



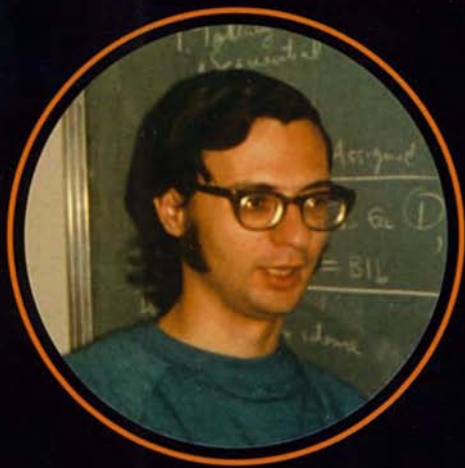
DAN!

**40 years
of innovation**



“I reinvent myself

every ten years.”





Professor Daniel P. Siewiorek

*Buhl University Professor of Electrical and Computing Engineering and
Computer Science, Carnegie Mellon University*

From his earliest endeavors as an Eagle Scout through his most recent foray into context-aware computing, Daniel P. Siewiorek has continually worked to bring a fresh perspective to the task at hand, be it teaching classes, mentoring each of his 58 successful Ph.D. candidates or his many significant contributions to four diverse yet overlapping areas of research: multiprocessors, design automation, wearable computers and reliability.

Raised in Cleveland, Dan graduated summa cum laude from the University of Michigan in 1968 and then accepted a Textronix Fellowship at Stanford University. His Ph.D. thesis, "Fault Tolerant Computers Using Self-Diagnosis and Hybrid Redundancy," took root in the one of the newest areas of research at Stanford at the time. Dan arrived at Carnegie Mellon University in early January of 1972, just a few days after handing in his thesis.

He initially focused on building systems and became principle investigator on an NSF grant for

register transfers and modular design. By 1974, he had written the first instructional set processor language (ISP) for the PDP-11. ISP allowed people for the first time to study in a uniform manner many different computer instruction sets. Eventually nearly 50 computers were described in ISP and more than 80 organizations benefited from the freely distributed source code. Dan was also a principle developer of Cm*, one of the first modular multiprocessor systems and the first non-uniform memory access (NUMA) processor. He was elected as an IEEE Fellow in 1981 for his contributions to the design of modular computing systems.

Design Automation is another branch of research that developed from Dan's interest in building systems. Under his direction, Carnegie Mellon developed the software called MICON, which was able to synthesize computer hardware and software from specifications such as processor family, amount of memory, cost and reliability.





A chance to put the MICON design synthesis into practice during a summer executive workshop on design at Carnegie Mellon in 1991 led to the start of Dan's work in wearable computers. Using an interdisciplinary approach, the ten-week course married electrical engineering, computer science and design to produce a working, wearable computer for each of the 30 German engineers attending. In the years since then, Dan's research has influenced many handheld devices with practical applications such as aircraft maintenance and in-the-field language translation for NATO troops. Dan is currently working on the next generation of wearable computers equipped with numerous context-aware sensors to aid users in a variety of situations.

Dan is also an internationally recognized expert on computer reliability; he led a U.S. delegation on computer reliability to China in 1980. Beginning with his Ph.D. thesis and continuing through his research into the combined fault tolerance of hardware and software and the development of design automation tools, the impact of Dan's work has been felt far and wide—from a monitoring system for Carnegie Mellon's Andrew File System (one of the first distributed, networked file systems) to diagnostics for commercial circuit board manufacturing, and from reliability analysis

of the Federal Aviation Administrations' air traffic control system to the RAS architecture (reliability, availability and service) of over two dozen commercial systems.

A broad array of awards reflects the importance of his contributions to the science of computing. Dan has received the Frederick Emmons Terman Award, the ACM Eckert-Mauchly Award and the SIGMOBILE Outstanding Contributions Award. In addition to his election as an IEEE Fellow, Dan is a member of the inaugural class of ACM fellows, has been elected to the NAE and named as a fellow of the AAAS.

Dan's research results have been disseminated through his participation on several technology advisory boards, the development of a half dozen start-up companies and via research-oriented courses that he has taught in Brazil, China and throughout Europe. In addition, Dan is the author of more than 450 papers and the author or co-author of eight textbooks, each of which encapsulates a portion of his research.

The Carnegie Mellon University School of Computer Science and College of Engineering are pleased to have him on the faculty and look forward to many more years of collaboration.



8:30-9:00 am Continental Breakfast, *Singleton Room, Roberts Engineering Hall*

Opening Remarks

9:00 - 9:45am *Singleton Room, Roberts Engineering Hall*

Angel Jordan, University Professor of Electrical and Computer Engineering and Robotics Emeritus and Provost Emeritus, Carnegie Mellon University

Asim Smailagic, Research Professor, Institute for Complex Engineered Systems and Department of Electrical and Computer Engineering, Carnegie Mellon University

Jared L. Cohon, President, Carnegie Mellon University

Mark S. Kamlet, Provost, Carnegie Mellon University

Randal E. Bryant, Dean, School of Computer Science, Carnegie Mellon University

Pradeep K. Khosla, Dean, Carnegie Institute of Technology, Carnegie Mellon University

Reliability and Multiprocessors

9:45-10:15am

Joseph F. Traub, Edwin Howard Armstrong Professor of Computer Science, Columbia University

QUBIT COMPLEXITY OF CONTINUOUS PROBLEMS

10:15-10:45am

Samuel H. Fuller, Vice President of Research and Development, Analog Devices, Inc.

10:45-11:00pm

Break

11:00-11:20am

Edward J. McCluskey, Professor of Electrical Engineering and Computer Science, and Director, Center for Reliable Computing, Stanford University

11:20-11:40am

Gordon Bell, Senior Researcher, Media Presence Research Group, Microsoft Research

Human-Centric Design

11:40-12:00pm

Raj Reddy, Mozah Bint Nasser University Professor of Computer Science and Robotics, School of Computer Science, Carnegie Mellon University

12:00-12:20pm

Sara Kiesler, Hillman Professor of Computer Science and Human-Computer Interaction, Human-Computer Interaction Institute, Carnegie Mellon University

12:20-12:40pm

James H. Morris, Dean, Carnegie Mellon West, and Professor of Computer Science, Carnegie Mellon University

12:45-1:40pm Lunch, *The Perlis Atrium, Newell-Simon Hall*

Design and Rapid Prototyping

1:40-1:55pm **Steven J. Fenves**, Guest Researcher, Manufacturing Engineering Laboratory, National Institute of Standards and Technology, and University Professor Emeritus of Civil and Environmental Engineering, Carnegie Mellon University

1:55-2:10pm **Stephen W. Director**, Provost and Senior Vice President, and Trustee Professor of Electrical and Computer Engineering, Drexel University

2:10-2:25pm **Friedrich (Fritz) B. Prinz**, Chair, Department of Mechanical Engineering, and Rodney H. Adams Professor, School of Engineering, Stanford University

2:25-2:40pm **Cristina H. Amon**, Dean, Faculty of Applied Science and Engineering, and Alumni Chair Professor in Bioengineering of Mechanical and Industrial Engineering, University of Toronto

Education and Research

2:40-2:55pm **T.E. (Ed) Schlesinger**, Professor and Head Electrical and Computer Engineering, Carnegie Mellon University

2:55-3:10pm **Jeannette M. Wing**, President's Professor of Computer Science, and Head Department of Computer Science, Carnegie Mellon University

3:10-3:25pm **Donald E. Thomas**, Professor of Electrical and Computer Engineering, Carnegie Mellon University

Student Session

3:30-4:45pm Remembrances by Students
Hors D'oeuvres

DAN!

40 years
of innovation

Symposium Schedule

Monday, 4 December 2006

“Dan is a legend in my research community. He has received the most prestigious award (the award all junior researchers dream of one day to get) in computer architecture, the *Eckert Mauchly* award. Of course, what sets Dan apart from other receivers of this award is that, he has since switched communities several times and managed to receive the highest distinctions in those communities as well.”

- Babak Falsafi



Opening Remarks

Angel Jordan

University Professor of Electrical and Computer Engineering and Robotics Emeritus and Provost Emeritus, Carnegie Mellon University

Angel Jordan is a University Professor of Electrical and Computer Engineering and Robotics Emeritus and Provost Emeritus of Carnegie Mellon. He was Provost of CMU in 1983-1990, Dean of Engineering in 1979-1983, Head of Electrical Engineering in 1969-1979. He has been a faculty member in Electrical Engineering since 1959. (Assistant Professor 1959-1962; Associate Professor 1962-1965; Professor since 1965.) U.A. and Helen Whitaker Professor of Electronics and Electrical Engineering in 1972-1980; Keithley University Professor of Electrical & Computer Engineering and Robotics in 1997-1999. He was a Founder of the Software Engineering Institute, where he has served as Acting Director twice, and was a Founder of the Robotics Institute. He holds a degree Licenciado en Ciencias Físicas from the Universidad de Zaragoza (Spain) and an M.S. and Ph.D. in Electrical Engineering from Carnegie Mellon University (1959). Over the years, he has been interested and has conducted research on Semiconductor Devices, Integrated Circuits, Thin Films, Environmental and Biomedical Instrumentation, Intelligent Sensors for Robotics, Advanced Video Systems, Technological Innovation, Management of Technology, and Studies of the Computer Industry. More recently he has been interested in Robotics, Automation, and

Software Engineering, focusing on Technological Change and Technology Transfer. He is currently interested in Software Technologies, Software Project and Process Management, and Software Outsourcing. He is the author of over 200 research publications and numerous research reports, and has been speaker at numerous



conferences, seminars, and symposia in the U.S. and Abroad. He has been a consultant and member of the BOD of a number of companies and not profit organizations in the US and Abroad.

Among his numerous honors, he is a Member of the National Academy of Engineering; a Corresponding Member of the Real Academia de Ingeniería in Spain; Fellow of the IEEE and the American Association for the Advancement of Science. He is Doctor Honoris Causa for the Universidad Politécnica de Madrid (Spain) and the Universidad Pública de Navarra (Spain), and Honorary Professor of several universities in China.

Asim Smailagic

Research Professor, Institute for Complex Engineered Systems and Department of Electrical and Computer Engineering, Carnegie Mellon University

Dr. Asim Smailagic is a research professor in the Institute for Complex Engineered Systems and Department of Electrical and Computer Engineering (courtesy) at Carnegie Mellon. He is also director of the Laboratory for Interactive Computer Systems at Carnegie Mellon, which has designed and built more than two dozen generations of novel wearable computers and several pioneering prototypes of context-aware computing systems.



Dr. Smailagic is a chair of the IEEE Technical Committee on Wearable Information Systems. He has been a program chairman of IEEE conferences more than ten times. Dr. Smailagic has acted as co-editor, associate editor, and guest editor in leading archival technical journals, such as IEEE Transactions on Mobile Computing, IEEE Transactions on VLSI Systems, IEEE Transactions on Computers, Journal on VLSI Signal Processing and Journal on Pervasive Computing. He is widely recognized for his contributions to the design and

rapid prototyping of wearable computers and pervasive context-aware computing systems, as well as to an interdisciplinary concurrent design methodology used for rapid prototyping of these new classes of computer systems. He received the Fulbright post-doctoral fellowship in computer science in 1988, and spent it at Carnegie Mellon.

Dr. Smailagic received the 2000 Allen Newell Award for Research Excellence from Carnegie Mellon's School of Computer Science (with Dan Siewiorek) for revolutionizing hardware-software co-design through the creation and demonstration of task-specific wearable computers, for developing a rapid prototyping methodology for such systems and for demonstrating applications of wearable computers. He also received the 2003 Carnegie Science Center Award for Excellence in Information Technology, the 2003 Steve Fennes Systems Research Award from the Carnegie Mellon College of Engineering and other prestigious awards. Professor Smailagic has written or edited books in the areas of mobile computing, digital system design, field programmable gate arrays and VLSI systems. For example, he is co-author of the book on Rapid Design and Prototyping of Digital Systems Using Field Programmable Logic,

which has been used as a textbook at over three dozen universities worldwide. He gave keynote and invited lectures at many representative international conferences and institutions, such as the Royal Academy of Engineering, Great Britain. His recent research projects include Wearable Computer Systems, Smart Module Computers, Communicator, RADAR Personal Assistant that Learns, Aura Pervasive Self-Tuning Computing System, and Quality of Life Technologies. Some of the recent and ongoing projects have introduced wearable, pervasive, and context computing to the automotive industry, the health care industry, the services industry and the military.

Jared L. Cohon

President, Carnegie Mellon University

Jared Cohon has been president of Carnegie Mellon University since 1997. He came to Carnegie Mellon from Yale, where he was dean of the School of Forestry and Environmental Studies from 1992 to 1997. He started his teaching and research career in 1973 at Johns Hopkins, where he was a faculty member in the Department of Geography and Environmental Engineering for 19 years. He also served as Assistant and Associate Dean of Engineering and Vice Provost for Research at Johns Hopkins. Dr. Cohon earned a B.S. degree in civil engineering from the University of Pennsylvania in 1969 and a Ph.D. in civil engineering from the Massachusetts Institute of Technology in 1973.

An author, co-author, or editor of one book and more than 80 professional publications, Dr. Cohon is an authority on environmental and water resource systems analysis, an interdisciplinary field that combines engineering, economics and applied mathematics. He has worked on water resource problems in the United States, South



America and Asia and on energy facility siting, including nuclear waste shipping and storage. In addition to his academic experience, he served in 1977 and 1978 as legislative assistant for energy and the environment to the Honorable Daniel Patrick Moynihan, retired United States Senator from New York. President Bill Clinton appointed Dr. Cohon to the Nuclear Waste Technical Review Board in 1995 and appointed him as chairman in 1997. His term on the Board ended in 2002. President George W. Bush appointed Dr. Cohon in 2002 to his Homeland Security Advisory Council. He was also appointed as Chairman of the Council's Senior Advisory Committee on Academia and Policy Research.

During his presidency, Carnegie Mellon has continued along its trajectory of innovation and growth. Priorities have included: undergraduate education; new interdisciplinary initiatives in information technology, biotechnology, environment, and the fine arts and humanities; diversity; international initiatives; and the economic development of southwest Pennsylvania. In recognition of the last of these, President Cohon shared "Pittsburgher of the Year" honors in 2001 with Mark Nordenberg, the Chancellor of the University of Pittsburgh.

Mark S. Kamlet

Provost, Carnegie Mellon University

He received a B.S. in Mathematics from Stanford, and an M.S. in Statistics, M.S. in Economics and Ph.D. in Economics from the University of California at Berkeley. He has taught at Carnegie Mellon since 1976. He has served as head of the Department of Social and Decision Sciences, associate dean of the College of Humanities and Social Sciences, and for eight years served as dean of the H. John Heinz III School of Public Policy and Management.

Kamlet's research areas are in the economics of health care, quantitative methodology, and public finance. He has over 75 published papers, and has received the outstanding publication award from the Association of Public Policy and Management for his work on the federal budgetary process.

He has served on a U.S. Public Health Service panel to produce national guidelines on applying cost-effectiveness analysis in health care; and on three National Institute of Health consensus panels to make recommendations on national policies relating to prenatal genetic testing; neonatal screening; and end-of-life care. He currently serves on the Institute of Medicine's Board on Population Health and Public Health Practice, IOM's Committee on Poison Prevention

and Control and NIH's Public Access Working Group.

Kamlet is chairman of the board of directors of Carnegie Learning, Inc., past chairman of the board of Carnegie Technology Education, Inc. He is on the

board of organizations in the Pittsburgh region including: Pittsburgh Parks Conservancy, the Institute for Transfusion Medicine, Western Pennsylvania Hospital and Highmark Inc. He served on the committee that drafted the

rules and procedures for the new

Allegheny County Executive and County Council, chaired the transition team for Allegheny County in the area of information technology, and chaired the first advisory board for the County Chief Executive on economic development.



Randal E. Bryant

*Dean, School of Computer Science,
Carnegie Mellon University*

Randal E. Bryant is Dean of the Carnegie Mellon University School of Computer Science. He has been on the faculty at Carnegie Mellon since 1984, starting as an Assistant Professor and progressing to his current rank of University Professor of Computer Science. He also holds a courtesy appointment in the Electrical and Computer Engineering Department.

Dr. Bryant's research focuses on methods for formally verifying digital hardware, and more recently some forms of software. His 1986 paper on symbolic Boolean manipulation using Ordered Binary Decision Diagrams (BDDs) has the highest citation count of any publication in the Citeseer database of computer science literature. In addition, he has developed several techniques to verify circuits by symbolic simulation, with levels of abstraction ranging from transistors to very high-level representations.



Dr. Bryant has received widespread recognition for his work. He is a fellow of the IEEE and the ACM, as well as a member of the National Academy of Engineering. His awards include the 1997 ACM Kanellakis Theory and Practice Award (shared with Edmund M. Clarke, Ken McMillan, and Allen Emerson) for contributing to the development of symbolic model checking, as well as the 1989 IEEE W.R.G. Baker Prize for the best paper appearing in any IEEE publication during the preceding year.

Dr. Bryant teaches courses in computer systems. Along with David R. O'Hallaron, he developed a novel approach to teaching about the hardware, networking, and system software that comprise a system from the perspective of an advanced programmer, rather than from those of the system designers. Their textbook "Computer Systems: A Programmer's Perspective" is now in use at over 110 universities worldwide and has been translated into Chinese and Russian.

Dr. Bryant received his B.S. in Applied Mathematics from the University of Michigan in 1973, and his PhD from MIT in 1981. He was on the faculty at Caltech from 1981 to 1984.

Pradeep K. Khosla

**Dean, Carnegie Institute of Technology,
Carnegie Mellon University**

Pradeep Khosla is currently the Dean (2004 –) of the Carnegie Institute of Technology (the College of Engineering at Carnegie Mellon), the Philip and Marsha Dowd Professor in the College of Engineering and School of Computer Science (1998 –), and Founding co-Director of CyLab (2003 –). His previous positions include Assistant Professor (1986-90), Associate Professor (1990 – 94), and Professor (1994 –), Founding Director (1997 – 1999) of Institute for Complex Engineered Systems (ICES), Department Head of Electrical and Computer Engineering (1999 – 2004), and Director of Information Networking Institute (2000 – 2004). Prior to joining Carnegie-Mellon, he worked with Tata Consulting Engineers, and Siemens in the area of real-time control. He received B. Tech (Hons) from IIT (Kharagpur, India) in 1980, and both MS (1984) and PhD (1986) degrees from Carnegie Mellon University. From January 1994 to August 1996 he was on leave from Carnegie Mellon and served as a DARPA Program Manager in the Software and Intelligent Systems Technology Office (SISTO), Defense Sciences Office (DSO), and Tactical Technology Office (TTO), where he managed advanced research and development programs,

with a total budget exceeding \$50M in FY96, in the areas of Information based Design and Manufacturing, Web-based Information Technology Infrastructure, Real-Time Planning, and Distributed AI and Intelligent Systems, Real-Time Embedded Software, Sensor-based Control, and Collaborative Robotics.



During his tenure as Founding Director (1997 – 1999), ICES grew to a total budget of more than \$8M per year through strategic positioning to pursue interdisciplinary projects that involved faculty from 6 different colleges at Carnegie Mellon in the areas of Embedded Systems, Tissue Engineering, Design and Manufacturing, Design and Human Factors, and Networking. During his tenure as department head of Electrical and Computer Engineering, the department grew more than 80% in research volume, added 23 new faculty (tenure track and research), defined

several strategic multidisciplinary initiatives, and the Computer Engineering graduate program was ranked number one for the first time, and the undergraduate program ranked 3rd by US News and World Report in their 2002 rankings.

In 2003 he founded Carnegie Mellon CyLab – a university-wide research center – with the goal of integrating technology (security, privacy, and next generation IT), policy, and economics of IT, to address multidisciplinary issues that require collaboration of experts across various disciplines. CyLab is a broad-based research, development, and community outreach oriented multidisciplinary center that supports and involves more than 40 faculty and 100 graduate students from 5 different colleges within Carnegie Mellon, and has an annual budget of more than \$10M per year.

As Director of the Information Networking Institute (INI), he increased its enrollment severalfold, created the Master of Science in Information Security Technology and Management degree program, and defined international graduate degree, and research programs with the Athens Information Technology (AIT) Institute in Athens, Greece (CyLab Athens), CyLab Korea, and CyLab Japan.

He is involved in education both at the graduate and the undergraduate level. He was a member of the committee that formulated a curriculum for the multidisciplinary PhD program

in Robotics at Carnegie Mellon. He was also a member of the Wipe the Slate Clean Committee that created a new four-year undergraduate ECE degree curriculum at CMU and proposed, amongst several other new ideas, the notion of teaching Engineering to freshman – an idea that has been adopted widely by US and international universities. In support of the new curriculum he developed the Introductory Freshman level course “Introduction to Electrical and Computer Engineering” that emphasizes the notion of Teaching in Context. He is the co-author of a text book and a laboratory manual for this freshman course. As Dean, he initiated the development of a professional MS program in Innovation Management and is providing leadership to redefine undergraduate education in engineering.

He is a recipient of the Inlaks Foundation Fellowship in 1982, the Carnegie Institute of Technology Ladd award for excellence in research in 1989, two NASA Tech Brief awards (1992, 1993), the ASEE 1999 George Westinghouse Award for Education, the Siliconindia Leadership award for Excellence in Academics and Technology in 2000, and the W. Wallace McDowell award from IEEE Computer Society in 2001. He was elected Fellow of IEEE in January 1995, Fellow of AAAI in 2003, Fellow of AAAS in 2004, and member of the NAE in 2006. He served as Distinguished Lecturer for the IEEE Robotics and Automation Society (1998-2003). In December 2002, he was appointed a

member of the IT transition team of Pennsylvania Governor-elect Ed Rendell and in February 2003 he was appointed to the National Research Council Board on Manufacturing and Engineering Design for a three-year term. Professor Khosla's research has resulted in 3 books and more than 300 articles in journals, conferences, and book contributions. He has been a keynote and plenary speaker at several international conferences and workshops.

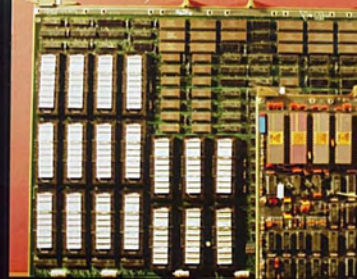
He has served as member of the AdCom of the IEEE Robotics and Automation Society and the IEEE Systems, Man and Cybernetics Society, Chairman of the Education Committee of the IEEE Robotics and Automation Society, Professional Activities (PACE) Chair of the Robotics and Automation Society, member of Robotics and Intelligent Machines Coordinating Council (RIMCC), member of the Long Range Planning Committee of the Robotics and Automation Society, member of the Board of Directors of The Robotics Industries Association (RIA) from 1998 – 2002, and member of the Board of Directors of Pittsburgh Tissue Engineering Initiative (PTEI) during 2000-2001, and 2004 – present. He served as Technical Editor of the IEEE Transactions on Robotics and Automation and Associate Editor for ASME Journal of Computers and Information Science in Engineering (JCISE), and IEEE Security and Privacy. He currently serves on editorial boards of IEEE Spectrum, and Oxford University Press

series in Electrical and Computer Engineering.

He is a consultant to several companies and Venture Capitalists and has served on the technology advisory boards of many start-ups and currently serves on several advisory boards including iNetworks, ITU Ventures, iPolicy, and Alcoa CIO's Advisory Board. He is a member of the Board of Directors of Quantapoint Inc., the Children's Institute, IIT Foundation, and MPC corporation. He also serves on the advisory boards of Institute for Systems Research (Univ. of Maryland), College of Engineering (Univ. of Waterloo), and is a member of the IT advisory committee, CSIRO, Australia. He has served as member of the Strategy Review Board for Ministry of Science and Technology, Taiwan; Council of Deans of the Aeronautics Advisory Committee, NASA; and Senior Advisory Group, DARPA Program on Joint Unmanned Combat Air Systems. He is a co-founder of Quantapoint Inc. – a high tech company based in Pittsburgh. Quantapoint specializes in high precision laser scanners that are used for creating high fidelity 3D models.

“Dan has been a friend, mentor, colleague, and source of inspiration throughout my career at CMU. I owe him more than he can imagine for his support and guidance. Interestingly one of the reasons I came to CMU as a graduate student was because I recognized his name from having read a book about programming a PDP-11 that he had written.”

- David Garlan



Cm* Star

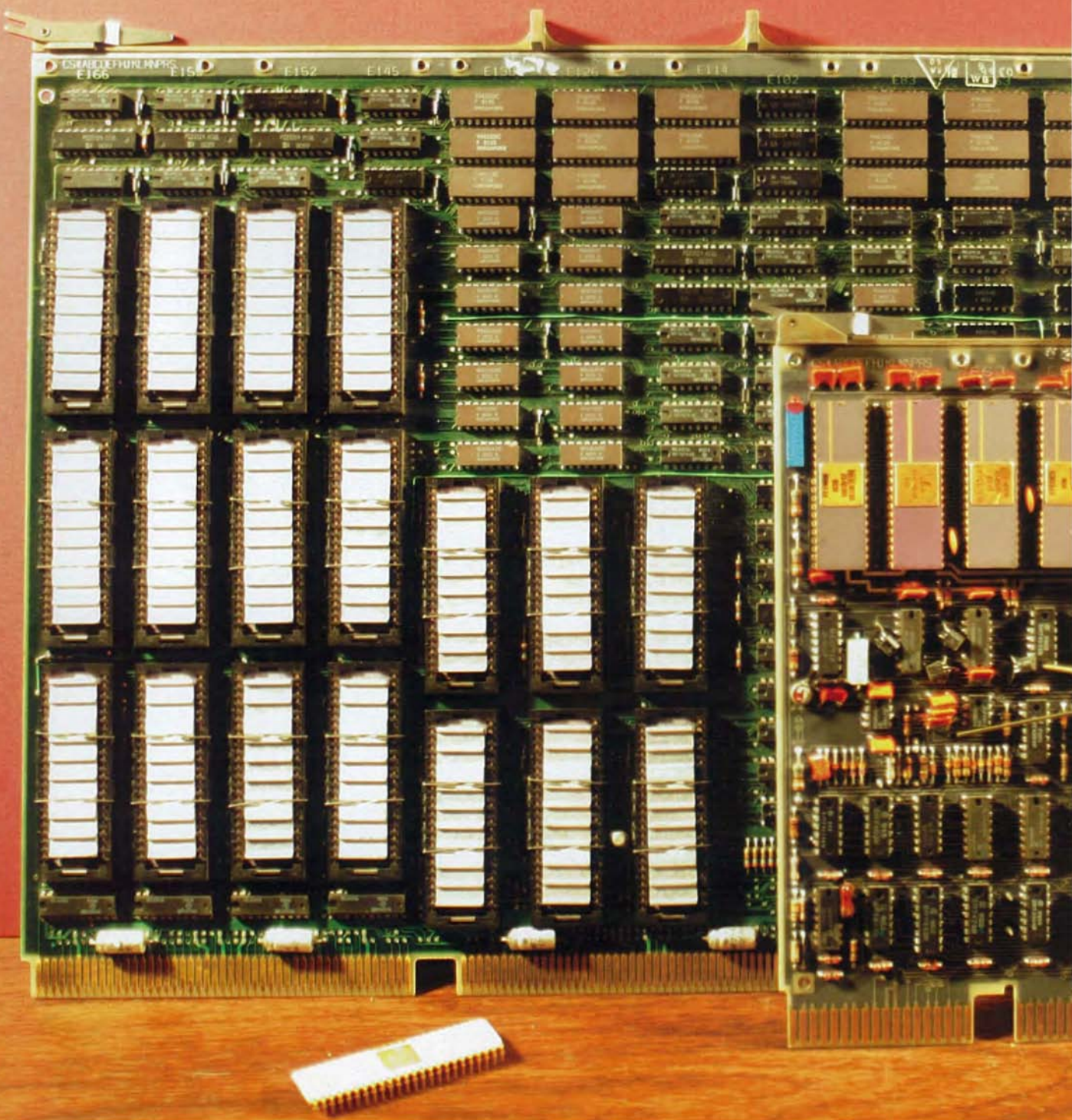
Reliability



Reliability and Multiprocessors

Computer Science Department - School of Computer Science

VAX 750, Cm* LSI-11, CMU Voter Chip



Joseph F. Traub

Edwin Howard Armstrong Professor of Computer Science, Columbia University

He was Head of the Computer Science Department at Carnegie-Mellon University 1971-1979 and Founding Chairman of the Computer Science Department at Columbia University 1979-1989. He served as Founding Chair of the Computer Science and Telecommunications Board (CSTB) of the National Academies 1986-1992. He is again serving as Chair 2005-.

T r a u b pioneered the field of information-based complexity starting in 1959. His current focus is on quantum computing. He is the author or editor of ten books and some one hundred and twenty journal articles. His most recent monograph is "Complexity and Information", Cambridge University Press, 1998. He is Editor-in Chief of the Journal of Complexity and Associate Editor of Complexity.

His numerous honors include election to the National Academy of Engineering in 1985, the 1991 Emanuel R. Piore Gold Medal from



IEEE, and the 1992 Distinguished Service Award, Computer Research Association. He is a Fellow of the American Association for the Advancement of Science, the Association for Computing Machinery, and the New York Academy of Sciences. He has been Sherman Fairchild Distinguished Scholar at the California Institute of Technology and received a Distinguished Senior Scientist Award from the Alexander von Humboldt Foundation. He was selected by the Academia Nazionale dei Lincei in Rome to present the 1993 Lezioni Lincee, a cycle of six lectures. Traub received the 1999 Mayor's Award for Excellence in Science and Technology. The Award was presented by Mayor Rudy Giuliani at a ceremony in New York City. In May, 2001, he received an honorary Doctorate of Science from the University of Central Florida.

He has served as advisor or consultant to the senior management of numerous organizations including IBM, Hewlett-Packard, Schlumberger, Stanford University, INRIA (Paris), Federal Judiciary Center, DARPA, NSF, and Lucent Technologies.

10:15 pm - 10:45 pm

Samuel H. Fuller

***Vice President of Research & Development,
Analog Devices, Inc.***

Dr. Fuller is the Vice President of Research and Development at Analog Devices Inc (ADI). In this position he guides the technology strategy of ADI, leads the design tools group within the company and other corporate wide engineering functions, and directs ADI's university-based research programs.

Prior to joining ADI in 1998, Dr. Fuller was Vice President of Research and Chief Scientist at Digital Equipment Corporation, where he was responsible for establishing and leading Digital's research laboratories that led to innovations in RISC computers, network processors, and internet search engines.

In the 1970s, Dr. Fuller was an associate professor of Computer Science and electrical engineering at Carnegie Mellon University, where he was involved in the design and performance evaluation of several experimental multiprocessor computer systems.

Dr. Fuller serves on the board of Zygo Corporation, Middlefield, CT and the CNRI (Corporation for National Research Initiatives). He currently serves as a member of the Division of Engineering and Physical Sciences Board of the National Research Council. He

holds a B.S. degree in Electrical Engineering from the University of Michigan and a M.S. and Ph.D. from Stanford University. He is an IEEE Fellow, AAAS Fellow, and a member of the National Academy of Engineering.



Edward J. McCluskey

**Professor of Electrical Engineering and Computer Science, and
Director, Center for Reliable Computing, Stanford University**

Professor McCluskey worked on electronic switching systems at the Bell Telephone Laboratories from 1955 to 1959. In 1959, he moved to Princeton University, where he was Professor of Electrical Engineering and Director of the University Computer Center. In 1966, he joined Stanford University, where he is Professor of Electrical Engineering and Computer Science, as well as Director of the Center for Reliable Computing. He founded the Stanford Digital Systems Laboratory (now the Computer Systems Laboratory) in 1969 and the Stanford Computer Engineering Program (now the Computer Science MS Degree Program) in 1970. The Stanford Computer Forum (an Industrial Affiliates Program) was started by Dr. McCluskey and two colleagues in 1970 and he was its Director until 1978.



Professor McCluskey developed the first algorithm for designing combinational circuits - the Quine-McCluskey logic minimization

procedure as a doctoral student at MIT. At Bell Labs and Princeton, he developed the modern theory of transients (hazards) in logic networks and formulated the concept of operating modes of sequential circuits. His Stanford research focuses on logic testing, synthesis, design for testability, and fault-tolerant computing. Prof. McCluskey and his students at the Center for Reliable Computing worked out many key ideas for fault equivalence, probabilistic modelling of logic networks, pseudo-exhaustive testing, and watchdog processors. He collaborated with Signetics researchers in developing one of the first practical multivalued logic implementations and then worked out a design technique for such circuitry.

Dr. McCluskey served as the first President of the IEEE Computer Society. He is the recipient of the 1996 IEEE Emanuel R. Piore Award. He is a Fellow of the IEEE, AAAS, and ACM; and a member of the NAE. He has honorary doctorates from the University of Grenoble and Bowdoin College. He has published several books including two widely used texts.

11:20 pm - 11:40 pm

Gordon Bell

**Senior Researcher, Media Presence
Research Group, Microsoft Research**

Gordon Bell spent 23 years (1960-1983) at Digital Equipment Corporation as Vice President of Research and Development, where he was responsible for Digital's products. He was the architect of various mini- and time-sharing computers (e.g. the PDP-6) and led the development of DEC's VAX and the VAX Computing Environment. Bell has an SB and SM degree from MIT (1956-57), was a Fulbright Scholar at the University of New South Wales (1957-58), Professor of Computer Science and Electrical Engineering at Carnegie-Mellon University (1966-72) and received an honorary D. Eng. from WPI (1993).

In 1986-1987 he was the first Assistant Director of the National Science Foundation's Computing Directorate. He led the National Research and Education Network (NREN) panel that became the NII/GII, and was an author of the first High Performance Computer and Communications Initiative.

Bell has authored books and papers about computer structures and start-up companies. In April 1991, Addison-Wesley published High Tech Ventures: The Guide to Entrepreneurial Success, which describes the Bell-Mason Diagnostic, for analyzing new ventures. His first book, Computer

Structures, with Allen Newell was published in 1970 by McGraw-Hill. Dan Siewiorek, Bell, and Newell, Computer Structures, was published as the second version in 1982 .

He is a founding board member of The Computer History Museum at 1401 Shoreline, Mountain View, CA, established in 1999.



Bell is a member of various professional organizations including the American Academy of Arts and Sciences (Fellow), American Association for the

Advancement of Science (Fellow), ACM (Fellow), IEEE (Fellow and Computer Pioneer), and the National Academy of Engineering. His awards include: the IEEE Von Neumann Medal, Fellow of the Computer History Museum, the AEA Inventor Award for the greatest economic contribution to the New England region, the IEEE 2001 Vladimir Karapetoff Eminent Member's Award of Eta Kappa Nu, and The 1991 National Medal of Technology.

“You are always our source of inspiration!”

- Chen Lee



VUMAN 2



Human 2



Human-Centric Design



Human-Computer Interaction Institute

VUMAN 1



Raj Reddy

Mozah Bint Nasser University Professor of Computer Science and Robotics, School of Computer Science, Carnegie Mellon University

He began his academic career as an Assistant Professor at Stanford in 1966. He has been a member of the Carnegie Mellon faculty since 1969. He served as the founding Director of the Robotics Institute from 1979 to 1991 and the Dean of School of Computer Science from 1991 to 1999.

Dr. Reddy's research interests include the study of human-computer interaction and artificial intelligence. His current research interests include Million Book Digital Library Project; a



Multifunction Information Appliance that can be used by the uneducated; Fiber To The Village Project; Mobile Autonomous Robots; and Learning by Doing.

He is a member of the National Academy of Engineering and the American Academy of Arts and Sciences. He was president of the American Association for Artificial Intelligence from 1987 to 89. Dr. Reddy was awarded the Legion of Honor by President Mitterrand of France in 1984. He

was awarded the ACM Turing Award in 1994, the Okawa Prize in 2004, the Honda Prize in 2005, and the Vannevar Bush Award in 2006. He served as co-chair of the President's Information Technology Advisory Committee (PITAC) from 1999 to 2001 under Presidents Clinton and Bush.

12:00 pm - 12:20 pm

Sara Kiesler

Hillman Professor of Computer Science and Human-Computer Interaction, Human-Computer Interaction Institute, Carnegie Mellon University

Sara Kiesler is Hillman Professor of Computer Science and Human Computer Interaction at Carnegie Mellon University. Prof. Kiesler applies behavioral and social science to technology design and to understanding how technology changes individuals, groups, and organizations.



She conducted among the first scientific studies of computer-mediated communication. With Lee Sproull, she authored "Connections: New Ways of Working in the Networked Organization"

(MIT Press). She has collaborated extensively within CMU and with colleagues elsewhere on social aspects of the Internet ("Culture of the Internet," Erlbaum). She continues to study the social impact of the Internet on families, problems associated with multidisciplinary and complex forms of collaboration, geographically dispersed science and project work ("Distributed Work," MIT Press), information sharing, behavior in online communities, and the design of human-robot interaction.

James H. Morris

**Dean, Carnegie Mellon West, and Professor of
Computer Science, Carnegie Mellon University**

He taught at the University of California at Berkeley where he developed some important underlying principles of programming languages: inter-module protection and lazy evaluation. He was a co-discoverer of the Knuth-Morris-Pratt string-searching algorithm.

For ten years he worked at the Xerox Palo Alto Research Center where he was part of the team that developed the Alto System. He also directed the Cedar programming environment project.



From 1983 to 1988 he directed the Information Technology Center at Carnegie Mellon University, a joint project with IBM, which developed a prototype university computing system, Andrew. He has been the principle investigator of two NSF projects aimed at computer-mediated communication: EXPRES and Prep.

He was a founder of the MAYA Design Group, a consulting firm specializing in interactive product design.

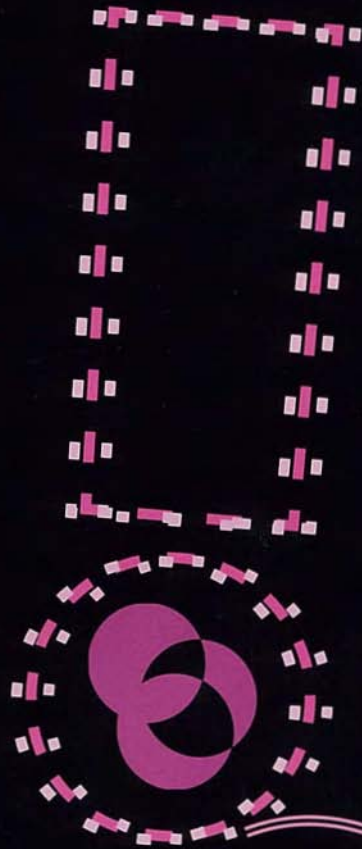
A native of Pittsburgh, he received a Bachelor's degree from Carnegie Mellon, an M.S. in Management from MIT, and Ph.D. in Computer Science from MIT.



Wiring VUMAN 1



Prototyping



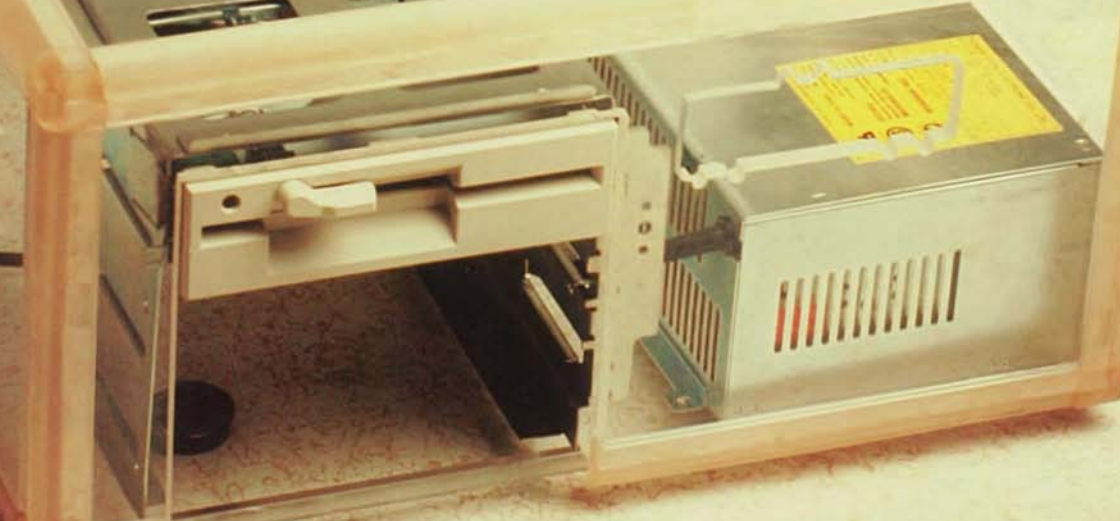
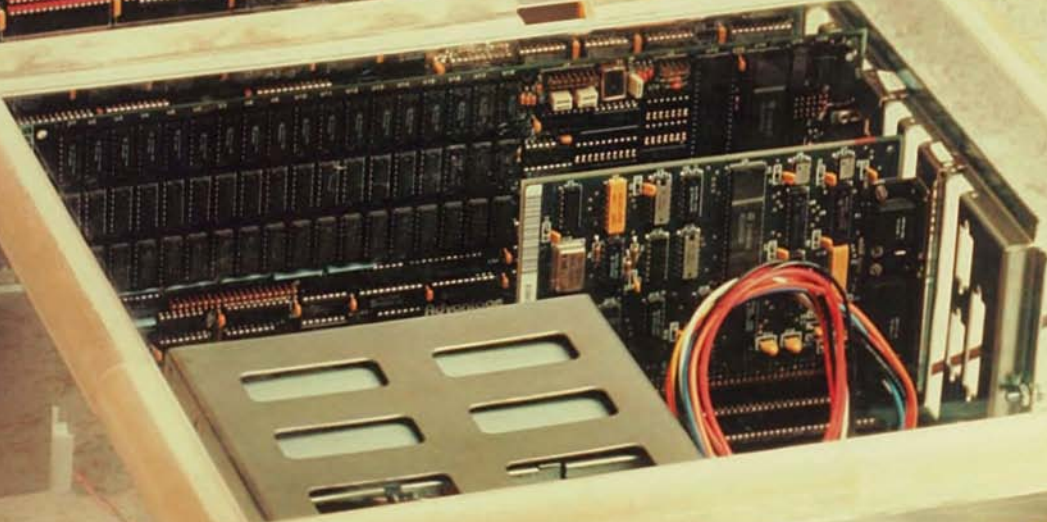
Design & Rapid Prototyping



Institute for Complex
Engineered Systems

101

Intel 386 Workstation



Steven J. Fenves

Professor Emeritus of Civil and Environmental Engineering, Carnegie Mellon University

Steven J. Fenves is University Professor Emeritus of Civil and Environmental Engineering at Carnegie Mellon University and is currently a guest researcher at the National Institute of Standards and Technology in Gaithersburg, Maryland. He received his BS (1957), MS (1958) and Ph.D. (1961) degrees in Civil Engineering from the University of Illinois, and served on the faculty there (1958-71). He joined Carnegie Mellon University in 1972, serving as Head of the Civil Engineering Department (1972-75) and Director of the Design Research Center (1980-84), attaining the position of University Professor in 1984. He retired from active teaching in 1998.



Dr. Fenves' research and teaching has been devoted to computer-aided engineering, an emerging discipline that seeks to understand, model and improve the processes civil and environmental engineers use in the planning, design, construction and operation of engineered

facilities. He was the co-developer of one of the earliest structural analysis systems (STRESS, 1962). His research has dealt with design standards, engineering databases, knowledge-based systems, machine learning, and comprehensive design environments.

Dr. Fenves is the author or co-author of six books, over 100 journal articles and book chapters, and over 120 articles and conference papers. His 38th Ph.D. student graduated in May 1998. He is a member of the National Academy of Engineering and an Honorary Member of the American Society of Civil Engineers (ASCE). Among his awards are the Huber Prize and the Moisseif and Winter Awards from ASCE, the Alumni Honor Award and Distinguished Alumnus Award from the University of Illinois, and the Teare Award and Doherty Prize from Carnegie Mellon University.

1:55 pm - 2:10 pm

Stephen W. Director

***Provost and Senior Vice President and Trustee Professor of
Electrical and Computer Engineering, Drexel University***

Stephen W. Director is Provost and Senior Vice President and Trustee Professor of Electrical and Computer Engineering at Drexel University. He received his B.S. degree from the State University of New York at Stony Brook and M.S. and Ph.D. degrees in electrical engineering from the University of California, Berkeley. From July 1996 until July 2005 he was the Robert J. Vlasic Dean of Engineering and Professor of Electrical Engineering and Computer Science at the University of Michigan. From 1977 until 1996 he was at Carnegie Mellon University where he was the U. A. and Helen Whitaker University Professor of Electrical and Computer Engineering and served as Head of the Department of Electrical and Computer Engineering and then Dean of the College of Engineering. In 1982, he founded the SRC-CMU Research Center for Computer-Aided Design and served as its Director from 1982 to 1989. Prior to joining Carnegie Mellon University he was with the Department of Electrical Engineering at the University of Florida, Gainesville. He was named an Honorary Professor of Shanghai Jiao Tong University by the Chinese Ministry of Education in 2002.

Director is a member of the US National Academy of Engineering (NAE) and a Fellow of both the Institute of Electrical and Electronics Engineers (IEEE) and the American Society of Engineering Education (ASEE). He is a pioneer in the field of electronic design automation and has long record of commitment to, and innovation in, engineering education. He has published over 150 papers and authored or co-authored six texts and has a long record of commitment to, and innovation in, engineering education. He has received numerous awards for his research and educational contributions.



Friedrich (Fritz) Prinz

**Chair, Department of Mechanical Engineering,
Stanford University**

Fritz B. Prinz is Professor of Mechanical Engineering and of Materials Science and Engineering, the Rodney H. Adams Professor in the School of Engineering, and Chair, Department of Mechanical Engineering. He obtained his Ph.D. in Physics at the University of Vienna, Austria. His current research interests are in designing and prototyping micro and nanoscale devices for energy and biology. Examples include fuel cells and bioreactors. His group studies transport phenomena across thin oxide layers and lipid bilayers with the help of Atomic Force Microscopy combined with Impedance Spectroscopy.



2:25 pm - 2:40 pm

Cristina H. Amon

***Dean, Faculty of Applied Science and Engineering, and
Alumni Chair Professor in Bioengineering of Mechanical
and Industrial Engineering, University of Toronto***

Cristina H. Amon received her M.S. and Sc.D. degrees from the Massachusetts Institute of Technology in 1985 and 1988, respectively. She was the Raymond J. Lane Distinguished Professor of Mechanical Engineering, and Director of the Institute for Complex Engineered Systems at Carnegie Mellon University until 2006 when she joined the University of Toronto as the Dean of the Faculty of Applied Science and Engineering, and the Alumni Chair Professor in Bioengineering of Mechanical and Industrial Engineering. She has received numerous awards for research and education, including the ASEE George Westinghouse Award in 1997, SWE Distinguished Engineering Educator in 1999, ASME Gustus L. Larson Memorial Award in 2000, ASEE Ralph Coats Roe Award in 2002, ASME Electronics and Photonics Packaging Division Clock Award in 2003 and EPPD Award for Outstanding Contributions to the Engineering and Science of Thermal Management of Electronics in 2004. She has contributed eleven book chapters, one McGraw Hill Custom Textbook, and over 200 refereed articles in education and research literature.

Cristina Amon has served as Chair of the ASME HTD K-16 Committee on Electronics Cooling, executive member of the ASME Electronic and Photonic Packaging Division, and is the Chair of AAAS Engineering. Her editorship roles have included the ASME Journal of Heat Transfer, IEEE Transactions on Components and Packaging Technology, and Heat and Mass Transfer. She was elected to the National Academy of Engineering (NAE) and is a Fellow of ASME, AAAS, ASEE and IEEE.

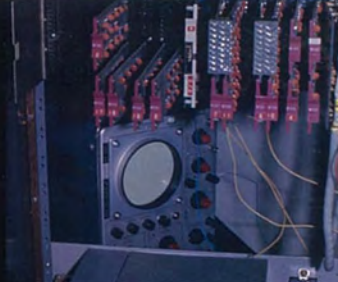


“I first met Dan at a Fault Tolerant Computing Conference in Orlando in 1984 while working at Exxon. He presented a paper on approach to adding fault tolerance for small systems that was both elegant, practical, and ultimately useful.

Our paths did not cross again until I relocated to Pittsburgh in 1987 and was invited to join the EDRC industrial advisory board. At that time Dan introduced me to the MICON project. I watched MICON mature for a couple of years and finally commercialized the technology at Omniview which resulted in the Fidelity board-level synthesis tool.

Twenty years later, Dan still amazes me with his innovative, practical solutions to real world problems as well as his ability to inspire his students to excellence.”

- Charles Buenzli



Laboratory use of Register Transfer Modules (RTMs) to control multiple trains



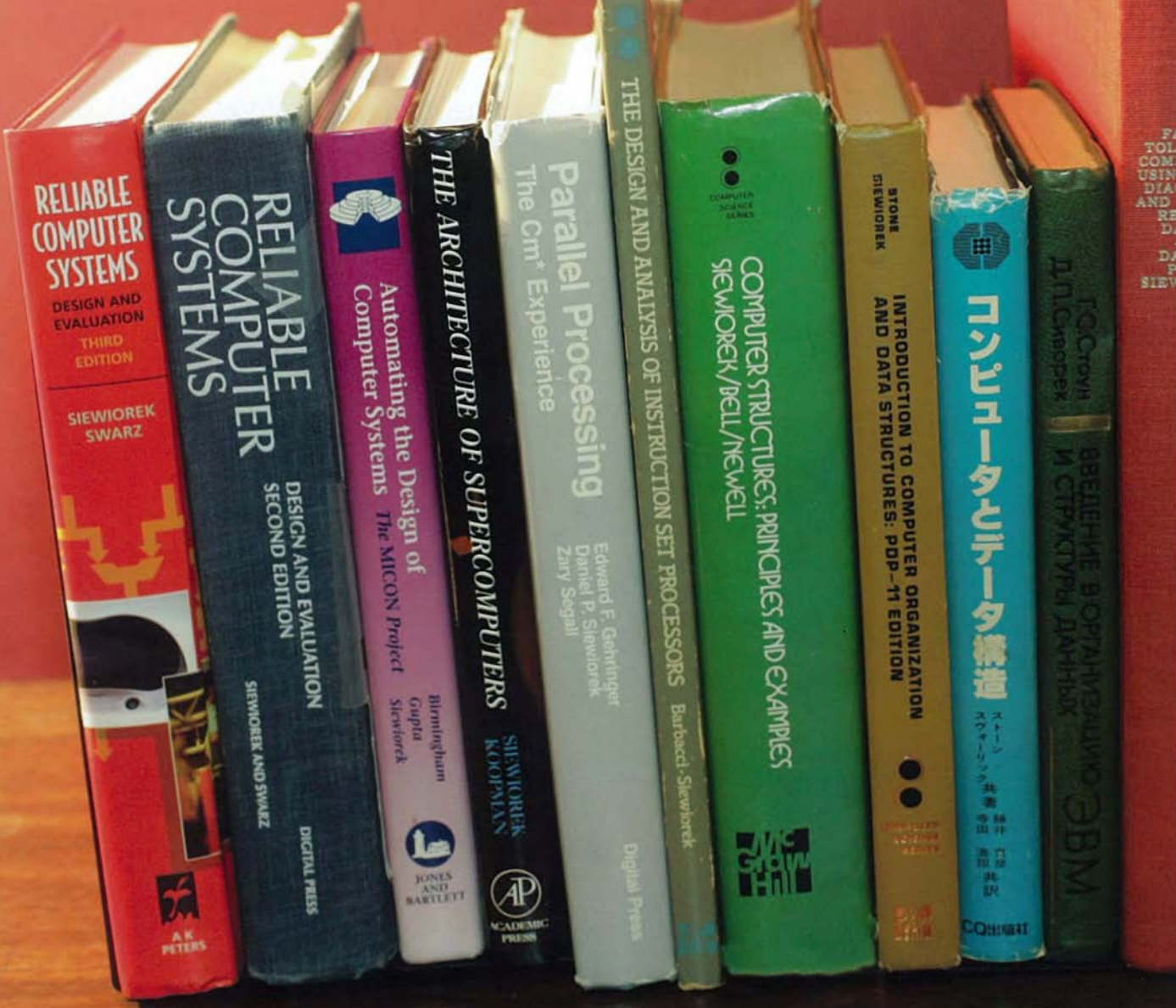
Education



Education & Research



Electrical & Computer
ENGINEERING



T.E. (Ed) Schlesinger

Professor and Head of Electrical and Computer Engineering, Carnegie Mellon University

Professor T.E. Schlesinger is Professor and Head of Electrical and Computer Engineering at Carnegie Mellon University. He received his B.Sc. degree in Physics from the University of Toronto in 1980 and his M.S. and Ph.D. degrees in Applied Physics from the California Institute of Technology in 1982 and 1985 respectively. His research interests are in the areas of solid state electronic and optical devices, nanotechnology, and information storage systems.



and the Carnegie Science Center 1998 “Scientist” award. In 1988 he received the George Tallman Ladd Award for research and in 2001 he received the Benjamin Richard Teare Award for teaching from the Carnegie Institute of Technology. He has published over two hundred archival journal publications, keynote, invited and contributed conference presentations and holds ten patents. He is a Fellow of the SPIE.

Professor Schlesinger was the founding co-director of the General Motors Collaborative Research Laboratory at CMU and was Director of the Data Storage Systems Center prior to becoming head of ECE. His work and the work of his students is of direct interest to a number of industrial partners and he has received a number of awards and honors including; 1999 and 1998 R&D 100 Awards for his work on nuclear detectors and electro-optic device technology

2:55 pm - 3:10 pm

Jeannette M. Wing

President's Professor of Computer Science and Head of the Computer Science Department, Carnegie Mellon University

Dr. Jeannette M. Wing is the President's Professor of Computer Science and the Head of the Computer Science Department at Carnegie Mellon University. She received her S.B. and S.M. degrees in Electrical Engineering and Computer Science in 1979 and her Ph.D. degree in Computer Science in 1983, all from the Massachusetts Institute of Technology.

Professor Wing's general research interests are in the areas of specification and verification, concurrent and distributed systems, and programming languages. Her current focus is on the foundations of trustworthy computing.

Professor Wing has published extensively in top journals and major conferences and has given over 200 invited, keynote, and distinguished lectures. She was or is on the editorial board of nine journals, including the Journal for the ACM.

Professor Wing is a member of many advisory boards, including: the Networking and Information Technology (NITRD) Technical Advisory Group to the President's Council of Advisors on Science and Technology (PCAST), the National Academies of Sciences's Computer Science and Telecommunications Board, Microsoft's Trustworthy Computing Academic Advisory

Board, and the Intel Research Pittsburgh's Advisory Board. She is a Member-at-Large on ACM Council. She was a member of the DARPA Information Science and Technology (ISAT) Board and the National Science Foundation Scientific Advisory Board. She was on

faculty at the University of Southern California, and has worked at USC/Information Sciences Institute and Xerox Palo Alto Research Laboratories. She spent a sabbatical at MIT in 1992 and at Microsoft Research

2002 - 2003. She has consulted for Digital Equipment Corporation, the Mellon Institute (Carnegie Mellon Research Institute), System Development Corporation, and the Jet Propulsion Laboratory. She is a member of AAAS, ACM, IEEE, Sigma Xi, Phi Beta Kappa, Tau Beta Pi, and Eta Kappa Nu. Professor Wing is an ACM Fellow and an IEEE Fellow.



Donald E. Thomas

***Professor of Electrical and Computer Engineering,
Carnegie Mellon University***

Donald E. Thomas received the Ph.D. degree in 1977 from Carnegie Mellon University. He is currently Professor of Electrical and Computer Engineering there, working in the area of single-chip heterogeneous multiprocessor systems, and hardware/software co-design. He

is co-author of the book

“The Verilog Hardware

Description Language

Fifth Edition” which

has been translated

into Japanese

and Mandarin

Chinese. From

1985 to 1986 he was

a Visiting Scientist at

IBM T.J. Watson Research

Center, Yorktown Heights, NY. He was chair of

the 1989 Design Automation Conference. He

has been on the editorial board of IEEE Design

and Test Magazine, an Associate Editor for the

IEEE Transactions on VLSI Systems and ACM’s

Transactions on Embedded Systems, and on

the IEEE Computer Society Board of Governors.

He has been chair of the CODES/CASHE-96

Workshop on Hardware/Software Co-design

and is now Steering Committee Chair for the



International Conference on Hardware/Software Codesign and System Synthesis. He was elected Fellow of the IEEE “For contributions to automatic design of integrated circuits and systems, and to education in computer engineering.”

"Since I came to CMU 25 years ago, Dan has been always the person to ask whenever I need to know about from computer architecture to wearable computing and from how to write a proposal to how to run an ERC. Dan, thank you for your help."

- Takeo Kanade

"I first met Dan as an undergraduate when I took one of his courses. I did an undergraduate research project with him, and later went on to be one of his PhD students graduating in 1992. I returned to CMU in 1998 and worked on the Amaranth project with Dan."

- Jeff Hansen

"Congratulations and thank you for all the many years of superb service and leadership to our community!!!! All the best and many, many more years to come! "

- Alex Waibel

"To me the best way to describe Dan's advising was that he had given me right directions at the right times. His care and support made my study at Carnegie Mellon a very rewarding experience. We admire his accomplishments and are thinking of him all the time. Dan, we wish you a very happy birthday! Congratulations to you and Karon!"

- Chia-Jeng Tseng



"One of the things that epitomizes how thoughtful Dan is, is how he reacted to the news that I was having a baby -- he was so full of questions about how it would affect me and my family, I had to remind him to discuss how it might affect the department :) ."

- Jen Mankoff

"Dan's success comes 100% from real content, including both his intellectual contributions and his personal interactions with others, and not from any perceptions or hype."

- Lee Weiss

**Thank you
DAN!**

40 years of innovation



“Do good science



and the rest will follow.”





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