JUNE 2, 2000

Projects Day

SCIENCE AND ENGINEERING

PROJECT CENTER

SENIOR DESIGN

PROJECTS 1999-2000

WELCOME

This is the thirteenth year of the Science and Engineering Project Center. I congratulate all those within the School and outside for making this Project Center the success it is today. Welcome, all of you, and thank you for your participation.

On this, Projects Day 2000, we present the results of student work sponsored by industry, government, and our university, and developed by senior students in the science and engineering design program at Seattle University. This is a wonderful opportunity for our students to share with you the results of their hard work.

We are grateful to our sponsors — those who are veterans at sponsoring our projects and those who are new this year. It is a tribute to your faith in our students, and in the quality of their work, that you choose to invest your time and resources in these projects.

This senior capstone experience is perhaps the most important learning experience for our students in culminating their careers at Seattle University. Working in small groups, solving open-ended problems that may not have a unique solution, and being responsible to strict timelines, budgets, and the needs of outside agencies, are excellent preparations for the professional positions our students will soon fill.

Congratulations to our faculty, students, and professional mentors for bringing these challenging projects to fruition and to success.

George Simmons, Dean
School of Science and Engineering

On behalf of our faculty and students, I also welcome you to Projects Day 2000, our annual presentation of design team results to sponsoring organizations, visitors, and friends. I am grateful for the encouragement and assistance provided by our Science and Engineering Advisory Board and the Project Center Advisory Committee in promoting the external sponsorship of our projects. I would also like to acknowledge the coordination efforts of professors Rolf Skrinde in Civil and Environmental Engineering, Robert Heeren in Electrical Engineering, Ananda Cousins in Mechanical and Manufacturing Engineering, Everald Mills in Computer Science, as well as Sheridan Botts, contracts manager, and Kathy Fletcher, administrative assistant for the Project Center.

Special thanks go to the students in our engineering organizations who are your hosts today and who volunteer to carry out many of the tasks associated with our Projects Day celebration. These student societies are the American Society of Civil Engineers (ASCE), American Society of Mechanical Engineers (ASME), Institute of Electrical and Electronics Engineers (IEEE), National Society of Black Engineers (NSBE), Society of Environmental Engineers and Scientists (SEES), Society of Women Engineers (SWE), and Tau Beta Pi.

Patricia D. Daniels, Director
Science and Engineering Project Center

PROJECTS DAY

9:00 A.M. LEMIEUX LIBRARY FOYER
Projects Day Registration, project displays

9:15 A.M. – 10:55 A.M. SCHAFER AUDITORIUM
The Boeing Company	Boeing Antenna Analysis Software
AGRA Earth & Environmental	Geotechnical Study of Proposed Student Center
Harrison's Comfort Footwear	Custom Insole Manufacturing Process Improvement
Appian Graphics	Adaptation of J2000 Graphics Card to Sun Platform
A. K. Gordon & Associates	Bridge Truss Rating Program Studies

10:55 A.M. – 11:10 A.M.
Break

11:10 A.M. – 12:30 P.M. SCHAFER AUDITORIUM
Kenworth Truck Company	Redesign of Ride Height Control System
Virtual WarpSpeed	Spinoza
Visio Division of Microsoft Corporation	PocketVisio Natural Drawing Recognition

12:30 P.M. LEMIEUX LIBRARY FOYER
Buffet Lunch

1:30 P.M. – 3:30 P.M. SCHAFER AUDITORIUM
GTE Network Services	Intranet Based Synchronization Map
Seattle University	A Document Image Analysis Viewer (DiaView)
Seattle University	Market Sim
Wellness by Design	Wellness by Design

1:30 P.M. – 3:30 P.M. STIMSON ROOM
The Boeing Company	Environmental Analysis of Alternative Plating Processes
Puyallup Integrated Circuit Company	Dual-Clock, Two-Port, First-In/First-Out Static Memory Array
Seattle University	Design and Construction of a Power-Assisted Wheelchair
David Evans & Associates	132nd Street SE Improvement Project

PROJECT NUMBER: INT 00.2
PROJECT TITLE: Design, Test, and Implementation of Boeing Antenna
                    Analysis Software
SPONSOR: The Boeing Company
SPONSOR LIAISON: Kurt Heidergott
FACULTY ADVISOR: Prof. Robert Heeren and Prof. Everald Mills
STUDENTS: Mark Hoang, Kenneth Kirchoff, Craig Livingstone,
                    Jarek Predki, and Jimmy Soong

DESCRIPTION:
A major division within The Boeing Company, the Boeing Commercial Airplane
Group designs and builds airplanes in a global arena. Boeing purchases airplane
antennas from contracted vendors and tests these antennas for adherence to
supplier stated specifications, at its outdoor antenna range. Boeing reports the
outcomes of these tests to internal and external organizations, including the FAA.
The old analysis software contained multiple bugs, was not compatible with newer
operating systems such as Windows 98/2000/NT, and did not plot the antenna test
data in the desired Boeing report format. The team designed, tested and imple-
mented a new stand-alone software package. The new software enables Boeing to
analyze, manipulate, extract and plot antenna pattern data from their antenna test
range. The software is compatible with newer software operating systems and has
the flexibility to expand with the company's growing needs.

PROJECT NUMBER: CEE 00.2
PROJECT TITLE: Geotechnical Study of the Proposed Student
                    Center at Seattle University
SPONSOR: AGRA Earth & Environmental
SPONSOR LIAISON: James M. Brisbine
FACULTY ADVISOR: Prof. Nirmala Gnanapragasam
STUDENTS: Ryan Barrett, Roel Dulay, Brian Matsumoto,
                    Ryan McLaughlin

DESCRIPTION:
Seattle University is currently planning for and designing a new Student Center.
AGRA Earth & Environmental, an engineering firm contracted by Seattle University,
asked the team to perform a geotechnical study for the proposed Student Center.
The team performed field and laboratory soil tests and constructed a geologic
profile of the site based on boring log information provided to them by AGRA Earth
& Environmental. The team came up with recommendations for the foundation,
shoring, drainage and dewatering based on the information collected and the
Student Center preliminary architectural plans.

PROJECT NUMBER: MME 00.1
PROJECT TITLE: Custom Insole Manufacturing Process Improvement
SPONSOR: Harrison's Comfort Footwear
SPONSOR LIAISON: John O'Brien
FACULTY ADVISOR: Prof. Greg Mason
STUDENTS: Grida Chiewcharat, Silas Curfman, Nick MacDonald,
                       Dale McKee

DESCRIPTION:
Harrison's Comfort Footwear manufactures custom orthotic insoles used to
correct certain types of foot ailments. Harrison's asked the team to review their
current manufacturing process, identify problem areas, and recommend improve-
ments to increase production rate while still allowing customization throughout the
process. The team identified the vacuum-forming procedure as a bottleneck. The
team built a dual vacuum-forming chamber to allow multiple pairs of insoles to be
vacuum-formed at one time. The new dual vacuum-forming chamber doubled
insole production. The team also ran insole cooling tests to determine the earliest
possible time of insole removal.

PROJECT NUMBER: INT 00.1
PROJECT TITLE: Adaptation of the Appian J2000 Graphics Card to
                       the Sun Ultra Platform: Design and Testing
SPONSOR: Appian Graphics
SPONSOR LIAISON: Michael Larson
FACULTY ADVISORS: Prof. Bruce Duba, Prof. Bert Otten, S.J.
STUDENTS: David Giner, Emily Jorgenson, Shahid Khatri,
                       Frank Paglia, Matthew Sanford, Teresa Straub

DESCRIPTION:
Multiple monitor desktops are becoming popular because computer desktops have
become overcrowded. Appian Graphics offers a solution to this problem by
developing multiple monitor video cards that allow computer users to simulta-
neously use two or more monitors with one computer. Currently, the Jeronimo
2000 multiple monitor graphics card operates only on IBM compatible PCs running
Windows/NT and Macintosh based systems. Appian Graphics asked the team to
adapt its J2000 to the Sun SPARC platform, a UNIX based system. The team
developed software to support the J2000 through manipulation of publicly available
code. The team delivered a fully functional J2000 graphics card for the Sun SPARC
environment. The project included the development of an Open Boot ROM, an X11
server, a C language library of accelerated hardware functions, and a seamless
desktop window manager.

PROJECT NUMBER: CEE 00.3
PROJECT TITLE: Bridge Truss Rating Program Studies
SPONSOR: A. K. Gordon & Associates
SPONSOR LIAISON: Alan K. Gordon
FACULTY ADVISOR: Prof. Richard Schwaegler
STUDENTS: Ron Austill, Douglas Gadow, Joe Win Kon,
     Shawna Richardson

DESCRIPTION:

Alan K. Gordon & Associates has developed bridge-rating software for the
Washington State Department of Transportation and its consultants. This software,
BRIDG97®, is designed to determine a live load rating capacity based on a prescribed
set of national standard truck loadings. Alan K. Gordon & Associates recently
upgraded BRIDG97® to analyze truss bridges in a three-dimensional mode and
commissioned the team to verify that the new truss utility is reliable. Using
conventional methods of structural analysis, and employing Washington State
Department of Transportation design codes, the team performed an independent
structural analysis of a truss bridge. The team then used the upgraded BRIDG97®
software to rate the bridge. The team prepared a report detailing their methods,
their findings and a comparison of the two bridge ratings.

PROJECT NUMBER: MME 00.2
PROJECT TITLE: Redesign of the Ride Height Control System for
     Heavy Duty Trucks
SPONSOR: Kenworth Truck Company
SPONSOR LIAISONS: Dan Farmer, Roger Penzotti
FACULTY ADVISOR: Prof. Pierre Gehlen
STUDENTS: Justin Bedford, Cory Celestino, Chris Payne,
     Michael Wethington

DESCRIPTION:

The Kenworth Truck Company currently uses suspension air bags to level the height
of their heavy duty trucks. The amount of air in the bags is regulated by a mechanical
sensor and pneumatic valve. The team introduced an electrical sensor and solenoid
valves controlled by a logic circuit to increase the reliability, ease of use and
functionality of the height control leveling system. The improved system will also
eliminate wear and premature failure.

PROJECT NUMBER: INT 00.3
PROJECT TITLE: Spinoza
SPONSOR: Virtual WarpSpeed – A Division of RKM Holdings
SPONSOR LIAISON: Hank Meuret
FACULTY ADVISORS: Prof. Al Moser, Prof. Everald Mills
STUDENTS: Tuan Do, Sylvain Ekel, Glen Goulter, Lloyd
                        Musabayana, Cory Pritchard, Quyet Tran

DESCRIPTION:
Some Personal Digital Assistants (PDA) can download information from some web
pages without hard wired connections. To then transfer that information to another
device requires direct connections. Virtual WarpSpeed asked the team to develop a
prototype wireless PDA using Bluetooth Technology that can both download
information from all web pages (Receive HTML) and communicate that information
to other devices (Push HTML). The team designed a prototype that downloads web
pages, music, games, and video from the web to various non-connected peripherals
(such as screens, printers, and speakers). In addition to Push and Receive HTML, the
team's prototype is able to perform multimedia streaming (broadcast streaming
media from the internet) and internet telephony (makes and receives internet
telephone calls). The team simulated the PDA prototype by using two laptops
equipped with Bluetooth demonstration cards and Software Developer Kits. They
demonstrated the success of their design by sending complete web sites to
peripheral displays and downloading music and stream video from the internet to
Bluetooth Technology enabled peripherals.

PROJECT NUMBER: CSSE 00.4
SPONSOR: Visio Division of Microsoft Corporation
SPONSOR LIAISONS: Wendy Richardson, Brett Eddy
FACULTY ADVISOR: Adair Dingle

PROJECT TITLE: PocketVisio
STUDENTS: Edward Shanahan, Doug Kresge, and Abdel Muamar

Visio 2000 software is a worldwide standard for creating, storing, and exchanging business drawings and diagrams. The Visio Division of Microsoft Corporation is exploring the development of applications that operate on a palm-size personal computer. The limited memory and screen size of the palm-size personal computer platform create many challenges, one of which is the development of a user interface that supports the functionality of Visio 2000. The Visio Division of Microsoft Corporation asked the team to develop a prototype user interface, codenamed PocketVisio, which operates on the Microsoft Windows CE platform. The team interviewed prospective users, compiled a list of desirable user interface features, and developed a prototype that incorporated these features and optimized available screen space.

PROJECT TITLE: Natural Drawing Recognition
STUDENTS: Bruce Amsbaugh, Teague Mapes, Chris Oje

DESCRIPTION:
Visio software uses drag and drop technology to create detailed flowcharts, technical drawings, and network diagrams. Most users however, tend to initiate a drawing using pen and paper or a whiteboard and later translate the hand drawn sketch - or natural drawing - into a more formal Visio diagram. Today, input devices exist that can capture drawn or written information and electronically store the strokes in a computer. The design team's responsibilities included developing an interface to enable Visio software to receive input from these devices or natural drawing systems. The team developed an application programming interface (API) that takes the form of a Visio Plugin or dynamically linked library (DLL). This DLL extracts points and time information from the natural drawing system and uses this information to create a Visio document through C++ automation. The team also developed a modified Visio interface to facilitate the use of this DLL.

PROJECT NUMBER: CSSE 00.1
PROJECT TITLE: Intranet Based Synchronization Map and Timing
                         Output Assignment Record
SPONSOR: GTE Network Services – Northwest Region
SPONSOR LIAISON: Garth Oksness, Morrie Sachsenmaier
FACULTY ADVISOR: Prof. Susan Reeder
STUDENTS: Daniel J. Buenas, Kenneth M. Cam, Dinesh K. C.,
                         Voravat Maleenont, Firoozeh Ojagh

DESCRIPTION:
GTE Network Services field engineers need access to Synchronization Maps
showing Central Office locations, and for each office, the synchronization source,
switch type, stratum clock level, facility type and timing route as well as access to
Digital Clock Distribution assignment tables. The maps are in proprietary CAD
software and Digital Clock Distribution assignment tables are on Mylar drawings. The
team was asked to create an intranet website to display the map and assignment
tables, providing read/write permissions to network designers, and read-only
permissions to other telephone company personnel. The team converted a map
into a web-accessible format and transcribed the Digital Clock Distribution tables
into a database. The team then linked the map to the database to draw Central
Office locations and their respective timing routes. Now field engineers have easy
access to Synchronization Maps and Digital Clock Distribution assignment tables.

PROJECT NUMBER: CSSE 00.2
PROJECT TITLE: A Document Image Analysis Viewer (DiaView)
SPONSOR: Seattle University
SPONSOR LIAISON: Yalin Wang (Washington Technology Center)
FACULTY ADVISOR: Prof. Ihsin Tsaiyun Phillips
STUDENTS: Marchel Cohn, Farhad Hafezipour, Karrie Meyer,
                         Craig Tadlock, Thach Tran

DESCRIPTION:
Illuminator is a Graphical User Interface tool that can be used only on Sun work-
stations to read and modify documents in DAFS (Document Attribute Format
Specification) file formats. The team's goal was to use Java to design and implement a
new more powerful Graphical User Interface tool, which is called DiaView
(Document Image Analysis Viewer). DiaView is an improvement over Illuminator in
two ways: 1) DiaView can be used either on stand-alone PCs or Sun workstations,
and 2) DiaView can display, edit, and navigate the content of documents in either the
DAFS or XML (Extended Markup Language) file formats. DiaView can display a
document as a scanned image, as a combination of image and data, or as data alone.
The data may be viewed in and altered in any of various modes.

PROJECT NUMBER: CSSE 00.3
PROJECT TITLE: Market Sim
SPONSOR: Seattle University
FACULTY ADVISOR: Prof. Mitchell Spector
STUDENTS: Tim DeGregori, Henry Goss, Hardy Sugiarto,
                      Victor Tsai

DESCRIPTION:
The goal of this project is to demonstrate how a self-evolving algorithm works. Our
program employs and demonstrates self-evolving algorithms by generating
"organisms" that can reproduce and evolve on their own. Using a market simulation,
the organisms compete against each other by buying and selling goods. Our
program determines the organisms that may stay alive and continue to reproduce
and the ones that should be eliminated based on their ability to accumulate wealth.

PROJECT NUMBER: CSSE 00.5
PROJECT TITLE: Wellness By Design
SPONSOR: Wellness By Design
SPONSOR LIAISON: V. M. Popovsky
FACULTY ADVISOR: Prof. Barbara Popovsky
STUDENTS: Marisa Aversa, Paul Houillon, Brian Kobuki,
                      Donna McKee, Peter Salama

DESCRIPTION:
Wellness By Design commissioned the team to design and construct software to aid
volleyball coaches. Incorporating Dr. V. M. Popovsky's volleyball methodology and
training techniques, the team designed easy to use software that tracks individual
athletic progress. Coaches can apply the tool at all levels of athletic performance,
from beginner to expert. With minimal input, the application creates and displays
reports that graph an athlete's age, skills and ability against their performance. From
that information, the coach with the help of an accompanying user manual, can build
a training improvement plan designed to develop the athletes' fullest potential.

PROJECT NUMBER: CEE 00.1
PROJECT TITLE: Environmental Analysis of Alternative Plating Processes
SPONSOR: The Boeing Company
SPONSOR LIAISONS: Laurence Weinberg, Joseph Osborne, Roark Doubt, David Logsdon, Denis Bourcier
FACULTY ADVISOR: Prof. Phillip Thompson
STUDENTS: Dean Bose, Olivia Buban, Fred Jiencke, Holli Klages

DESCRIPTION:
Cadmium plating is currently used to protect certain metal parts at The Boeing Company. However, because of the toxic nature of cadmium, the Joint Group-Pollution Prevention (JG-PP) has recommended that safer and less hazardous plating processes be evaluated. Boeing has proposed ion-vapor-deposited aluminum, tin-zinc, and zinc-nickel plating as three feasible alternative processes, each of which is anticipated to provide plated products that are equivalent in quality. A ranking of these plating processes was performed using three decision making tools: Life Cycle Analysis (LCA), Life Cycle Costing (LCC), and an Environmental and Health Risk Assessment (EHRA). The results of this evaluation may enable Boeing to reduce waste management costs and risks associated with regulatory compliance or worker exposure, as well as provide the customer with a more environmentally friendly product.

PROJECT NUMBER: EE 00.1
PROJECT TITLE: Dual-Clock, Two-Port, First-In/First-Out Static Memory Array: Design & Simulation
SPONSOR: Puyallup Integrated Circuit Company (PICCO)
SPONSOR LIAISON: Don Haueisen
FACULTY ADVISOR: Prof. Paul Neudorfer
STUDENTS: Chris Norwood, Axel Peterson, Jolly Walia

DESCRIPTION:
The Puyallup Integrated Circuit Company asked the team to design and simulate a two-port, 256 X 64 first-in/first-out (FIFO) static memory application specific integrated circuit. The two ports allow for independent and simultaneous read/write operations governed by separate clocks. The design and simulation were carried out using CAD software from Tanner Research.

PROJECT NUMBER: INT 00.4
PROJECT TITLE: Design and Construction of a
Power-Assisted Wheelchair
SPONSOR: Seattle University
FACULTY ADVISOR: Prof. Ananda Cousins
STUDENTS: Meshal Al-Doub, Tamara Conant, Consuelo Guzman,
Je-Won Kim, Brian Schwenka

DESCRIPTION:
Currently the only options for people who use wheelchairs are fully manual chairs (which require good upper-body strength and coordination) and full powered chairs (which provide no exercise). For a large group of people who use wheelchairs an intermediate solution would be appropriate: a "power-assisted" wheelchair. Such a chair assists the person by providing some fraction of their own effort in propelling the chair; for example, the motor may be set to match the person's own force, thus providing 50% of the required propulsive effort. Our team designed and built a power-assisted wheelchair using a motor driving a fifth wheel. Strain gauges measure the instantaneous propulsive force on the wheel and provide a proportional assistive motor torque. The level of motor assistance can be reduced if the person becomes stronger with training. The primary benefit of the chair is to allow even people with reduced upper-body strength to obtain the exercise benefits of a manual chair; since the assisted chair amplifies their own efforts rather than replacing them entirely with a motor.

PROJECT NUMBER: CEE 00.4
PROJECT NAME: 132nd Street SE Improvement Project
SPONSOR: David Evans & Associates, Inc.
SPONSOR LIAISONS: Gina Hortillosa, Manuel Feliberti,
                     Anna-Trang Nguyen
FACULTY ADVISOR: Prof. Jean Jacoby
STUDENTS: Debra Duffy, James Fong,
                     Anthony Hopkins, Jim Rhodes

DESCRIPTION:
David Evans and Associates, Inc., a multidisciplinary engineering consulting firm, requested
the team to prepare a design report and roadway plans for the 132nd Street SE Improve-
ment Project in Snohomish County. The current configuration of this one-mile stretch of
132nd Street SE is a two-lane, two-direction roadway. To facilitate neighborhood accessibil-
ity, alleviate current traffic congestion, and increase intersection safety, 132nd Street SE is to
be widened to a five-lane roadway with two lanes in each direction and a center left turn
lane. This increase in roadway size will accommodate the expected traffic volume increase
when 132nd Street SE is connected to State Route 9. The final design report addressed
horizontal and vertical alignments of the roadway, channelization, bicycle lanes, curbs, gutters
and sidewalks. The final design plans include roadway cross sections, detailed specifications,
and an estimate of the cost of the project.

SCIENCE AND ENGINEERING ADVISORY BOARD

Ms. Irene Bjorklund, Bjorklund Consulting, Chair
Dr. Dale Carlson, University of Washington
Mr. Mark Dobrinen, Van Waters & Rogers, Inc.
Ms. Debbie Faulkner, Active Voice Corporation
Dr. David Ferguson, The Boeing Company
Mr. Bill Finnegan, Retired from Puget Sound Energy
Mr. Brian Hanrahan, The Boeing Company
Mr. Robert Jones, US WEST
Mr. Dick Kuhner, Retired from US WEST
Dr. Bill Poole, ARIS Corporation
Mr. William D. St. John, Nutraceutix, Inc.
Mr. Dan Sjolseth, Weyerhaeuser Company
Dr. Anthony M. Sutey, The Boeing Company
Mr. Mo Zareh

CIVIL AND ENVIRONMENTAL ENGINEERING

Ms. Susan Serres, City of Bellevue Transportation Department, Chair
Mr. Arthur Barkshire, Retired from Skilling, Ward, Magnusson, Barkshire, Inc.
Mr. William F. Cottrell, Consultant
Dr. Jeffrey J. Dragovich, Skilling, Ward, Magnusson, Barkshire Inc.
Mr. Larry A. Esvelt, Esvelt Environmental Engineering, Inc.
Ms. Amy J. Haugerud, RoseWater Engineering, Inc.
Ms. Joan Lee, Snohomish County Public Works Division
Ms. Jill K. Nelson, Watermark Engineering
Ms. Glynda J. Steiner, Seattle Public Utilities City of Seattle
Mr. Stephen C. Wagner, Tetra Tech Infrastructure Northwest
Mr. Clifford N. Williams, Horton Dennis and Assoc., Inc.

ELECTRICAL ENGINEERING

Dr. Frank D. Gorecki, The Boeing Company
Ms. Mollie Launer, Doble Engineering Company
Mr. Andy Siguenza, Crane ELDEC Corporation
Mr. Merv Smith-Casem, Siemens Medical Systems, Inc.
Mr. Mark Waechter, Quinton Instruments
Ms. Diane Wood, The Boeing Company

MECHANICAL AND MANUFACTURING ENGINEERING

Dr. Dodd Grande, K2 Corporation, Chair
Ms. Rhonda Baresh, Wieland Lindgren and Associates, Inc.
Mr. Kevin M. Brewer, The Boeing Company
Mr. Leo Finnegan, Consultant
Mr. Michael Haynes, HDR Engineering
Dr. Mostafa Rassaian, The Boeing Company
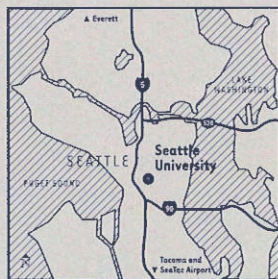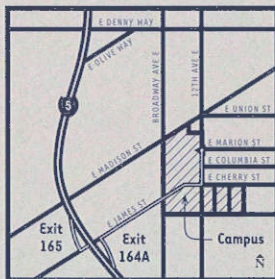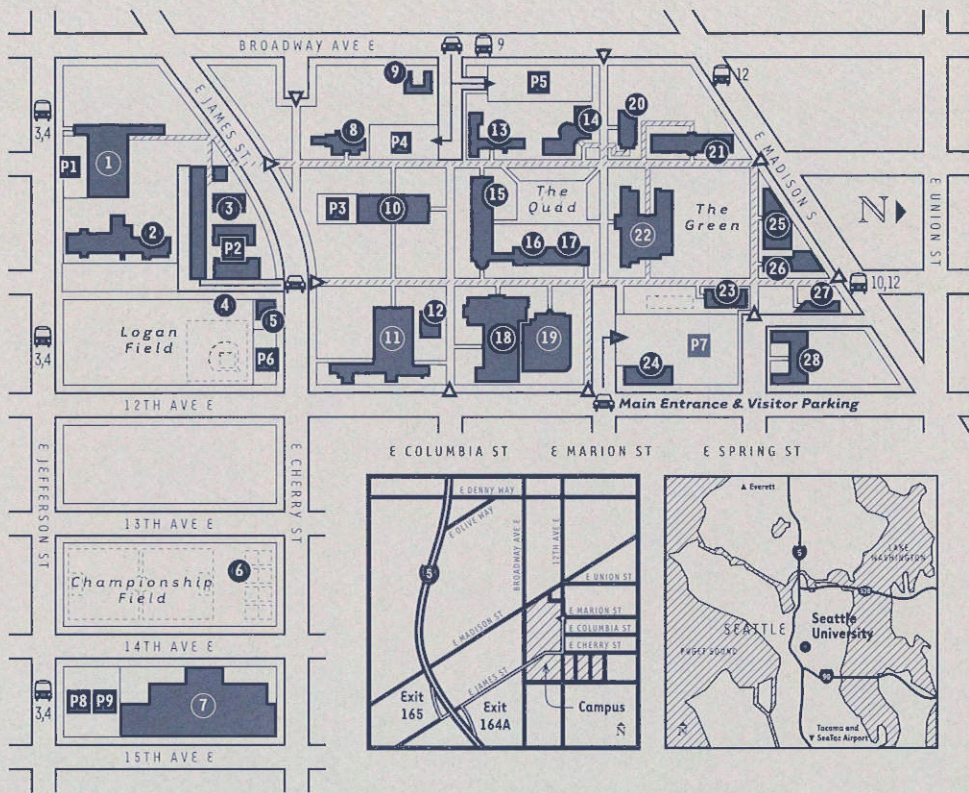Ms. Cynthia M. Stong, The Boeing Company

PROJECT CENTER ADVISORY COMMITTEE

Ms. Debbie Faulkner, Active Voice Corporation, Chair
Mr. Bob Davies, The Boeing Company
Mr. Mark Dobrinen, Van Waters & Rogers, Inc.
Mr. Bill Finnegan, Retired from Puget Sound Energy
Mr. Dick Kuhner, Retired from US WEST
Mr. Dan Sjolseth, Weyerhaeuser Company
Mr. William D. St. John, Nutraceutix, Inc.
Mr. Howard Voorheis, Eaton Corporation
Mr. Stephen C. Wagner, Tetra Tech Infrastructure Northwest

SPONSORING ORGANIZATIONS AND LIAISONS

We want to acknowledge with special thanks the organizations that sponsored projects in 1999-2000, and especially the liaisons representing the sponsors, who worked with the students throughout the year. The time these liaison representatives spent in consultation with our teams is much appreciated by the students and their faculty advisers. It is the liaisons who provide the history and background of each project, its relationship to other work in the sponsoring organization, and much of the technical direction that makes a project successful.

AGRA Earth & Environmental, James M. Brisbine
A. K. Gordon & Associates, Alan K. Gordon
Appian Graphics, Michael Larson
The Boeing Company, Denis Bourcier, Roark Doubt, Dave Logsdon,
    Joseph Osborne, and Laurence Weinberg
The Boeing Company, Kurt Heidergott
David Evan and Associates, Manuel Feliberti, Gina Hortillosa, and
    Anna-Trang Nguyen
GTE Network Services, Garth S. Oksness and Morrie Sachsenmaier
Harrison's Comfort Footwear, John R. O'Brien (from The Boeing Company)
Kenworth Truck Company, Dan Farmer and Roger Penzotti
    (from PACCAR Incorporated)
Puyallup Integrated Circuit Company (PICCO), Don Haueisen
Seattle University, Yalin Wang (from Washington Technology Center)
Virtual WarpSpeed – A Division of RKM Holdings, Hank Meuret
    (from Meuret Consulting)
Visio Division of Microsoft Corporation, Wendy Richardson and Brett Eddy
Wellness by Design, V. M. Popovsky

BROADWAY AVE E

P5 · P1 · P3 · P4 · P6 · P7 · P8 P9

The Quad · The Green · Logan Field

Main Entrance & Visitor Parking

E JAMES ST · E MADISON S · E UNION ST · E JEFFERSON ST · E CHERRY ST

12TH AVE E · 13TH AVE E · 14TH AVE E · 15TH AVE E

Championship Field

E COLUMBIA ST · E MARION ST · E SPRING ST

E DENNY WAY · E OLIVE WAY · BROADWAY AVE E · E UNION ST · E MADISON ST · E MARION ST · E COLUMBIA ST · E CHERRY ST · E JAMES ST

Exit 165 · Exit 164A · Campus

A Everett · LAKE WASHINGTON · SEATTLE · Seattle University · PUGET SOUND · Tacoma & SeaTac Airport

▲ Campus Entry Point   ♿ Accessible Route   🚌 King County Metro   🚗 Parking Entrance   **P9** Parking Area

21 Administration Building
19 Admissions Office
3 Alumni Office
3 Archbishop Murphy Apartments
8 Arrupe Jesuit Residence
17 Arts and Sciences
17 Bannan Biology Wing
16 Bannan Building
15 Bannan Center for Science and Engineering
11 Bellarmine Residence Hall
2 Bessie Burton Sullivant Skilled Nursing Residence
19 Book Store
22 Albers School of Business and Economics

1 Campion Residence Hall
24 Campus Services Building
1 Casey Building
23 Chapel of St. Ignatius
7 Connolly Center
21 Development Office
15 Engineering Building
4 Field House
25 Fine Arts Building
20 Garrand Building
19 Human Resources
5 International Student Center
10 Lemieux Library
13 Loyola Hall
27 Lynn Building

14 Matteo Ricci College
12 McGoldrick Center
2 Pigott Building
27 Institute of Public Service
22 Public Relations Office
13 School of Education
18 School of Law
20 School of Nursing
9 School of Theology and Ministry Annex
15 Science and Engineering
26 Student Union Building
6 Sullivan Hall
6 Tennis Courts and Facility
19 University Services Building
28 Xavier Residence Hall

P1 10th and E. Jefferson Lot *F, S*
P2 11th and E. Cherry Garage *D, F, S, V*
P3 10th and E. James Lot *S*

P4 10th and E. Columbia Lot *D, J, S*
P5 Broadway and E. Columbia Garage *C, F*
P6 12th and E. Cherry Lot *S*

P7 12th and E. Marion Lot *C, D, S, V*
P8 14th and E. Jefferson South Lot *S*
P9 14th and E. Jefferson North Lot *F*

C Carpool   D Disabled   F Faculty and Staff   J Jesuit   S Student   V Visitor

Seattle University
FOUNDED 1891

Science and Engineering Project Center
900 Broadway
Seattle, WA 98122-4340

(206) 296-5504
sciengpc@seattleu.edu
www.seattleu.edu/scieng/engpc

DIRECTIONS
Take the James Street exit off I-5
(southbound exit #165, northbound exit #164A),
continue east to Broadway. Turn left at the light on
Broadway and north two blocks to East Columbia.
Turn right onto East Columbia and immediately
left into the Seattle University parking garage (P5).
Request a parking permit from the attendant. Pojects
Day presentations are at the Lemieux Library (10).