

JUNE 4, 1999

# Projects Day

SCIENCE AND ENGINEERING

PROJECT CENTER

SENIOR DESIGN

PROJECTS 1998-99



## W E L C O M E

**T**his is the twelfth 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 joining us today.

On this, Projects Day 1999, 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, people, and resources in these projects.

This senior capstone experience is perhaps the most important learning experience of our students' careers at Seattle University. Working in small groups, solving 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**

**O**n behalf of our faculty and students, I also welcome you to Projects Day 1999, 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, Everaldo Mills and Garry Kampen in Computer Science, as well as Sheridan Botts, contracts manager, and Rachael Mendonsa, 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 A.M. LEMIEUX LIBRARY FOYER

- Projects Day Registration and Tours

## 9:30 A.M. – 12:30 P.M. SCHAFFER AUDITORIUM

- Boeing Safety, Health and Environmental Affairs ..... Low-Dragnet Basket/Rack Design Study
- AT&T Wireless Services ..... Mobile Reverse Radio Channel Quality Monitor
- fine.com Corporation ..... Supplemental Web-based Reporting for Project Management Database
- The Nesting Bird Yurt Company ..... Yurt Engineering
- Parsons Brinckerhoff Quade & Douglas, Inc. .... Interstate 90 Undercrossing Sunset Interchange
- Puyallup Integrated Circuit Company ..... Two-Port Synchronous Static Memory with Bypass: Design and Testing
- CareWise, Inc. .... Client Service System Re-design
- Boeing Commercial Airplane Group ..... Turbo-Compressor Control System

## 12:30 P.M. LEMIEUX LIBRARY FOYER

- Buffet Lunch

## 1:30 P.M. – 3:30 P.M. SCHAFFER AUDITORIUM

- Kenworth Truck Company ..... Automatic Turn Signal Cancellation Device for Heavy Trucks
- Kenworth Truck Company ..... Auxiliary Heating Ventilation and Air Conditioning System
- Francis P. Wood S.J./ Boeing Chair ..... Three-phase to Six-phase Autotransformer
- Boeing Defense and Space Group ..... Interface Material Testing
- US Public Health and Service/Management Assistance and Concepts ..... Automated Survey Health and Safety System
- Vietnam Veterans of America Foundation ..... Prosthetic Foot Testing Machine

## 1:30 P.M. – 3:30 P.M. STIMSON ROOM

- Seattle City Light ..... Union-Massachusetts Transmission Line Reroute and Replacement
- Applied Microsystems ..... Aphrodite
- ARIS Corporation ..... Performance Improvement Consulting Field Guide System
- Boeing Information and Support Services ..... Knowledgeable Agent-Oriented System
- Regence BlueShield ..... Subrogation Management Information System
- SU School of Theology and Ministry ..... STM Database



**PROJECT NUMBER:** CEE 99.1  
**PROJECT TITLE:** Low-Dragout Basket/Rack Design Study  
**SPONSOR:** Boeing Safety, Health and Environmental Affairs  
**SPONSOR LIAISON:** Wade Wheeler  
**FACULTY ADVISOR:** Prof. Phillip Thompson  
**STUDENTS:** Aura Cuellar, Victor Morassi, Sara Stanley, Willie Wilson

**DESCRIPTION:**

All fabricated metal parts require some form of cleaning or surface treatment. At the Boeing Company's Fabrication Division, parts are placed in chemical-resistant baskets and immersed into a series of solution baths. During the cleaning process the baskets (and the parts) carry chemicals from one tank to the next (dragout) causing cross-contamination. Excessive dragout results in the frequent changing of tank solutions and translates into increased water use and chemical waste. This project evaluated methods that reduce solution dragout by optimizing the basket design. The team redesigned a basket and compared the dragout to the current basket design. Dragout reduction was used to calculate cost savings in terms of chemicals used and wastewater processed. Economic analysis was used to compare these savings in annual operating costs to the capital cost of installing new baskets.

**PROJECT NUMBER:** EE 99.1  
**PROJECT TITLE:** Mobile Reverse Radio Channel Quality Monitor  
**SPONSOR:** AT&T Wireless Services  
**SPONSOR LIAISON:** Mark Loarie  
**FACULTY ADVISOR:** Prof. Robert Heeren  
**STUDENTS:** Haytham Al-Ohali, Jason Huff, Julien Picq, Reynold Suarez

**DESCRIPTION:**

AT&T Wireless Services wants to improve the quality of wireless telephony signals throughout its cellular network and thus increase customer satisfaction. To achieve this, AT&T Wireless Services asked the team to design, test, and build a mobile Reverse Radio Channel Quality Monitor to evaluate cellular phones' outgoing signals. The team designed a monitor that consists of two subsystems, a signal generator, and a signal evaluator. The signal generator is placed under the dashboard of the field service vehicle and generates a tone that is transmitted via a cellular phone. The signal evaluator is located at the base station and provides detection and evaluation of the equivalent of a Bit Error Rate (BER) Class 3 or greater signal for a minimum of one second. The results of the evaluations are transmitted back to the mobile station and received by the cellular phone. The system performance engineers will hear a tone if a BER Class 3 or greater has been detected and no tone otherwise.



**PROJECT NUMBER:** CSSE 99.5  
**PROJECT TITLE:** Supplemental Web-based Reporting for Project Management Database  
**SPONSOR:** fine.com Corporation  
**SPONSOR LIAISONS:** Bill Poole, Tim Guerrette  
**FACULTY ADVISOR:** Prof. Everaldo E. Mills  
**STUDENTS:** Matt L. Lin, Ramon L. Mariano, Jr., Lisa M. Pierce, Christine L. Sundin, Kevin C. Yang

**DESCRIPTION:**

fine.com creates interactive marketing, electronic commerce, and business process automation solutions. The organization maintains a database of active projects, employees and schedules. fine.com requires database reports in such areas as resource utilization and team makeup. The company must make sure employees are maximizing their billable client work, and uses this information for employee review. They also need to know which employees are assigned to which clients and projects. Using the latest Microsoft technologies, the design team developed a web-based interface to generate reports from an SQL database. The interface was designed for ease of use and the reports present the information in a logical manner. With the reports provided by the design team, fine.com management will be able to accurately assess workload and employee availability.

**PROJECT NUMBER:** MME 99.4  
**PROJECT TITLE:** Yurt Engineering  
**SPONSOR:** The Nesting Bird Yurt Company  
**SPONSOR LIAISON:** Will Hays  
**FACULTY ADVISOR:** Prof. Dennis Wiedemeier  
**STUDENTS:** Khalifa Al-Sowaidi, Brian Carter, Michael Nguyen, Eric Simon

**DESCRIPTION:**

A yurt is a portable structure based on a centuries-old Mongolian design. The Nesting Bird Yurt Company wishes to adapt their rendition of the traditional yurt to meet the standards set by the Uniform Building Code for residential structures in hopes that their yurt can be used as temporary housing for migrant farm workers. Design team 99.4 analyzed the current structure using handbook calculations, finite element analysis, and component testing. Tests were also performed to measure the structural integrity of the yurt under worst-case scenarios such as asymmetric loading and loading during wind deformations. Modifications were made to both the roof and lattice walls to allow the yurt to meet the required 65 psf snow load and 100 MPH Exposure "C" wind requirements stated by the Uniform Building Code.

**PROJECT NUMBER:** CEE 99.2  
**PROJECT TITLE:** Interstate 90 Undercrossing Sunset Interchange  
**SPONSOR:** Parsons Brinckerhoff Quade & Douglas, Inc.  
**SPONSOR LIAISON:** Yuhe Yang  
**FACULTY ADVISOR:** Prof. Richard T. Schwaegler  
**STUDENTS:** Joseph De la Cruz

**DESCRIPTION:**

Parsons Brinckerhoff Quade & Douglas, Inc., an international transportation engineering corporation, requested that the team provide schematic drawings and preliminary design calculations for a bridge crossing over Interstate 90 at the Sunset Interchange, one mile east of Issaquah, Washington. The team's goal was to provide the most functionally safe, economically feasible, and esthetically pleasing overcrossing in compliance with Washington State Department of Transportation (WSDOT) and American Association of State Highway and Transportation Officials (AASHTO) bridge design specifications. The final bridge layout and design consisted of two simple span structures with five precast, prestressed concrete girders per span. In addition to the normal gravity design for dead, live and impact loadings, the design also included preliminary analyses for seismic loading on the bridge.

**PROJECT NUMBER:** EE 99.4  
**PROJECT TITLE:** Two-Port Synchronous Static Memory with Bypass: Design and Testing  
**SPONSOR:** Puyallup Integrated Circuit Company  
**SPONSOR LIAISON:** Dr. Donald Haueisen  
**FACULTY ADVISOR:** Prof. Paul Neudorfer  
**STUDENTS:** Hatim Abdelmagied, Katrina Jensen, Kenny Nagy, Albert Ojerio

**DESCRIPTION:**

The Puyallup Integrated Circuit Company (PICCO) designs full-custom transistor-level modules of cache, embedded, and specialty memory. One type of specialty memory is a two-port static random-access memory (SRAM), which can be accessed simultaneously by independent sets of address, data, and control lines. Under normal operating conditions, the memory module allows for storage and retrieval of data through a write-port and a read-port. However, a problem arises when both ports try to access a shared memory location. PICCO requested the team to design a two-port SRAM capable of dealing with simultaneous write and read conditions. The team implemented a bypass, a component that directs the write data to the output, to solve the problem of shared memory locations. The memory module met all the design specifications stated by PICCO and was verified over a full range of operating conditions.



**PROJECT NUMBER:** CSSE 99.4  
**PROJECT TITLE:** Client Service System Re-design  
**SPONSOR:** CareWise, Inc.  
**SPONSOR LIAISON:** Sheri Brown  
**FACULTY ADVISOR:** Prof. Bruce Duba  
**TEAM MEMBERS:** Elizabeth Brock, Nathan Hong, Vien Ly,  
Patricia Sayah, Yu-Chang Wu

**DESCRIPTION:**

CareWise, Inc. provides nurse triage for demand and disease management as a healthcare benefit program. CareWise Administration used their Client Service System to track product and client information such as eligibility, health history, and services provided. This 16-bit stand-alone application was slow, awkward to use, and not Y2K compliant. The team was asked to re-design the Client Service System as a user-friendly 32-bit Intranet Y2K compliant application. Microsoft Transaction Server was used with Visual Basic, SQL, and Active Server Pages to create a web-based Client Service System with improved functionality, faster data access, and an easier-to-use interface. The new design is based on a three-tier model, meaning the database, business logic, and graphical user interface are treated as separate entities. This model allows each entity to be modified for use in future applications.

**PROJECT NUMBER:** MME99.1  
**PROJECT TITLE:** Turbo-Compressor Control System  
**SPONSOR:** Boeing Commercial Airplane Group  
**SPONSOR LIAISON:** John O'Brien  
**FACULTY ADVISOR:** Prof. Pierre Gehlen  
**STUDENTS:** Michael Hjorten, Ryan MacKrell, Janelle Vo

**DESCRIPTION:**

Boeing's Mechanical Systems Lab uses a turbo-compressor to test air circulation systems in aircraft cabins. The current turbo-compressor control system is open loop and the operator must manually adjust and monitor five electrically operated valves to achieve the desired airflow and temperature. This is costly and inefficient and few engineers are trained to operate the system. The team designed a closed loop automatic control system for the turbo-compressor, identified a method of controlling the airflow rate and output temperature independently, constructed a program for an Allen-Bradley SLC-500 programmable logic controller, and installed and tested the controller. With the new system the operator can enter the desired temperature and flow required and the control system will adjust the turbo-compressor to achieve and maintain the new desired setting. The new system provides a simplified, reliable, and efficient method of producing the conditioned air for the tests conducted by Boeing.

**PROJECT NUMBER:** EE 99.3  
**PROJECT TITLE:** Automatic Turn Signal Cancellation Device for Heavy Trucks  
**SPONSOR:** Kenworth Truck Company  
**SPONSOR LIAISON:** Ted Scherzinger  
**FACULTY ADVISOR:** Prof. Bert Otten  
**STUDENTS:** Abdulla Al-Wahedi, Daniel Bayeh, Joshua Marti, Judy Pizarro

**DESCRIPTION:**

Kenworth's existing turn signal device does not feature automatic turn signal cancellation. To add to their competitive edge in the trucking market, Kenworth Truck Company would like to provide the automatic turn signal cancellation option in its line of trucks. The criteria of our design were cost, reliability, durability, and design time. Our team was asked to design a system that interacts with the SAE J1708 information bus to cancel the turn signal after certain criteria have been met. After considering four alternate solutions, the team decided to use the parameters measured from sensors on the truck and design an algorithm that cancels the turn signal automatically. With the SAE J1708 information bus, and micro-controllers located throughout the truck, the algorithm successfully cancels turn signals after a turn is completed.

**PROJECT NUMBER:** MME 99.3  
**PROJECT TITLE:** Auxiliary Heating Ventilation and Air Conditioning System Design  
**SPONSOR:** Kenworth Truck Company  
**SPONSOR LIAISON:** Dan Farmer  
**FACULTY ADVISOR:** Prof. Jack Mattingly  
**STUDENTS:** Bader Bosakher, Samantha Parlier, Monte Richardson, Suparta Tjandra

**DESCRIPTION:**

Currently the Heating Ventilation and Air Conditioning systems on Kenworth trucks are powered by the trucks' engines. To reduce emissions, Kenworth asked the team to design and size a system that will allow truck cab temperature to remain constant in various external conditions without the use of the engine. The team designed a system that consists of three major components: a heat pump with an auxiliary electric heating element, an electrical inverter/charger, and a battery bank. The system will also be able to operate from either the truck's alternator or be plugged into a power source at a truck stop. This system will allow truck drivers to maintain a comfortable temperature in the largest Kenworth cab without the use of their engine in outside temperatures ranging from 30° to 95° Fahrenheit.



**PROJECT NUMBER:** EE 99.2  
**PROJECT TITLE:** Three-phase to Six-phase Autotransformer  
**SPONSOR:** Francis P. Wood S.J./ Boeing Chair  
**SPONSOR LIAISON:** Prof. Chen  
**FACULTY ADVISOR:** Prof. Chen  
**STUDENTS:** Daniel Lindsey, Herve Roca, Quang Vu

**DESCRIPTION:**

Six-phase power allows the portage of more power without additional right-of-ways. The right-of-ways needed to carry six-phase power are also smaller in land size, which reduces cost enormously in urban and sub-urban areas. Currently six-phase power uses regular wye type transformers, which are very costly. The goal of our project is to use autotransformers to reduce the cost of utilizing six-phase systems. The project team researched and designed a six-phase autotransformer. The autotransformer attributes were then sent to Magnetic & Controls Inc. to be built to specifications. The autotransformer was then tested for performance and effectiveness. The data taken from the test was used to create a mathematical model that will be used by future power researchers. The model will be used to design future six-phase systems.

**PROJECT NUMBER:** MME 99.2  
**PROJECT TITLE:** Interface Material Testing  
**SPONSOR:** Boeing Defense and Space Group  
**SPONSOR LIAISON:** Devin W. Hersey  
**FACULTY ADVISOR:** Prof. Greg Mason  
**STUDENTS:** David Alloway, Mohammed Haq, Sid Johnston, Christopher Ting

**DESCRIPTION:**

The Boeing Company uses a variety of electronic components in their aircraft. These components generate heat, which must be dissipated into a mounting surface through conduction. To improve the conduction heat transfer, interfacial materials are placed between the components and the mounting surface. The Boeing Company asked the team to test the interface material's thermal resistance and compare the results to manufacturers' reported thermal resistance. The team constructed a test fixture and performed tests on a variety of interface materials in several configurations. Test data was used in conjunction with a finite difference computational model to determine the thermal resistance of the interfacial materials. This thermal resistance information will allow The Boeing Company to determine whether interfacial materials supplied by potential vendors will perform well enough to prevent electronic component failure.



**PROJECT NUMBER:** EE 99.5  
**PROJECT TITLE:** Automated Survey Health and Safety System  
**SPONSOR:** US Public Health and Service / Management Assistance and Concepts Corporation  
**SPONSOR LIAISON:** Roger L. DeRoos, Jon Scott  
**FACULTY ADVISOR:** Prof. Alvin T. Moser  
**STUDENTS:** Jesse Borja, Chris Mueller, Emmanuel Pinault, Markham Ratcliffe

**DESCRIPTION:**

The US Public Health Service is developing an Automated Survey Health and Safety System. The system has two main subsystems, the Central Database Server and the Field Data Entry Subsystem, which require the use of specialized software. The US Public Health Service asked the team to develop software to communicate, via the Internet, between the Central Database Server Subsystem and the Field Data Entry Subsystem. The software also manages the Central Database Server Subsystem's database, where data will be stored. Finally, the software generates various managerial reports based on the stored data. The team used Visual Basic Pro 6.0 to develop the software for the Central Database Server Subsystem. The software on the Central Database Server Subsystem, together with the software on the Field Data Entry Subsystem, allows the US Public Health Service to quickly and accurately perform, store, and generate survey data and reports.

**PROJECT NUMBER:** MME 99.5  
**PROJECT TITLE:** Prosthetic Foot Testing Machine  
**SPONSOR:** Vietnam Veterans of America Foundation  
**SPONSOR LIAISON:** Robert Eaton, James Beck  
**SPONSOR ADVISOR:** Prof. Ananda Cousins  
**STUDENTS:** Naser Al Hajeri, Christopher Chow, Thaweechai Phanthapirat, David Weller

**DESCRIPTION:**

Vietnam Veterans of America Foundation is an international education organization dedicated to assisting victims of war. They have produced and given away more than 5,000 artificial limbs to land mine victims in Cambodia. Currently the prosthetic foot that Vietnam Veterans of America Foundation uses fails prematurely due to fatigue. In order to improve the feet, the Foundation needs to know how each prototype foot will perform over its expected life span (three years, or an average three million cycles). They asked the team to design and build a machine that would be able to rapidly simulate the life span of a prosthetic foot. The machine will run a three million cycle test in approximately 30 days at a rate of 70 cycles per minute. The design team has designed an effective, reliable, and economical machine with an expected machine life of more than 50 million cycles.



## STIMSON ROOM AFTERNOON

<b>PROJECT NUMBER:</b>	INT 99.1
<b>PROJECT TITLE:</b>	Union-Massachusetts Transmission Line Reroute and Replacement
<b>SPONSOR:</b>	Seattle City Light
<b>SPONSOR LIAISON:</b>	Dennis Lee
<b>FACULTY ADVISOR:</b>	Prof. Nirmala Gnanaprasam
<b>STUDENTS:</b>	Adil Marrakchi, Clint Saner, Nathan Wong

### DESCRIPTION:

The existing 1.5 mile stretch of electric transmission lines between Massachusetts Street Substation and Union Street Substation are nearly 30 years old. They consist of two 115,000 volt pipe-type low pressure fluid-filled cables. The lines are routed underground when leaving the substations until they reach the Alaskan Way Viaduct, where they are then attached to the bottom of that elevated structure. The Alaskan Way Viaduct is not designed for earthquake events and there have been reported fluid leaks in one of the cables. The team designed a new underground route for one of the cables, studying the existing utility maps to locate the proposed route. The team also designed the cable type and size; checked the ampacity, conduit, and splicing vault requirements and the bending criterion for the cable; and estimated the cost of construction for the proposed route.

<b>PROJECT NUMBER:</b>	CSSE 99.1
<b>PROJECT TITLE:</b>	Aphrodite
<b>SPONSOR:</b>	Applied Microsystems
<b>SPONSOR LIAISON:</b>	Ian Searle
<b>FACULTY ADVISOR:</b>	Prof. Adair Dingle
<b>STUDENTS:</b>	Gail Akiyama, Cory Mason, Sa Xiong, Christine Yost

### DESCRIPTION:

Applied Microsystems Corporation produces both software and hardware to aid in embedded system development. An improved user interface and streamlined configuration process are the foci of this proposal. CodeTEST, an Applied Microsystems product, is a complex embedded systems tool that monitors program execution on multiple processors and platforms. CodeTEST aids engineers near the end of the development process. CodeTEST can trace program execution, monitor memory allocation and de-allocation, and provide extensive statistics as to the effectiveness and coverage levels of embedded code. The process of integrating and configuring CodeTEST into a user project has been made more intuitive and user friendly. The team also added features that enable customers to browse both CodeTEST-specific and user-defined files. The files that are viewed with the new tool have the supplementary feature of syntax highlighting for standard source code keywords and CodeTEST data.



**PROJECT NUMBER:** CSSE 99.2  
**PROJECT TITLE:** Performance Improvement Consulting Field Guide System  
**SPONSOR:** ARIS Corporation  
**SPONSOR LIAISONS:** Dineen Tallering, Jeff Gilles  
**FACULTY ADVISOR:** Prof. Barbara Popovsky  
**STUDENTS:** Richard Heng, Fai Hutacharern, Kristie Mitchell, Gabe Ovalles, Haida Razali, Thai Binh Vu

**DESCRIPTION:**

ARIS Corporation provides Information Technology services worldwide that include consulting, software development, and training. ARIS is implementing an innovative technology capable of providing an efficient method for customizing training. This technology, known as Performance Improvement Consulting, begins with a training assessment administered by an ARIS project manager. ARIS wants to host the training assessment process on a secure Internet-accessible, interactive computer system. This system must extract, translate, and compile project information into a job skill matrix. The ARIS client and project manager will use this matrix to precisely identify the client's training needs. The team began with extensive analysis of software products for which ARIS provides training, then used this information to develop a database, implemented in SQL Server 7.0. A Graphical User Interface was developed with Active Server Pages using VBScript and JavaScript. With this new system data can be interpreted and extracted within the SQL Server. The resulting job matrix is then compiled and presented to the client as a tool for developing a training needs assessment.

**PROJECT NUMBER:** CSSE 99.3  
**PROJECT TITLE:** Knowledgeable Agent-oriented System  
**SPONSOR:** Boeing Information and Support Services  
**SPONSOR LIAISON:** Dr. Jeffery Bradshaw, Renia Jeffers  
**FACULTY ADVISOR:** Prof. William Bricken  
**STUDENTS:** Manish Aggarwal, Hiromi Hoyt, Danielle Miner, John Nardello, Villy Siu

**DESCRIPTION:**

Knowledgeable Agent-Oriented System (KAoS) is an on-going research project that began in 1992. This year, the team designed and implemented a Graph Editor tool for agent developers, which facilitates the definition of conversation policies for KAoS agents. A conversation policy is a set of mechanisms, which encode the message sequencing rules that characterize communication between the users of a language. Conversation policies help to coordinate the interaction between semi-autonomous software agent programs. The Graph Editor provides a visual and interactive interface, which uses a graph to represent agent conversation policies. The team designed interface capabilities that include viewing, modifying, saving, and testing conversation policies. The Graph Editor was written in Java 2 and is portable to Windows, Macintosh, and Sun Solaris platforms.



**PROJECT NUMBER:** CSSE 99.6  
**PROJECT TITLE:** Subrogation Management Information System  
**SPONSOR:** Regence BlueShield  
**SPONSOR LIAISON:** Dan Peters  
**FACULTY ADVISOR:** Prof. Ihsin Phillips  
**STUDENTS:** Cary Bran, Bruce Cresanta, Jessica Cunningham,  
Karl Nygard, Trisha Tateyama

**DESCRIPTION:**

"SUBMIS" is a computer application in use at Regence BlueShield for assisting in the recovery of money already paid for health care, when a third party has a legal obligation to pay (for example, because of an automobile accident, product liability, etc.). The purpose of the project was to replace the "SUBMIS" application, for Y2K compliance, and to correct application errors caused by poor database design. The project also added functionality: enhanced management reporting to track the effectiveness of the recovery process; a new database design to permit user-defined queries, as in the "data warehouse" model; and a clean, effective graphical user interface to make the replacement system easier to use. To solve this problem the team designed and implemented a large database in Oracle, wrote a new application from scratch in Visual Basic, and created a tool to migrate historical data from the old database.

**PROJECT NUMBER:** CSSE 99.7  
**PROJECT TITLE:** STM Database  
**SPONSOR:** Seattle University School of Theology and Ministry  
**SPONSOR LIAISONS:** Julie Davis, Roberta Frey  
**FACULTY ADVISOR:** Prof. David Umphress  
**STUDENTS:** Rod Eligio, Reggie Matto, Chris Marshall,  
Chai Wananarungson

**DESCRIPTION:**

Every ten years, Seattle University's School of Theology and Ministry must submit a statistical report to the Association of Theological Schools as part of the accreditation process. The previous reports were generated manually, using labor-intensive and error-prone procedures. The recent growth of Theology and Ministry has made this approach unworkable. To facilitate accurate and automated report generation, the design team created an integrated relational database using Microsoft Access and Visual Basic. Existing data were imported into this new database; multiple security levels were implemented; and forms, reports, graphical interfaces, and user/administrator documentation were created. These changes will increase the usefulness of School of Theology and Ministry data.



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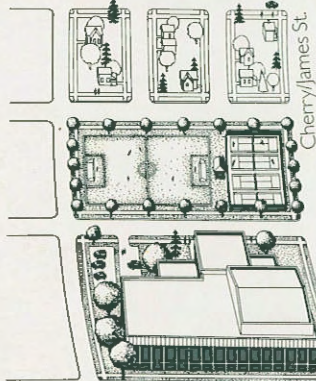
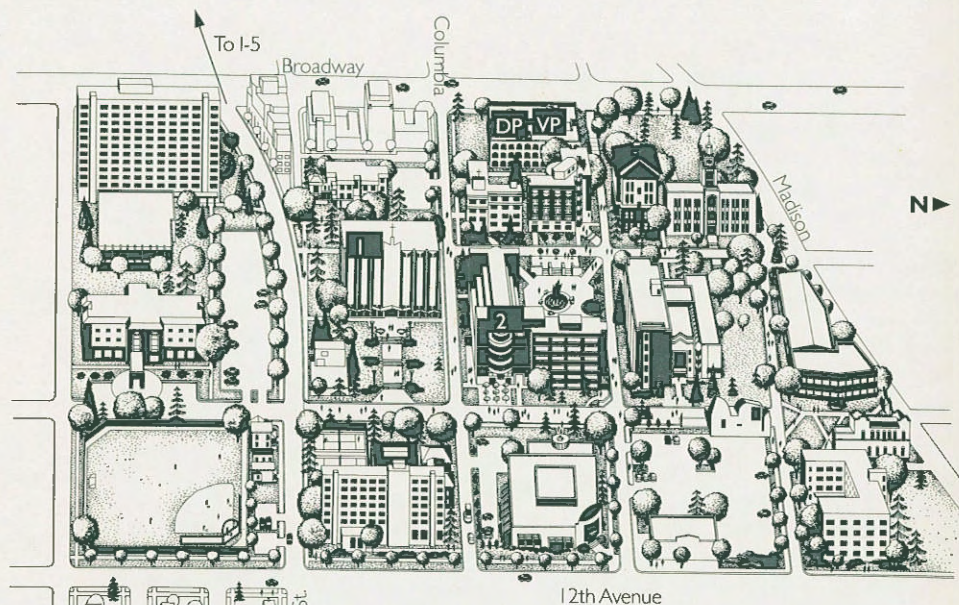
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## SPONSORING ORGANIZATIONS AND LIAISONS

We want to acknowledge with special thanks the organizations that sponsored projects in 1998-99, 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.

Applied Microsystems, Ian Searle  
ARIS Corporation, Dineen Tallering  
AT&T Wireless Services, Mark Loarie  
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US Public Health and Service/ Management Assistance and Concepts,  
Roger DeRoose and John Scott  
Vietnam Veterans of America, James Beck and Robert W. Eaton





- VP** Visitor Parking
- DP** Disabled Parking
- 1** Lemieux Library
- 2** Bannan Center for Science and Engineering

### 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. Request a parking permit from the attendant.



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