Rick Harris	**Expert Software Developer**	
rh@rickharris.com	**Project Manager**	
(940) 320-9525	**IT Guru/Executive**	

EDUCATION

Both **Bachelor's** and **Master's** degrees in **Computer Science** from **Rice University**, with additional majors in **Managerial Studies** and **Mathematical Science**.

EXPERTISE

Over twenty-five years of IT and software development experience covering a broad spectrum of information technologies including hardware, firmware, device drivers, rule-based expert systems, network applications, desktop applications, client-server database applications, mobile applications, and highly scalable multi-tier web applications. Four years of university level Computer Science teaching and course development. Six years of authoring and delivering custom software development courses for in-house corporate training programs. Over ten years consulting and six years of self-employment participating in a wide variety of very challenging projects, usually resulting in commercial products and/or intellectual property. Confidence to take on tasks others may perceive as insurmountable. Thrive on new projects that truly tax intellectual skills as a thorough researcher, resourceful solution architect, and expert software developer. Hands on manager that leads and inspires by example.

EXPERIENCE

Rick Harris, Inc., Feb '12 – Present

Independent Consultant

Currently specializing in mobile and web app development leveraging cloud based platforms as a service (PaaS) such as Google App Engine, Windows Azure, and Oracle Public Cloud. System and application architecture solutions utilizing native and cross-platform development tools appropriately.

DC Contractors, Inc., Nov '11 – Jun '13

IT/Project Manager

Moved IT infrastructure to Google Apps for Domains, including Google Drive. Evaluated several 3rd party SaaS CRM and Project Management tools that integrated with Google Apps. Chose Solve360 as our CRM/Project Management platform and customized it to assist in the entire life cycle of a government project, from the bidding stage to the final close out of the contract.

Was also the primary Project Manager for the following Federal and State government construction contracts totaling over $2.5M:

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Dec '12-Jun '13, Defense Logistics Agency, Bldg 20 Ceiling Tile and Misc Repairs, Columbus, OH
Dec '12-Mar '13, Defense Logistics Agency, Bldg 20 Terrazzo Floor Restoration, Columbus, OH
Nov '12-Dec '12, United States Army Corp of Engineers, Pole Building, Senecaville Lake, OH
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Aug '12-Oct '12, Texas Parks and Wildlife Department, Sewer System, JD Murphree WMA, TX
Jul '12-Aug '12, Federal Emergency Management Agency, AC/Heater, Denton, TX
Jul '12-Aug '12, Texas Parks and Wildlife Department, Septic System, Copper Breaks Park, TX
Jul '12-Sep '12, United States Coast Guard, Aluminum Storm Doors, Hatteras, NC
Jun '12-Jul '12, Bureau of Prisons, TPO Roof for 10-C Unit, Springfield, MO
Apr '12-Sep '12, United States Air Force, Drainage Slabs, Minot AFB, ND
Mar '12-May '12, Defense Logistics Agency, Raised Flooring, Columbus, OH
Jan '11-Feb '12, Bureau of Indian Affairs, TPO Roof for Elementary School, San Simon, AZ
Nov '11-Dec '11, National Oceanic and Atmospheric Administration, Duct Bank, Woods Hole, MA
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Molinaro Koger, Inc., Oct '04 – Oct '11

Chief Information Officer

System architect for fully redundant fault tolerant IT infrastructure spanning 12 remote offices around the world. Formalized ad-hoc business processes with highly customized and integrated CRM, Document Repository, and Intranet/Extranet/Internet systems supporting over $4B in hotel real estate transactions. Hands on design and development of a Web 2.0 data-driven web app with JavaScript AJAX frontend and C#.NET web services. To accomplish the above, the following infrastructure projects were successfully conceived, implemented, and managed during my tenure at MK:

- Migrated IT infrastructure from Novell NetWare to Microsoft Windows Servers.

- Replaced distributed GroupWise servers and with centralized redundant Exchange servers.

- Eliminated NotifyLink and Blackberry devices in favor of Exchange's natively supported Windows Mobile devices. Favored the fact that we could require our own server certificate on the devices and we reduced our reliance on yet another 3rd party.

- After failing miserably with MS CRM 1.2, we ultimately migrated from ACT! 6.0 to MS CRM 3.0, but only after stepping back and doing a very thorough 6 month evaluation of most major CRM products. The evaluation included SalesLogic, Seibel, SalesForce.com, SugarCRM, Maximizer, ACT7, Outlook Business Contact Manager, OutlookCRM, SalesOutlook, ExchangeWise, MX-Contact, and others. MS CRM 3.0 was chosen primarily for its well-documented SOA/SDK, extensive customization capabilities, and the fact that it could be deployed and managed on our own servers.

- Moved most production servers (expect for one Domain Controller/Print Server) from DC headquarters office to a centralized remote data-center (Equinix in Ashburn, VA) and initially installed a Level3 DS3 private line between the data center and our McLean office. When we moved to the Vienna office, we upgraded to a 100Mbps fibre optic circuit.

- Brought web site hosting and development back in-house by first migrating the existing site from the Atlanta based Interland servers with limited/throttled bandwidth to our own servers with up to 1Gbps bandwidth at Equinix.

- Replaced single instance of shared file server with two redundant/scalable SharePoint 2.0/3.0 servers using 64-bit SQL Server 2005 as the back-end database.

- Adopted Microsoft Virtual Server 2005 R2 to host SharePoint and CRM in separate 32-bit virtual

machines on the same 64-bit physical machine (HP DL585 with Quad Dual Core AMD Opterons) running SQL Server.

- After centralizing our production servers and standardizing on web-based services, it eliminated the need for Citrix terminal services for our remote offices and allowed us to adopt a homogeneous Service Oriented Architecture across all MK offices. We also provided support for individual remote desktop access via Microsoft's Remote Web Workspace.

- Moved E-mail uptime into the four 9's range by upgrading from single server running Exchange 2003 to two clustered HP DL380s running Exchange 2007 with Clustered Continuous Replication performing the Exchange DB role and two HP DL585s hosting both the Edge and Transport server roles.

- Implemented comprehensive data-center disaster recovery plan including full redundancy for all production servers with offsite disk-to-disk synchronization on hourly basis, using Microsoft's Data Protection Manager 2007 running on a 9-TeraByte HP All-In-One Storage Server. This also included adding redundancy and high-availability on firewall/SPAM appliances from FortiNet and Barracuda.

- Adopted Microsoft's System Center Essentials 2007 to control and run Windows Update Services in-house and help proactively manage all workstations and servers.

- Rolled out Microsoft's Forefront Client Security to all workstations.

- Extensively leveraged Windows Server GPOs (Group Policy Objects) to lock down and improve overall security/stability of all workstations.

- Migrated Nortel telephone system to a hybrid VoIP system utilizing Cisco IP phones and centralized call management servers from iCore Networks.

- Installed Blackberry Enterprise Server for our India/Dubai offices, which turned out to be a one-day project thanks to our virtualization strategy.

The following custom software development projects were undertaken to improve the integration and use of the commercial off-the-shelf products mentioned above:

- Migration from ACT! to MS CRM 3.0 required writing our own migration tool using the CRM 3.0 SDK because the standard data migration tools (including 3rd parties) did not preserve all the ACT! data we wanted to keep, especially record ownership. Furthermore, we wanted to automatically create the proper parent/child relationship for accounts and contacts.

- MS CRM 3.0 was heavily extended to support the vertical aspects of our Hotel Brokerage and Advisory services. Many custom entities and relationships where created to handle the different types of transactions we participate in. Many custom reports were designed to help the brokers manage their current pipeline as well as provide insight into the status of their individual deals. Several executive level reports were also developed to aid in overall business intelligence and to provide ongoing performance insight.

- A custom internal ASP.NET 2.0 site/service, called MKCRMExt, was developed to support many features that were missing from CRM 3.0 including: mail merging from several different entities, sending automatic notifications to other parties related to a deal, automatically generating PDFs from mail

merged content and attaching it to CRM emails.

- A custom MS Outlook Add-in was developed using .NET 2.0 and Visual Studio Tools for Office runtime to add synchronization of the Company name with the Contacts. This tool was also extended to support much more robust importing and/or linking of Outlook contacts to CRM Contacts.

- A custom SharePoint extension was written to aid in the integration between CRM 3.0 Entities and their corresponding SharePoint sites/files.

- Custom SharePoint administration commands were written to automate the archival process by moving sites from an active site that is backed up regularly to an archive site that is backed up much less frequently.

- Designed, developed, and deployed highly integrated data-driven SOA based Internet/Extranet/Intranet web application for www.mkhotels.com utilizing: SQL Server 2005, MS CRM 3.0, SharePoint 3.0, and custom ASP.NET AJAX code using Visual Studio 2005/8, ComponentArt Controls (which were ultimately replaced with open source jQuery objects), and Microsoft's Virtual Earth live mapping control.

- Developed a custom MK Dialer (windows system tray application and windows hook dll written in C/C++) that allows users to select any phone number in any application (e.g., web browser, Word, Excel, Outlook, etc.) and simply hit Ctrl-D to dial it on their phone.

- Evaluated the possibility of moving some/all of the MK applications to the "Cloud". Thus, I performed hands-on investigations of two popular platforms as a service: Windows Azure and Google Apps.

Microsoft, Dallas, TX, Apr '04 – Sep '04

Senior Consultant for Communications Sector

Dramatically improved the performance of **Verizon's** real-time call management software by 10 fold in most cases and 100 fold in one scenario. Taught Verizon developers how to leverage thread pooling and I/O completion ports to handle many connections very efficiently, rather than spawning a separate thread for each new connection (as shown in many books and tutorials).

Texas Instruments, Inc., Dallas, TX, Aug '03 – Mar '04

Senior Software Developer for Educational and Productivity Solutions Division

Made the move from a consultant to a full time employee of TI's Educational and Productivity Solutions (E&PS) division to become more intimate with the educational market and work closer with end users of a very exciting new wireless handheld device. This device was based on a TI OMAP™ processor running embedded Linux with Qt/Embedded™ as the C++ application framework.

Instrumental in the overall design and development of the application framework for the entire device, as well as one of the primary end user applications called Scribe. Designed and implemented a lightweight object request broker (ORB) along with a general purpose object discovery and inter-process communication (IPC) scheme which leveraged run-time meta-data provided by the Qt framework. Designed a component-based architecture that allowed all internal and third party developers to create shared libraries

that implemented a common object interface. The ORB was used to create these objects in the same process or to spawn them into their own address space, depending on the needs of the client process. Thus, all components could be run as stand-alone applications or could be embedded into different kinds of containers. For example, I developed a word processor that allowed insertion of these components within the flow of text, while another developer created a container that arranged components in a tiled/split view fashion. Essentially, this was a very lightweight OLE-like component architecture for a handheld device with limited memory and speed.

Ran the Apache HTTP server on the device and wrote a generic CGI script that sent commands directly to the ORB, which dispatched them to the appropriate object and method. This ORB architecture allowed the test team to create external test scripts that could be run locally on the device or remotely from a test automation client; thus, there was no need to add special test instrumentation code to the device under test. Another primary objective of this ORB architecture was to allow for future wireless collaborative applications to remotely control the state of pre-existing applications developed using this framework.

TimeBOOK.com, Mar '00 – Jun '03

Chief Technology Officer and Chief Software Architect/Developer

TimeBOOK.com was both a Web site and Web service that provided a centralized calendar/booking system for individuals and businesses. One very unique aspect of this site was the ability to view your own calendar alongside others and to automatically find the next available time slot for the attendees.

Used my own proprietary data-driven Web application server, HSWebDB™, along with several custom COM+ components (written in C++ and ATL). The COM+ objects provided a very efficient, in memory, way to fabricate recordsets without having to connect to the DB server. To improve scalability and user responsiveness, this site also employed loosely coupled events and the message queuing services provided by COM+. The overall design of this site is a classical three-tier abstraction; however, for performance reasons, many of the middle tier objects were physically located in the same process as the web server's (IIS 5.0) and much of the business logic placed in the data base server stored procedures. Chose to use SQL Server 2000 to leverage its user defined functions and its ability to scale out by creating a federation of SQL servers (i.e., can split large tables across clustered machines). Chose to keep all transaction management in the data base server, even though COM+ supports transactions in middle tier components.

Developed a custom ISAPI filter for this site, which was used for two reasons: 1) as a scalable way to implement vanity URLs across a Web farm of servers (e.g., TimeBOOK.com/RickHarris) and 2) to hide the technology being used by not exposing any file extensions in the URL (e.g., .asp , .jsp, .php., etc.).

Also developed a SOAP based auto-synchronization plug-in for MS Outlook, which worked in both directions. That is, any time a new event was added or an existing one was updated in MS Outlook; it would automatically synchronize the data with the Web service, and vice-versa. Developed a demo using iPAQs with wireless cards that illustrated the round trip synchronization across all three platforms - the PDA, the desktop, and the Web service. As an experiment, the synchronization piece was implemented twice, using both VB.NET and C#.NET, in order to contrast the different approaches. As suspected, the VB.NET and C#.NET code was almost line for line semantically equivalent and performed the same. The only real difference between them was primarily syntactic sugar.

Several demos and pitches were made to potential investors and customers; unfortunately, we were

unsuccessful in garnering the funding needed to survive.

Harris Software, Inc., Argyle, TX, Jan '97 – Aug '03

President/Owner and Senior Developer/Consultant.

In response to the overwhelming demand for custom software and Web application development, I formed Harris Software, Inc., in 1997. Below is an overview of the projects my firm has worked on:

- **Texas Instruments, Jan '01 – Aug '03.** Designed and developed embedded software for a next generation handheld device from TI's Educational and Productivity Solutions (E&PS) division, details of which are under non-disclosure. Spent almost a year developing a very comprehensive working prototype of an application very similar to TI Interactive!™ described below, which afforded me the opportunity to be a co-inventor on two TI patent applications ([DN/20040114258](#) and [DN/20040041843](#)) with numerous claims. Designed an extensible architecture to support new kinds of content, including wireless collaborative activities. The prototype was developed using the Limbo language running on the Inferno operating system on an OMAP 1510.

  Played a strong role in assisting TI to chart a new course for the final product and ultimately choosing embedded Linux with Qt/Embedded and Qtopia as the application development framework. I was instrumental in designing and documenting many aspects of the device's software architecture, heavily influenced by the Bredemeyer Visual Architecting Process.

- **Texas Instruments, Dec '98 – Feb '00.** Developed the MathBox and MathPalette components of TI Interactive!™ 1.0 and 1.1 , which allows the user to type mathematical expressions using a simple one dimensional (text based) syntax and automatically converts it to a standard two dimensional mathematical format. Alternatively, the user may pick a pattern from the palette and simply fill in the rest. (For more information on TI Interactive!™, see http://education.ti.com/product/software/tii/features/features.html). This project was an extremely challenging and high profile project. I was presented with the daunting task of building a component with the editing and presentation features found in Mathematica™, Scientific Notebook™, and MathType™, plus several new requirements designed to make TI Interactive!™ a more competitive product. This required a great deal of upfront research, which included reading many white papers and dissertations related to rendering and editing Mathematical equations.

  Leveraged many of the design patterns found in "Design Patterns - Elements of Reusable Object-Oriented Software" by Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides (the "Gang of Four"). The details of my design are protected by a non-disclosure agreement; however, I am very proud of the fact that I produced a general-purpose object-oriented architecture, which allows TI to easily enhance the components. For example, I was able to add MathML 2.0 support by simply extending functionality in key base classes and then overriding specific methods in derived classes.

- **Molinaro Koger, Apr '98 – Jun '03.** Developed and hosted their Web site (hotelrealestate.com and molinarokoger.com). Initial site was developed with FrontPage™; however, it was redesigned using the HSWebDB™ engine. The new site was a 100% data driven site, including hotel listings with the ability to administer them via a browser interface.

- **Hewlett Packard, Nov '97 – Aug '00.** Developed and hosted an early B2B Web application

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(HPUSA.com). This Web application was designed to provide training incentives to CompUSA employees for HP products. Used SQL Server, IIS, and ASP (Active Server Pages) to provide a dynamic content delivery and a quiz-taking environment.

- **Clarity Learning, Jan '95 – Aug '01.** Taught the following one week courses on many occasions: "Distributed COM+ Programming using VB", "COM+ Programming using ATL", "COM and DCOM Programming using ATL", "ActiveX Web Programming and DCOM", "Distributed Application Development Using ActiveX", "Programming COM and OLE Using MFC", "MFC Windows Programming for C++ Programmers", "Object-oriented Programming in C++", and "MFC Windows Programming with Database Classes for C++ Programmers". Due to the numerous requests from Clarity for a good Java course, I authored "Java Programming with Visual J++".

    In July '98, developed their data driven Web site (claritylearning.com). The original site was developed with ASP and SQL Server. Hosted this site also.

- **7Th Level, Aug '98 – Feb '99.** Built a sample Web site that illustrated how their animated characters could be used in a site that contained an intelligent inference engine (e.g., GroupLens). In other words, it made their characters respond differently depending on the end user profile and answers to previous questions.

    Also, built an instant messaging server and client (similar to ICQ) that allowed their animated characters to represent each person in a chat based conversation. Used the WinSock API, MFC, and ATL to build the client piece as COM objects and provide the connection abstraction, then reused them in a very simple VB server application. Learned a great deal about instant messaging protocols and how they work behind NAT based proxy servers by utilizing a socket sniffing tool to inspect the instant messaging traffic at the packet level. This also opened my eyes to many security issues and the overall vulnerability of any computer that is indirectly connected to the Internet, even behind proxies and firewalls.

- **Stonebridge Technologies, Jan '98 – Jul '98**. Developed an online course to teach Web application development. Leveraged the same quiz technology developed for the HPUSA.com site. The great thing about this project is that it forced me to research and solidify my understanding of the evolution of the Internet and most of its primary protocols. It gave me a much better perspective of where we have been and where we should expect to go in the future.

- **New Realm Media Group, Nov' 98 – Dec' 00.** In a partnership agreement with this Web development firm, I developed a local portal for Denton, TX (dentononline.com). NRMG ceased operation in December of 2000 and the live site was discontinued. This site was the motivating factor for building the HSWebDB™ application server. It was very data intensive, with dynamic content, which had to be updated easily on a daily or hourly basis. After building four ASP data driven sites and reinventing the wheel each time, I decided there had to be a better way. I spent a great deal of time researching many other Web application server approaches and ultimately decided to build my own.

    Also acted as a subcontractor for New Realm Media Group, providing the data driven portion of several web sites:

    1) dentonregional.com, which allowed the end user to search for doctors based on several different criteria (hosted and maintained this site until Columbia.net decided to bring it in-house)

2) allstarpromotions.com, which allowed users to search for different kinds of magazines (this site used MS Access, due to the fact the customer wanted to maintain their own database and simply upload it to the Web server using FTP)

3) realestatedenton.com and northtexasrealestate.com were realtor sites that also used the HSWebDB™ engine.

Ericsson Radio Systems, Inc., Plano, TX, Jul '95 – Feb '97

Consultant with Oxford & Associates

Designed and implemented an automated test and repair tracking system for cellular radio base station equipment. SQL Server 6.0 on Windows NT Server 3.51 was used as the server and NT Workstation 3.51 as the client. Win32 development was performed with Visual C++ using the latest Windows '95 controls and ODBC. Made many general extensions to several MFC database and control classes to give combo boxes, tree views, and list views intelligent database awareness. Also used MS Access to design the database and used the "Upsizing Add-in" to automatically create the SQL Server tables, defaults, and triggers to maintain referential integrity. Implemented the business rules of the repair process, by defining general support tables that may be modified as the system evolves and by creating the appropriate "stored procedures" and "triggers" for the primary tables.

Used the Booch method of object-oriented analysis and design as described in the second edition of his book.

Created several different OCX's (OLE Controls) and DLL's (dynamic link libraries) to support integration of the following features: bar code printing, bar code scanning, document viewing using Framemaker 5.0, and report generation using both Crystal reports and MS Access.

Aided in the implementation and debugging of the automated test software which included writing a custom Windows NT parallel port device driver. Also performed kernel mode debugging on 3rd party device drivers for high speed serial ports (i.e., T1 compatible).

Alcon Labs, Ft. Worth, TX, Jul '94 - Jul '95

Consultant with Coopers & Lybrand

Designed and implemented a Windows based client/server office management system for the medical industry. Used Visual C++ 1.5x and MFC 2.5x to develop a full OLE container and server application that combined an outlining metaphor with object-oriented drawing techniques. Each item in the outline could be as simple as a single line of text or it could be a complex input form containing several standard windows controls, OLE Embedded objects, or OCX's. Developed several custom controls and some OCX's including a floating combo box with an owner draw drop down list that could be torn off and placed anywhere on the screen.

Developed a Medical Record application that used the outlines created with the above tool as the primary data input mechanism. Used ODBC as the interface to the database server to provide hardware/server independence to the client. ORACLE 7.0 on Novell Netware 3.12 was used as the industrial strength database server and MS Access was used to accommodate a stand-alone disconnected platform. Learned a great deal about the subtle differences of third party ODBC drivers and their idiosyncrasies with regard to

different backend servers.

Also used Delphi, MS Access, and Visual BASIC to prototype user interface ideas. Helped build the team of developers by interviewing and assessing the technical skills of candidates.

The Foley Group, Arlington, TX, Mar '95 – May '95

Independent Consultant

Developed a Windows 3.1 based object-oriented publishing tool that supports insertion of both text and picture fields to facilitate advanced mail merging features. This application included the development of several standard drawing features such as snap to grid, rulers, and scaling. It was implemented in 16-bit Visual C++ as a full OLE container/server and an automation server so it could be controlled by the client's Visual BASIC application. In addition, a DLL to read and play the three common types of Windows metafiles was developed to provide a nice method for creating and using predefined backgrounds. Development of this application was done on Windows '95.

Sabre Decision Technologies, AMR, Ft. Worth, TX. May '94 - Jun '94

Consultant with COMSYS

Designed client-server architecture to accommodate both a LAN and WAN based decision support system for Penske trucking company. The design included integration of a legacy AS/400 DB2 system with a new Windows NT SQL Server system servicing 16-bit Windows clients in remote offices all across the United States.

System General, Taiwan, Mar '93 - Mar '94

Software Developer

Designed and developed a Windows 3.1 application to operate and control PC-based hardware that communicates via the serial and parallel ports. All the hardware dependent device drivers were implemented as DLLs, written strictly in C and the Win16 API for the best performance. The user interface was designed with Visual C++ and implemented with MFC. A multi-document interface (MDI) and a message based approached was used to facilitate the operation of several devices in parallel. Ported the Windows 3.1 application to Windows NT using Visual C++ 1.0 32-bit Edition and the Win32 API. MFC made porting much easier; however, the serial port COMM API for Windows 3.1 and Windows NT turned out to be significantly different.

BP Microsystems, Houston, TX, Oct '92 - Feb '93

Independent Consultant

Continued to do software development for BP Microsystems on a contract basis. Please see below for more details regarding BP Microsystems.

InfoBanq Inc, Houston, TX, Oct '92 - Dec '92

Independent Consultant

Implemented a demonstration prototype of a traffic-monitoring kiosk. This Visual BASIC 1.0 application

was comprised of a full screen bitmap of the city of Houston, with many objects lying on top of it to provide a dynamic/animated representation of the traffic flow throughout the entire city. The user could click/touch on a congested route and get both a textual and voice explanation of the problem. A multi-form approach was used to also show the Metro bus routes and schedules. Integrated it with direct calls to the Win16 API, specifically, the Multimedia Control Interface (MCI) API to add audio record and playback capabilities.

BP Microsystems, Houston, TX, May '89 - Sep '92

Vice President and Principal Software Engineer

Dramatically improved the interface and control software for PC-based design hardware. Wrote programming algorithms for and gained extensive knowledge of over 3000 programmable devices including E/EPROMs, Microcontrollers, PLDs, and FPGAs.

Worked closely with the president and principal hardware engineer in developing proprietary communications, control, and a single software development environment for several different products. This involved defining our own C-like language with custom extensions and writing our own dynamic linker, multiple optimized code generators (for Z80, 80286, and 80386), and a sophisticated memory manager to allow our 1.2MB executable to run on any 640K DOS based system. This memory manager loaded/unloaded individual object files on an as need basis. This work made me very familiar with the Microsoft object file format specification (based on COFF) and actually gave me a great deal of insight into how Windows DLL's are actually implemented, loaded, and used.

Another unique aspect of this system was that we decoupled the parsing and the code-generation. That is, we had one parser and dynamically loaded the proper code-generator depending on the target device. This is what gave us a distinct competitive advantage. We were able to add support for new devices on all our products well before most of our competitors. The single high-level code base not only made it much easier to maintain and support our existing products, but it made it easy to build new hardware utilizing more advanced chips without obsolescing our extensive code base.

Rice University (Computer Science Dept.), Houston, TX Aug '86 - May '91

Adjunct Instructor

Designed curriculum and taught Comp 100, Introduction to Computing, for four years. Used a network of Apple Macintosh computers and was one of the first Rice instructors to deliver all course material electronically, including taking and submitting exams. Average class size was about 80 students. Managed up to eight lab assistants each semester. Received highest student evaluation rating ever for this particular course. Also taught Comp 200, Elements of Computer Science, for one semester.

MITRE Corp., Houston, TX, May '86 - May '89

Member of the Technical Staff

Co-developed a qualitative modeling and simulation tool (U.S. Patent #4,965,743) for the design and analysis of failure management systems. This work was done under contract with the Intelligent Systems Branch at Johnson Space Center (JSC). It provided a very graphical oriented approach to defining a library of components and their relational objects. Once the library was defined, a model builder could simply click and drag instances of the objects from the library palette to the model canvas and select the proper relationships in the same manner. At this point, simulation and failure analysis could be performed. At any

point, the designer could go back to the library definition of components and make changes that would be inherited by all direct and indirect descendants in the model. Thus, if a model was not accurate enough, a simple change to a single component definition could have dramatic effects on the overall model performance. This was all done in a dynamic object-oriented environment, which eliminated the need to recompile every time a change was made. The end result was a GUI that could be used by mission operations to perform real time failure analysis and investigate what-if scenarios.

Implemented a prototype Communications and Tracking Expert System under contract with the Mission Operations Directorate at JSC. This provided a GUI to a hybrid rule-based expert system in which I mixed the forward chaining and backward chaining approaches to deriving answers based on the kind of questions that were being posed. It received telemetry data from the shuttle and illustrated the status of all the components of the system based on this data. When a failure occurred, it would graphically show possible reconfigurations and allow the operator to choose which one.

Several presentations, publications, and certificates of recognition from NASA resulted from both of the above projects. Also worked on documents for NASA headquarters in Washington D.C., resulting in approximately 9 million dollars in additional funding for Space Station Freedom.

Rice University, Houston, TX, Sep '82 - May '89

Graduate Student, Sep '86 – May '89

As a graduate student specializing in Artificial Intelligence, I completed several projects worth noting:

- An expert system for Baylor College of Medicine that aided in the process of gel preparation and the interpretation of DNA sequencing; implemented using a both M1 and Prolog for PCs.
- Neural Network research paper regarding its feasibility as a viable computing paradigm.
- A lexical scanner, parser, and code generator (hence, a full featured compiler) for a C-like language, implemented on a Sun workstation using an X-Windows environment.
- An objected-oriented graphical network configuration management system, implemented on a TI Lisp machine.
- Internet domain server browser that presented a UNIX like 'ls' directory listing of the current topology of the Internet; implemented on a Sun workstation running Berkley Unix.

Undergraduate Student, Sep '82 – May '86

I also had a few notable accomplishments as an undergraduate student at Rice:

- Wrote a multi-tasking operating system with dynamic loader and virtual memory manager
- President of both ACM and IEEE Student Chapters
- Lab assistant for several different CS/EE classes and math tutor for Rice Football Team
- Walk-on varsity pole vaulter for Rice Track Team, offered a scholarship for books as a Sophomore
- Summer intern for Motorola in Austin and for NASA at Johnson Space Center