Novel math formula is shortcut to auto design

The interplay between artists and engineers in automobile design can be as tenuous a relationship as that of actor to director, writer to editor.

There is a natural conflict between the two disciplines as the artist tries to convey his vision of the product, the engineer his practical logistics. Reluctant to give in, each side claims propriety. Egos are bruised, feelings are hurt, tensions rise, precious time is lost.

While it may seem that the root of the conflict would require the interpretation of a psychologist, Volvo Corp., of Gothenburg, Sweden, one of the world's premier automobile manufacturers, turned instead to a mathematician.

Bjorn Dahlberg, Ph.D., visiting professor of mathematics, has developed a math formula that is a shortcut to automobile design. The Volvo Corp. is integrating the formula into its design philosophy.

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From two weeks to eight minutes

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Bjorn Dahlberg, Ph.D., visiting professor of mathematics at Washington University, has developed a novel mathematical formula for automobile design that has cut the revision time needed for a team of artists and engineers to design a car from two weeks to just eight minutes, according to Volvo tests.

Called SLIP, a Swedish acronym for "polish," the concept is revolutionary in the field of automobile design, and so far is the exclusive domain of Volvo.

SLIP has passed the experimental stage at Volvo, and presently is being integrated with the corporation's computer-aided design (CAD) technology. After the computer software is smoothly formatted and employees become trained on the system, SLIP is expected to be fully deployed at Volvo in two to three years.

"SLIP is the conduit to an artful blend of geometry and engineering," its inventor says. "It is a mathematical compromise between two disciplines that is intended to eliminate much of the repetition leading to major bottlenecks in automobile design."

Because SLIP eliminates wasted time, design teams will be able to develop more models and make infinitely more revisions in their quest to create the best models possible, Dahlberg says.

Volvo issued a final report on the testing of the SLIP concept in March. Says Lennart Johansson, manager of computer-aided engineering in the corporation's product design department: "With the use of SLIP, the time spent on the (original) design of automobile surfaces will be cut by 90 percent, and the total time reduced in the entire design process, including numerous revisions, will be at least 25 percent. This will cut down expenses at Volvo and greatly increase the quality of our product."

Although American automobile manufacturers rely heavily on computer technology in design and production of automobiles, it isn't likely they will incorporate the concept immediately, Dahlberg says, noting that American manufacturers may be hesitant to adapt such a novel idea. But, he says, once the American industry realizes the concept, "American industry realizes the concept of a psychologist, Volvo Corp., of Gothenburg, Sweden, one of the world's premier automobile manufacturers, turned instead to a mathematician.

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Auto design — continued from p. 1

exists and knows it is operational, he expects U.S. auto manufacturers to become very interested.

The mathematical battleground of automobile design unravels like this. Highly trained, aesthetic industrial designers first sketch or model from clay their design of a new car; they then transfer the design to a computer model through CAD: engineers then examine the artists’ CAD model for efficiency and practicality.

An engineer may look at the model and say, “change the angle on the window by 5 degrees,” Dahlberg says. “This is when the fun flies. The artist thinks his vision has been irreparably altered; the engineer says the car now won’t run properly.”

For years, at this point it was back to the drawing board — more specifically, the computer terminal, where artists tinker for hours by mathematical long-hand to incorporate the engineer’s parameters and still try to salvage artistic expression. But now, at least at Volvo, this is where SLIP enters the picture.

“The system interprets the changes needed in mathematical terms,” Dahlberg says. “The aim is to make the iterative process of change automatic without the haggling and delays involved with the inevitable numerous changes that are inherent in design.”

Above is the courtyard and entryway to Louderman Hall’s new addition, which is part of the renovation that was recognized for architectural excellence.

Louderman Hall renovation recognized with award for architectural excellence

The recent renovation of Louderman Hall has been recognized for architectural excellence with the Construction Products Council/American Association of Architects Honor Award.

The prestigious award, given only once every three years, was one of two honor awards given in the Triennial Architectural Awards Competition held in St. Louis this spring. The other award went to Union Station.

Architect Thomas S. Harvath, of the St. Louis firm Ittner and Bowersox, designed the renovation and addition to Louderman Hall, which is part of the chemistry department complex. Harvath received a bachelor’s degree and a master’s degree from Washington University in 1972 and 1974, respectively.

Harvath’s design included nuclear magnetic resonance (NMR) laboratories, a three-story office addition, renovated chemistry and electronics laboratories and the landscaping of an overgrown courtyard.

The NMR laboratory design posed several unique problems for the architect, who had to exercise great care to ensure that the magnetic field generated by the NMR instruments would not be disturbed by nearby metal objects. The configuration was complicated because the space allocated for the laboratory lies between an elevator shaft and a machine room.

Jurors for the competition were Robert C. Broshar, an architect from Waterloo, Iowa; Gerald Horn, of Chicago, Ill.; and C. William Bruhaker, principal of the architectural firm of Perkins and Will, which has offices in Chicago, New York and Washington, D.C.

Eliot Honors recognizes seniors

A total of 385 graduating seniors will be honored for scholarship and leadership at Washington University’s 96th annual Eliot Honors Convocation at 2:30 p.m. Thursday, May 19, in the Athletic Complex Field House.

Jeffrey Samelson, an honors graduate of the College of Arts and Sciences, will give the student address. His lecture is titled “The Road Goes Ever On and On.” Samelson, a member of Phi Beta Kappa, also is a member of Delta Phi Alpha National Honor Society for German.

The convocation honors graduating students whose achievements in scholarship and service to the University have been recognized by honor organizations and by the academic divisions of the University. The ceremony is named in honor of the Rev. William Greenleaf Eliot, a Unitarian minister who was one of the founders of Washington University and chancellor from 1870 to 1887.

‘Murder in the Cathedral’ auditions set

The Performing Arts Department invites members of the St. Louis community to audition for a production of T. S. Eliot’s verse drama “Murder in the Cathedral.” Auditions will be held by individual appointment from 7 to 10 p.m. on Monday and Tuesday, May 16 and 17. The drama will be presented Sept. 23-30 at 8 p.m. in the Performing Arts Department office, 315 Mallinckrodt Center.

“Murder in the Cathedral” tells the story of Archbishop Thomas Becket’s martyrdom in Canterbury Cathedral in 1170 at the hands of henchmen of King Henry II. Nine male roles and five female roles in the female chorus are available. Rehearsals for those cast in the production will begin Aug. 22.

Auditions will be held by appointment from 7 to 10 p.m. on Mondays and Tuesdays, May 16 and 17. The drama will be presented Sept. 23-30 at 8 p.m. in the Performing Arts Department office, 315 Mallinckrodt Center.

Those interested in scheduling an audition are invited to inquire in person or by calling 889-5858.

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Deidre Boden, Ph.D., assistant professor of sociology, recently participated in a panel discussion on "New Directions in Northern Ethnic Interactions" at the Midwest Sociological Society Meetings in Minneapolis.

Richard Colignon, Ph.D., assistant professor of political science, has co-authored a book, titled "Reification and the 'Natural' View of Organizations," at the Computer Organizations Session of the Midwest Sociological Meetings, held in Minneapolis. He also was a discussant in a panel on "Analyzing Approaches to Class and Social Structure." Roy Curtiss III, Ph.D., George William and Irene Koechig Freiberg Professor of Biology and chairman of the biology department, has been named to a committee or elected an officer of an organization titled "Engineering Organisms for Safety: What is Necessary," at the First International Conference on the Release of Genetically Engineered Microorganisms, held April 5-8 in Cardiff, Wales. He also lectured at the Institut Pasteur, Paris, France, on "Use of Avirulent Salmonella to Evaluate Mechanicals of Bacterial Pathogenesis and the Use of Recombinant Avirulent Salmonella Vaccines" at Rhone Merieux, Lyon, France.

Joseph Fields, M.D., Ph.D., assistant professor of radiology, delivered a paper on "Primary Tumors of the Trachea—Results of Radiation Therapy" at the 70th annual meeting of the American Radiology Society, held April 16-20 in Seattle, Wash.

Mark A. Franklin, Ph.D., professor of electrical engineering and computer science, Michael Miller, Ph.D., professor of electrical engineering, and Gruia-Catalin Roman, Ph.D., professor of computer science, have received a National Science Foundation grant, titled "Equipment in Support of Parallel Processing Research." Money from this grant, supplemented by additional funds from the University, have been used to purchase an NCUBE parallel processing computer. The computer consists of 64 individual processors configured in a hypercube topology. With a peak computational rate of about 128 MIPS (millions of instructions per second), it is capable of performing 64 operations of the same type in the area. It will be used as a research tool to investigate parallel algorithms for computer-aided design, signal and image processing, and distributed operating systems.

Charles R. McNamis, J.D., professor of law, moderated a panel discussion on medical malpractice at the Washington University School of Medicine on March 11. The discussion was sponsored and videotaped by the local chapter of the American Medical Student Association.

E. Thomas Sullivan, J.D., led a five-person team as chair of the American Bar Association/Association of American Law Schools reinspection visit for the reaccreditation process at the Western Reserve University Law School.

Robert L. Thorp, Ph.D., associate professor of art history, gave four lectures recently: "The Quim-Han Transformation" at Los Angeles County Museum of Art; "Underground Palaces and Longevity Mounds" at the Cleveland Museum of Art, both in conjunction with the exhibition "Quest for Eternity;" "Death and the Afterlife in Early Imperial China" at the Walters Art Gallery in conjunction with the exhibition "Stories From China's Past;" and "Reinventing the Past" at the Birmingham Museum of Art.

Michael D. Ward, chief technologist for quality assurance and director of technical education for Mallinckrodt Institute of Radiology, has been selected to be a Fellow of the American Society of Radiologic Technologists. This honor is in recognition of outstanding contributions to the ASRT and to the profession of radiologic technology. He will receive the fellowship during the 89th annual conference in Buqueque, N.M., on June 12. Upon receiving the honor, Ward will be the youngest radiologic technologist to earn this distinction.

Robert L. Williams, Ph.D., professor of psychology and black studies, conducted a two-day workshop on culture in education for the Afro-American Students Program at the University of New Mexico in Albuquerque on March 4-5. He also delivered the keynote address on "Assessment and Evaluation of Minorities" at the Chicago School of Professional Psychology's Cultural Impact Conference on March 19.

Have you done something noteworthy?

Have you: Presented a paper? Won an award? Received recognition from a committee or elected to be a member of a professional organization? The Washington University Record will help spread the good news. Contributions regarding faculty and staff scholarly or professional activities are gladly accepted and reviewed.

The academy recognized Watson for 30 years of research into broad areas of anthropology, including the origin of horticulture in the North America and the Near East, archaeological theory and ethnoarchaeology — the study of living groups of people to determine how human behavior contributes to archaeological sites.

Ward received performance of Peter Shaffer's "Equus." He recently designed the set for the well-received performance of Peter Shaffer's "Equus." He also was named to a committee or elected an officer of an organization.

Academy — continued from p. 3.
CALENDAR

May 12-21

Honorary degrees

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Williams College, and a master's degree and a certificate from Harvard.

Carol Behrhorst, founder of the

The Behrhorst Development Foundation

in Guatemala, will receive a doctor of

humanities degree. The foundation

that bears his name began as a one-room,
one-man clinic; it has since achieved

worldwide renown as a model for rural

health care.

Behrhorst received his bachelor's

degree at Washington University in 1945

and graduated from the university's

medical school in 1947. Following a

practice and moved his family to

Chimaltenango, a town of 200,000

in Guatemala's poverty-stricken highlands.

Behavior's clinic has treated some

250,000 patients since 1962, and has

provided extensive training that allows

Indians to run health, agriculture, family

planning and water projects without

outside assistance.

Behrhorst is an adjunct assistant

professor at Tulane University's School of

Public Health and Tropical Medicine in

New Orleans.

Edwin T. Jaynes, Wayman Crow Professor of

Physics at WU. 300 Eliot.

T. S. Eliot's "Murder in the Cathedral" will be held at 9:15 a.m. Friday, May 13, also at the

Clopton Amphitheatre.

Cardinal vs. Atlanta Braves. Busch Stadium.

St. Louis

7 p.m. Senior Night at the Ballpark,

toast, Bowles Plaza.

Jack L. Strominger, one of the

nation's top biochemists, will be

awarded a doctor of science degree.

His early studies of complex

nucleotides led to a 25-year investiga-

tion of the action mechanism of peni-

cillin and the structure and biosynthesis of

cell walls. Twelve years ago, he turned

his attention to the study of transplanta-

tion antigens, which are responsible for

the rejection of transplanted organs.

Strominger received his bachelor's
degree from Harvard and his medical degree

from Yale. He joined Washing-

ton University's faculty in 1955 as the

Marlbe Scholar in Medical Science. In

1964, he became a professor in pharma-

cotherapy and chemical microbiology at the

University of Wisconsin in Madison,

where he also served as chairman of the

Department of Pharmacology. In 1968,

he was named a professor of biochem-

istry at Harvard, where he is the Higgins

Professor of Biochemistry.

August Wilson, a Pulitzer Prize-

and Tony Award-winning playwright,

will receive a doctor of letters degree.

Wilson currently has two plays running

on Broadway, which Newsweek

magazine calls an unprecedented feat for

a black playwright. "Fences," which

opened on Broadway in 1987, was

the first play in 30 years to capture all of

the major theatrical awards — including the

1987 Pulitzer Prize for Drama, Tony

Awards for Best Play and Best Director,

and awards from the New York Drama

Critics Circle, Drama Desk, Outer Critics

Circle and American Theatre Critics

Association for Best Play.

"Fences" and "Joe Turner's Come

and Gone," also on Broadway, are part

of a cycle of plays about the experience of

black Americans through each
decade of the 20th century. Another of

Wilson's plays, "The Piano in the

Black Bottom," won the New York Drama

Critics Circle Award in 1984. The pro-

duction was directed by Lloyd

Richards, artistic director of the Yale

Repertory Theatre and dean of the Yale

Drama School, with whom Wilson has

had a long association. "The Piano

Lesson," which completed its run for the

Yale Repertory late last year, is Wilson's

fourth collaboration with Richards.