, UIUC, 2013-2014.

Executive officer (Head) for department with approximately 110 faculty members and 60 staff. Responsible for administrative, budgetary, hiring, and tenure decisions, and for leading the faculty and staff in the development of research, teaching, and public service programs. Oversaw administrative and research expenditures of about $75M per year. Oversaw and participated in extensive advancement activities as head, including managing and increasing the Dept. endowment of approximately $75M. Leads aggressive faculty hiring campaign that has hired 35 new tenure-track, 8 teaching, and 5 research faculty since Jan. 2014.

Director, Coordinated Science Laboratory, UIUC, 2010-2014.
Acting Director, Coordinated Science Laboratory, UIUC, 2008-2010.

Director of the laboratory; responsible for research program with over 100 faculty members and 350 technical staff members. During Sanders's term as director, CSL's annual research expenditures rose from $17M to over $40M. CSL is a premier, multidisciplinary research laboratory that focuses on information technology at the crossroads of computing, control, and communications. During Sanders's tenure as director, CSL contained 3 institutes (the Advanced Digital Sciences Center, the Information Trust Institute, and the Parallel Computing Institute) and 7 centers (Center for Exascale Simulation of Plasma-Coupled Combustion; Center for People and Infrastructures; CompGEN; the Health Care Engineering Systems Center; the National Center for Professional & Research Ethics; SONIC Systems on Nanoscale Information fabriCs; and TCIPG, the Trustworthy Cyber Infrastructure for the Power Grid Center).

Member, Board of Directors, Illinois at Singapore Pte. Ltd., 2016-2019.
Associate Director, Advanced Digital Sciences Center (ADSC), UIUC, 2009-2016.

Sanders Co-founded ADSC 2009; was Illinois-based lead of the center, responsible (together with director) for its overall operation. ADSC (now known as Illinois ARCS) is a bricks-and-mortar research laboratory in Singapore, which has, at the time Sanders was Illinois-based lead 14 participating Illinois faculty, 57 full-time technical staff members, and about $70M U.S. in research funding (over 7 years) from the government of Singapore.

Donald Biggar Willett Professor in Engineering, Department of Electrical and Computer Engineering, UIUC, 2005-2018.

Endowed named professorship given to Sanders in 2005 for his contributions in dependability/security evaluation, reliable and secure systems, and computer systems modeling and analysis.

Director, Information Trust Institute, UIUC, 2004-2011.

Founding Director of the institute; Sanders established the Institute and grew it to include over 100 faculty from 28 departments, bringing in over $80M of external research funding and created or helped create the TCIP and TCIPG (Trustworthy Cyber Infrastructure for the Power Grid) Centers, the Boeing Trusted Software Center, the Illinois Cyber Security Scholars Program, the Illinois Center for a Smarter Electric Grid, the Center for Assured Critical Application & Infrastructure Security (CACAIS), the Assured Cloud Computing University Center of Excellence, and an NSA Science of Security Lablet.

Professor, Information Trust Institute, UIUC, 2004-2019.

Emeritus Professor, Department of Electrical and Computer Engineering, UIUC, 2020-Present.
Professor, Department of Electrical and Computer Engineering, UIUC, 1998-2019.

Professor, Coordinated Science Laboratory, UIUC, 1998-2019.

Associate Professor, Department of Electrical and Computer Engineering, UIUC, 1994-1998.

Research Associate Professor, Coordinated Science Laboratory, UIUC, 1994-1998.

Faculty Affiliate, Department of Computer Science, UIUC, 1994-2019.

Associate Professor, Dept. of Electrical and Comp. Engineering, University of Arizona, Tucson, AZ, 1994.

Assistant Professor, Dept. of Elect. and Comp. Engineering, Univ. of Arizona, Tucson, AZ, 1988-1994.

Other Professional Employment

Research Associate, Communications and Distributed Systems Laboratory, Industrial Technology Institute, Ann Arbor, Michigan, 1984-1988.
Teaching Assistant, Department of Electrical and Computer Science, University of Michigan, 8/83-12/83.
Digital Design Engineer, Optec, Inc., Lowell, MI, 1981-1983.

Areas of Research

Dependability/Security Evaluation
Architecting Reliable and Secure Systems
Computer Systems Modeling and Analysis

Consulting Activities

The United States District Court for the Southern District of West Virginia, Huntington Division, 2016-2018
SUNY Albany, 2014
Sterne, Kessler, Goldstein, and Fox, 2010-2012
WW Technology Group, 2006-2008
General Dynamics, 2006
Motorola Computer Group, 2000-2001
Motorola University, 1998-2001
IA Tech, Inc., 1998-2010
AT&T Bell Labs, 1996
Motorola Satellite Communications, 1993-2000
US West Advanced Technologies, 1991-1993
Bell Communications Research, 1990
Industrial Technology Institute, 1989

Professional Societies

Elected Member, National Academy of Engineering
Fellow, Institute of Electrical and Electronics Engineers

Fellow, Association for Computing Machinery
Fellow, American Association for the Advancement of Science
Past Vice-Chair, IFIP Working Group 10.4 on Dependable Computing
Tau Beta Pi
Eta Kappa Nu
Sigma Xi

Board Memberships

Pittsburgh Technology Council, Board Member, Pittsburgh, PA, 2022 - Present
Innovation Works, Board Member, Pittsburgh, PA, 2023 – Present (Member of Executive Committee 2024 – Present)
James Clark College of Engineering, University of Maryland College Park, Board of Visitors, 2023 – Present.

Selected Awards and Honors

Elected to that National Academy of Engineering, 2023.
Executive Officer Distinguished Leadership Award, University of Illinois at Urbana-Champaign, 2018.
IEEE Technical Field Award, Innovation in Societal Infrastructure, for "assessment-driven design of trustworthy cyber infrastructures for societal-scale systems," 2016.
Named on the University of Illinois's Fall 2015 List of Teachers Ranked as Excellent by Their Students.
Named on the University of Illinois's Fall 2014 List of Teachers Ranked as Excellent by Their Students.
Named Fellow of the American Association of the Advancement of Science (AAAS) for the development of fundamental theory and practical techniques to ensure that societal-scale distributed computing systems are trustworthy, 2014.
Named Fellow of the Association for Computing Machinery for "Outstanding contributions to the evaluation and design of dependable systems and networks," January 2004.
Named Fellow of the IEEE, for "Contributions to tools and techniques for performance and dependability evaluation of computer systems and networks," January 2000.