

**CURRICULUM VITAE**  
***Larry Kerschberg***

May, 2016

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## CURRICULUM VITAE

*Larry Kerschberg*

### University Address

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### 1. Education

Ph.D. in Engineering, Case Western Reserve University, 1969.

MS. in Electrical Engineering, University of Wisconsin, 1966.

B.Sc. in Engineering Science with Honors, Case Institute of Technology, 1964.<sup>1</sup>

### 2. Languages Spoken

Fluent in both Spanish and Portuguese.

### 3. Honors and Fellowships

TAU BETA PI, Case Engineering Fellowship, U.S. Steel Fellowship, NDEA Fellowship.

University of South Carolina, College of Business Administration Research Fellow (two semesters).

Society for Information Management Research Grant, with G. Powers and D.A. Marchand, to research Videotex and Information Utilities.

Fellow of the Japan Society for the Promotion of Science, at Kyoto University, February 27 through April 26, 1998. This fellowship was awarded based on the recommendation of the National Science Foundation

### 4. Professional Society Membership

Association for Computing Machinery: Special interest groups on Management of Data (SIGMOD), Data Mining (SIGKDD), Artificial Intelligence (SIGART), and Information Retrieval (SIGIR).

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<sup>1</sup> Junior year spent at Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM), Monterrey, Mexico.

## **5. Professional Experience**

### **5.1. Positions Held**

#### **George Mason University**

January 2010 — 2013

Co-Founder and Co-Director, Mason Center for Health Information Technology.  
<http://hit.gmu.edu/>

August, 2008 – August 2009

Associate Chair for Graduate Studies, Computer Science Department. <http://cs.gmu.edu/>

January 2008 — Present

Professor of Computer Science, Computer Science Department,  
Volgenau School of Information Technology and Engineering  
George Mason University

August, 2005 - 2010

Director, E-Center for E-Business

September, 1986 – January 2008

Professor of Information and Software Engineering  
School of Information Technology and Engineering  
George Mason University

June, 1989 - June 1997

Chairman, Department of Information and Software Systems Engineering  
School of Information Technology and Engineering  
George Mason University

September, 1991 - Present

Professor and Member of Executive Committee  
School of Computational Sciences  
George Mason University

May, 1994 - May, 2001

Director, Center for Information Systems Integration and Evolution  
Director, Knowledge Rover Lab for Logistics and Commerce  
School of Information Technology and Engineering  
George Mason University

July, 2001 – August, 2005

Co-Director, E-Center for E-Business  
George Mason University  
<http://ecsb.gmu.edu/>

**KRM, Inc.**

January, 1987 - Present

President, Knowledge Resource Management, Inc. (KRM, Inc.)  
10600 Vennard Place  
Fairfax, Virginia 22032

**University of South Carolina**

August 1981 - August 1986:

Associate Professor of Management Science,  
College of Business Administration,  
University of South Carolina,  
Columbia, South Carolina, 29208

Associate Professor of Computer Science (courtesy appointment), University of South Carolina.

Faculty Associate, Institute of Information Management, Technology and Policy, College of Business Administration, University of South Carolina.

Teaching and research in Management Information Systems, Enterprise Modeling, Database Management, Office Information Systems, Expert Database Systems, Business Expert Systems — Artificial Intelligence for Business Decision-Making.

**Bell Laboratories**

June 1977 - August 1981:

Member Technical Staff, Research Division  
Bell Laboratories, Holmdel, New Jersey.

Research in Database Management: Data Models, Distributed Query Processing, Performance Evaluation, and Distributed Databases.

**University of Maryland**

August 1976 - June 1977:

Assistant Professor  
Department of Information Systems Management,  
University of Maryland, College Park, Maryland.

Teaching and research in Information Systems, Database Management, and Data Models.

**University of Toronto**

January 1976 - May 1976:

Visiting Research Professor  
Computer Systems Research Group,  
University of Toronto, Toronto, Canada.

Research in Data Models and Query Languages, Sponsored by a grant from IBM of Brazil grant.

### **Pontifical Catholic University of Rio de Janeiro**

August 1970 - July 1976:

Associate Professor, Computer Science Department,  
Pontifical Catholic University of Rio de Janeiro (PUC-RJ).

Nine students completed M. Sc. theses under my direction.

One of these students subsequently completed his Ph.D. at UCLA.

August 1973 - June 1975:

Chief of a Performance Evaluation Project within a minicomputer software development project.

February 1971 - June 1972

Joint Appointment with the Computer Center as Chief of the Computer Applications Division.

Responsible for User Services and Special Projects.

The division offered programming assistance, short courses, and edited a number of application program manuals, including the user's manual for the center's IBM 370/165.

The Special Projects Group developed a jurisprudence information system and terminal-based, on-line, key-word retrieval system for scientific abstracts.

### **COPPE, Federal University of Rio de Janeiro**

August 1969 - July 1970:

Visiting Professor

COPPE, the engineering graduate school of the Federal University of Rio de Janeiro, under contract with the Organization of American States (OAS).

Two students completed M. Sc. theses under my direction. Both obtained their Ph.D. degrees from the University of California at Berkeley.

### **Corning Glass Works**

June 1966 - September 1966:

Research Engineer, Corning Glass Works, Corning, New York.

June 1965 - September 1965:

Engineer-Research, Data Systems Division of Autonetics,

North American Aviation (now Rockwell International), Anaheim, California.

### **Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM), Monterrey, Mexico.**

June 1964 - July 1964

Taught high school algebra in Spanish at the Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM), Monterrey, Mexico.

## 5.2. Courses Taught

### **George Mason University**

Database Concepts (CS 450)

Social Networks (INFS 797)

Principle and Practices of Communication Networks (INFS 612)

Systems Analysis and Design (INFS 622)

Introduction to E-Commerce (INFS 640)

Database Programming for the World Wide Web (INFS 740)

Advanced Database Systems (INFS 760)

Knowledge Management for E-Business (INFS 770)

Intelligent Agents and the Semantic Web (INFS 772)

Scientific and Statistical Databases (CSI 810/IT 864)

Expert Database Systems (IT 960)

### **University of South Carolina**

Decision Support Systems and Business Expert Systems (BADM 896)

Distributed Processing Systems (BADM 891)

Data Structures and File Organizations (BADM 880)

Business Information Structures and Design (BADM 596)

Information Systems (BADM 796) and (BADM 796T), T for Television.

Information Systems in the Masters in International Business Studies Program (MIBS) (BADM 702)

Introduction to Business Data Processing (BADM 190)

Data Structures (CSCI 500)

### **University of Maryland**

Electronic Data Processing

Management Information Systems: Conceptual Foundations, Structure and Development.

### **Pontifical Catholic University of Rio de Janeiro (PUC/RJ)**

General Systems Theory

Graph Theory and Algorithms

Introduction to Discrete Structures and Logic

Algebraic Structures

Simulation

Introduction to Database Management Systems

### **COPPE, Graduate Engineering School, Federal University of Rio de Janeiro**

Modern Algebra

Optimal Control Theory

General Systems Theory

### **5.3. Sponsored Research**

#### **George Mason University**

#### **Knowledge Sifter: Ontology-Based Search over Corporate and Open Sources using Agent-Based Knowledge Services.**

Sponsor: National Geospatial-Intelligence Agency

Co-Principal Investigators: Dr. Larry Kerschberg and Dr. Daniel Menascé

Date: October 1, 2003 – September 31, 2008

Funding Amount: \$640,000

Knowledge Sifter is a scalable agent-based system that supports access to heterogeneous information resources such as the Web, open-source repositories, XML-databases and the emerging Semantic Web. User query specification is supported by a user agent that accesses multiple ontologies using a conceptual model expressed in the Web Ontology Language. A collection of cooperating agents supports interactive query specification and refinement, query decomposition, query processing, integration, as well as result ranking and presentation. The Knowledge Sifter architecture is general and modular so that new ontologies and new information resources can be easily incorporated.

The Knowledge Sifter agent architecture has three layers: User Layer, Knowledge Management Layer, and Data Layer. Specialized agents reside at the various layers and perform well-defined functions. The User Agent interacts with the user to elicit user preferences that are managed by the Preferences Agent. These preferences include the relative importance attributed to terms used to pose queries, the perceived authoritativeness of Web search engine results, and other preferences to be used by the Integration Agent. The user indicates an initial query to the Query Formulation Agent. This agent, in turn, consults the Ontology Agent to refine or generalize the query based on the semantic mediation provided by the ontology services available. The Ontology Agent provides a conceptual model for the domain by means of the OWL schema specification. In this example, there are two such services: Princeton University's WordNet and USGS's GNIS. Other sources can be added in a modular fashion, and the OWL schema would be updated to accommodate new concepts. The Web Services Agent accepts a refined user query, that has been decomposed by the Query Formulation Agent, and transforms the subqueries into SOAP requests to the databases and open Web sources (e.g., TerraServer and Yahoo!) that have Web Service published interfaces; this is the case for the TerraServer, while Yahoo! provides an HTTP interface.

The Web Services Agent uses domain knowledge regarding the data sources, such as quality of services attributes, authoritativeness, and image sizes, to choreograph the execution of subqueries in an optimal fashion. The Integration Agent is responsible for compiling the sub-query results from the various sources, ranking them according to user preferences, as supplied by the Preferences Agent, for such attributes as: 1) the weight associated with the user's perception of the authoritativeness of a source, or 2) the weight associated with a term used in a query.

A proof-of-concept prototype has been implemented demonstrating Knowledge Sifter searching both geospatial ontology services such as the USGS Geographic Names Information System (GNIS) and cognitive science ontologies such as Princeton University's WordNet, as well as image databases including Lycos and TerraServer. Finally, each Knowledge Sifter agent is implemented as a Web Service and the external sources are also accessed via Web Service protocols.

### **Secure Metadata**

Sponsor: TASC (The Analytical Sciences Corporation)

Co-Principal Investigators: Dr. Ravi Sandhu and Dr. Larry Kerschberg

Date: August 1, 2001 – December 31, 2001

This project investigates the use of secure metadata to describe the characteristics of objects at various security levels and the use of such metadata for information assurance.

### **E-Center for Excellence in Research and Education in E-Business**

Sponsor: Virginia Center for Innovative Technology (CIT), companies and government.

Dr. Larry Kerschberg and Dr. Daniel Menascé

Funding amount: \$75,000 (CIT), \$60,000 (Companies)

Dates: July 14, 2000 – July 14, 2001

The E-Center for E-Business performs R&D in areas related to E-Business, including, methodologies, scalability and performance, intelligent agents and search, data mining and e-marketplaces. (Visit <http://eceb.gmu.edu>)

### **Secure Objects in a Business-to-Business Environment**

Sponsor: The National Reconnaissance Office (NRO)

Co-Principal Investigators: Dr. Ravi Sandhu, Dr. Edgar Sibley, and Dr. Larry Kerschberg

Funding amount: \$250,000

Dates: June 1, 2000 – May 31, 2001

The research explores NRO's security object requirements in the context of emerging commercial e-commerce marketplace in areas such as secure object access and dissemination, the use of XML.XMI (eXtensible Markup Language / eXtensible Metadata Interchange) for object sharing, secure electronic transactions, and secure collaboration environments. We evaluate these requirements to commercial systems such as Oracle 8 and Broadvision, GOTS and custom (Role Based Access Control) RBAC components, to demonstrate secure object concepts.

### **Software Capability Process improvement for Vistrionix**

Sponsor: Virginia Center for Innovative Technology and Vistrionix

Co-Principal Investigators: Dr. Larry Kerschberg and Dr. Richard Bechtold

Dates: July 1, 1999 to December 31, 2000

This project was designed to provide support services to Vistrionix, Inc. to achieve the SEI Capability Maturity Model Level 2 maturity.

### **Flat-Sat Vision Project**

Sponsor: NASA

Co-Principal Investigators: Dr. Hassan Gomaa and Dr. Larry Kerschberg

Funding amount: \$62,862

Dates: February 1, 1998 - January 31, 1999

The Flat-Sat Vision Project combines domain-modeling with agent-based systems to investigate the automatic design and configuration of a space mission including the spacecraft, hardware and software simulators, instruments, and flight control software.

### **Knowledge Rovers: A Family of Intelligent Software Agents for Logistics and Commerce**

Sponsor: DARPA through the Advance Logistics Program

Principal Investigator and Project Manager: Dr. Larry Kerschberg

Co-Principal Investigators: Drs. Hassan Gomaa, Sushil Jajodia, and Ami Motro

Funding amount: \$450,000 plus several options

Dates: August 1996 - August 1998

The knowledge rovers represent a *family* of cooperating intelligent agents that may be configured to support a collection of scenarios, decision-makers and tasks. These rovers play specific roles within the KLAD, supporting users, maintaining complex views, refining data into knowledge, and roaming the Global Information Infrastructure seeking, locating, negotiating for and retrieving data and knowledge specific to their mission. We will specify the Knowledge Rover architecture and several scenarios for the LAD which show the cooperation among agents in problem-solving. We propose to create a Knowledge Rover Laboratory (KRL) in which our proof-of-concept prototypes will be designed and implemented.

### **Knowledge Rovers to Support the Virtual Enterprise**

Sponsor: DARPA through the Advance Logistics Program

Principal Investigator and Project Manager: Dr. Larry Kerschberg

Co-Principal Investigators: Drs. Hassan Gomaa, Sushil Jajodia, and Ami Motro

Funding amount: \$45,000, Subcontract from AMS.

Dates: August 1996 - August 1998

The GMU team researched the Knowledge Rover concept as it pertains to the Virtual Enterprise Concept of the Defense Personnel Supply Center of DoD. Research in the Intelligent Integration of Information, Data Warehousing, and Data Quality will be applied in this research and development effort.

### **Information Integration and Interchange (I<sup>3</sup>) : A Federated Systems Approach**

Sponsor: ARPA through Office of Naval Research

Principal Investigator: Dr. Larry Kerschberg

Co-Principal Investigators: Drs. Hassan Gomaa, Sushil Jajodia, and Ami Motro

Funding amount: \$840,000.

Dates: August 1992 - August 1995

This research focused on the interchange and integration of information residing in a federation of heterogeneous knowledge base and database systems. A federated architecture is studied in which a Federation Manager, consisting of an active data/knowledge dictionary directory and support tools such as an Intelligent Thesaurus, Query Formulator, and Query Processor, will interact with federation-level users in elaborating and processing queries to the constituents.

Object-oriented domain modeling tools and techniques will be used to provide high-level specifications of the structure and behavior of constituent systems. These specifications will be used to characterize the information requirements and services of the constituents to be made available to the federation. The federation specifications will be stored in the active data/knowledge dictionary for use by federation-level tools described above.

Of particular importance to this research is the characterization and handling of uncertainty information. This uncertainty arises when two systems report on the same event, but the information is inconsistent. This may occur when the systems use differing measures of time, or when they are reasoning based on distinct rules of inference. Temporal reasoning techniques will be developed to handle different time scales and temporal events. Knowledge discovery tools and techniques will be used to determine the “quality” of an information source, based on previous performance as well as inferred intentions.

### **The Knowledge Discovery in Databases**

Sponsor: ARPA

Principal Investigator: Dr. Ryszard Michalski

Co-Principal Investigator: Dr. Larry Kerschberg

Funding amount: \$1,285,000.

Dates: July 1992 - June 1995

This project is concerned with the development of a large-scale multi-strategy reasoning system, called INLEN, for extracting knowledge from databases. The system assists a user in discovering general patterns or trends, meaningful relationships, conceptual or numerical regularities or anomalies in large databases. The volume of information in a database is often too vast for a data analyst to be able to detect such patterns or regularities. INLEN integrates symbolic learning and statistical techniques with database and knowledge base technologies. It provides a user with “knowledge generation operators” (KGO) for discovering rules characterizing sets of data, generating meaningful conceptual classifications, detecting similarities and formulating explanations for the rules, generating rules and equations characterizing data, selecting and/or generating new relevant variables or representative examples, and testing the discovered rules on new data.

### **The PROGEN Advisory System for Process Modeling**

Sponsor: Software Productivity Consortium/ Virginia Center of Excellence in Software Reuse, and Center for Innovative Technology, Herndon, Virginia

Principal Investigator: Dr. Larry Kerschberg

Co-Principal Investigator: Dr. Hassan Gomaa

Funding amount: Approximately \$100,000.

Dates: September - December 1993.

This research addresses the modeling and representation of expertise for process knowledge associated with the development of software systems. A software life cycle model, the Evolutionary Development Life-Cycle Model (EDLC), is used to model the events, activities, and products associated with the various phases in the specification, design and implementation and evolution of a complex software system. In particular, a domain model of the Evolutionary Spiral Process Model (ESPM) is used to specify the *family* of process models.

A prototype software “expert system” called PROGEN has been implemented and serves as a project manager’s assistant. The manager interacts with PROGEN to input process drivers for a project, and PROGEN reasons about these process drivers to tailor the ESPM domain model so as to generate the appropriate process model for that project.

This research also focuses on further refining the domain model of the ESPM, incorporating new process drivers associated with the SEI Capability Maturity Model. In order to handle larger numbers of process drivers, PROGEN supports the concept of process-driver *packages*.

### **Independent Architecture Study of Earth Observing System Data and Information System (EOSDIS)**

Sponsor: Hughes Applied Information Systems

Principal Investigator: Menas Kafatos, Institute for Computational Sciences and Informatics

Co-Principal Investigators: Dr. Larry Kerschberg, Daniel Menascé, Hassan Gomaa

Funding amount: \$322,000.

Dates: March - September 1994.

NASA asked Hughes Applied Information Systems to fund Independent Architecture Studies for EOSDIS. George Mason University put together an *interdisciplinary team* consisting of Earth, Information and Computer Scientists to provide end-to-end architecture (hardware, software, communications, information, and data) for EOSDIS.

The GMU-led team consisted of Earth Scientists from the University of New Hampshire, University of Delaware, the Center for Ocean, Land and Atmosphere (COLA), and the Institute for Computational Sciences and Informatics located at GMU.

Dr. Kerschberg was the leader of the Information and Computer Science group from the School of Information Technology and Engineering at GMU. This group provided the architectural principles, concept-of-operations, federated client-server software architecture, information and data architecture, and a summary of existing approaches to very large databases and hierarchical files systems for EOSDIS.

The complete architecture document was over 450 pages long, and was presented to a review panel consisting of scientists and engineers from NASA and Hughes. Other studies were performed by the Sequoia 2000 group led by the University of California—Berkeley, and the University of North Dakota.

### **The NASA Evolutionary Domain Life Cycle (EDLC) Project**

Sponsor: NASA Goddard Space Flight Center, Greenbelt, MD

Co-Principal Investigators: Dr. Hassan Gomaa and Dr. Larry Kerschberg

Funding amount: \$503,560.

Dates: September 1989 - June 1994

The Software Systems Engineering Center, of which Dr. Gomaa and Dr. Kerschberg are members, has been conducting research for the past three years in the area of domain modeling for software reuse. The project centers on the concept of an Evolutionary Domain Life Cycle (EDLC) Model, which is a highly iterative software life cycle model that eliminates the distinction between development and maintenance and addresses the development of a family of systems. The EDLC involves domain analysis, domain specification, and domain design for a *family* of systems. A first attempt at developing a domain analysis and specification method has been completed; the results are being applied to developing the software architecture for the NASA Payload Operations Control Center (POCC) domain.

We have *implemented* a proof-of-concept demonstration of the Evolutionary Domain Life Cycle Model using both commercial-off-the-shelf software (COTS) as well as custom-developed software. The configuration uses: 1) Software through Pictures as the multiple viewpoint graphical editor, 2) an Eiffel-based Object Repository which provides a persistent object store and checks for consistency among object specifications, 3) a Feature/Object Editor that allows the Domain Analyst to represent the dependencies among features and the objects supporting those features, and 4) a knowledge-based requirements elicitation tool, implemented in NASA's CLIPS shell, to assist the target system requirements engineer in selecting those features and objects that will constitute the target system.

The Object Repository manages the evolution of the object specifications, maintains consistency according to the information model, and provides data/knowledge translation services to other knowledge-based tools. One such tool is the knowledge-based requirements elicitation tool (KBRET), which elicits target system requirements by having users select desired features and object types from the domain model. KBRET accesses the object repository to obtain the knowledge required for its reasoning. In addition, KBRET has several domain-independent knowledge sources for browsing, for selecting target system features, and for generating a target system. In particular, KBRET has special reasoning methods for non-monotonic reasoning; users may select a feature and its dependent object types, and then retract that feature, causing many dependent objects to be retracted from the target system specification. The Target System Specification is stored in the object repository, and another translator provides the appropriate knowledge representation for a program to tailor the multiple viewpoints of the domain model to reflect the object types in the target system specification.

### **The Active Data/Knowledge Dictionary**

Sponsor: Rome Labs

Principal Investigator: Dr. Larry Kerschberg, KRM, Inc.

Project Director: Mr. John Dove, Dove Electronics, Rome, NY

Funding amount: \$180,000

Dates: August 1989 - May 1991

The Active Data/Knowledge Dictionary (ADKD) project examined the areas of data, knowledge, meta-data and meta-knowledge needed to support the concept of an *active* data/knowledge dictionary. The ADKD concept suggests the need for an environment to assist users such as Database and Knowledgebase Administrators to specify, design, build and evolve both data- and knowledge-based applications. The project specified a functional architecture for the ADKD, including an array of services and tools needed to support the environment.

The major issues addressed were: 1) The adequacy of the Information Resource Dictionary System (IRDS) for object-oriented database systems support, the role of the IRDS to support advanced systems development projects and databases, 2) A conceptual architecture for the Active Data/Knowledge Dictionary System based on the requirements of advanced application areas, 3) Query processing in heterogeneous database systems, 4) Schema evolution in object-oriented database systems, 5) Active data/knowledge management in object-oriented systems, 6) Coordinated problem solving with multiple heterogeneous knowledge sources, and 7) Hypermedia requirements for active dictionaries.

### **The MCI Telecommunications Network Project**

Sponsor: MCI Corporation

PI: Dr. Larry Kerschberg

Funding amount \$139,500

Dates: September 1989 to January, 1990

There are enterprises that depend on integrating heterogeneous, autonomous database systems. MCI Corporation is the provider of long-distance, telecommunications network support. It has databases that describe the physical constitution of the network; the repeaters, switches, cables, and so forth. MCI also has databases that describe virtual aspects of the network; routing tables, for example. Moreover, it has databases that describe the condition of the network; alarm tables, for example.

Managers of these networks must continually reason with information from what is equivalent to a heterogeneous, often inconsistent, database system. In our recent project with MCI, we interviewed MCI network managers, analyzed MCI network management, established a need for intelligent network management, and developed a functional architecture to perform this intelligent network management by integrating heterogeneous knowledge sources and reasoning paradigms via a blackboard control model.

## **A Knowledge-Based Architecture for Requirements Gathering, Analysis, and Subsequent Prototyping**

Sponsor: Software Productivity Consortium and Virginia Center for Innovative Technology

PI: Dr. Edgar H. Sibley

Research Associate: Dr. Larry Kerschberg

Funding amount \$250,000

Dates: June 1987 to December 1988

The objectives of this research are to obtain improvements in the information systems analysis and design process by using knowledge-based tools and techniques to support multiple viewpoints with potentially conflicting perspectives of an application domain.

### **University of South Carolina**

#### **Knowledge-Based Systems: The MEDCLAIM Project**

Project Director, “MEDCLAIM: A Decision Support System for Medical Claims Review,” (with D.A. Marchand, and J. Weitzel), sponsored by Blue Cross/Blue Shield of South Carolina, (\$120,000), September 1, 1985 to July 30, 1986.

This project explored the use of Expert System shells on the IBM/AT Personal Computer to create a decision support system to aid Registered Nurses in medical claims review. The project involved the evaluation of a number of ES shells, the Knowledge Engineering of decision-making rules, and the construction of a prototype system. The project was so successful that BC/BS plans to implement a production version as the third phase of MEDCLAIM.

### **Society for Information Management**

“Videotex and Information Utilities,” (with D.A. Marchand and G. Powers), a research grant (\$5,000) from the Society for Information Management (SIM), June 1983 to May 1985.

This research project resulted in Mr. Powers’ M.Sc. thesis, “SC-INFONET: A Videotex Network to Enhance Business and Economic Development.

We published an article, “Internal Corporate Videotex Systems,” which was published in the *Spectrum*, the Newsletter of the Society for Information Management, November 1985.

## **6. Legal Consulting**

### April 2011 – Present

IMS Expert Services contacted me to serve as an expert consultant and testifying expert in the case of Indacon v Facebook (Civil Action No. 5:10-cv-966). I am working with the law firm of Akin Gump Strauss Hauer & Feld, LLP that represents Indacon in these proceedings. This is an ongoing case that involves two patents held by Indacon. I have already given one 5-hour deposition pertaining to system hardware and software modules. I have examined the Facebook source code and system, and wrote both an infringement and a validity report. On July 29, 2014 I gave a 7.5-hour deposition related to my infringement report as well as my validity report.

### March 2014 – October 2014

I worked for Alston and Bird on the eDirect v. LiveCareer case. I wrote a declaration regarding the invalidity of patent 6,363,376 in a “Covered Business Method Post-Grant Review”.

### July 2013 – October 2014

IMS Expert Services contacted me to serve as an expert consultant and testifying expert of the case of AthenaHealth vs. AdvancedMD (Civil Action No. 1:11-cv-11260-GAO). I worked with the attorneys from Ropes & Gray on this case. I reviewed both documents and computer code dealing with patient visit processing for claim submission. The lead attorney was Ms. Leslie Spencer of Ropes & Gray in New York City, NY. The case was settled.

### November 2012 – November 2013

The firm of Procopio, Cory, Hargreaves and Savitch LLP has engaged me as an expert consultant in the case of Interpols Network Inc. v. Aura Interactive, Inc. (Case No. CV 8:12-832-JVS). There are two patents in question: US7673017 and US8204961. The patents involve the role of Internet servers in delivering advertising and movie show times to web browsers.

I provided research and advice on claim construction, prior art, infringement analysis, source code review, and other aspects of the case. I wrote a declaration to the court with respect to obtaining Aura source code for review. I wrote an infringement report in this case. However, the case was settled before I gave a deposition.

#### June 2007 – March 2008

I served as an expert consultant on a case described below.

A web applications consultant was sought by IMS Expert Services to testify as an expert witness in a patent infringement case involving web applications for measuring web traffic and other Internet metrics. Both parties to the lawsuit were involved in providing the Internet community with web applications for data capture and warehousing. This data, known as Internet metrics, is used in Internet marketing for data mining and business decisions regarding budgeting for Internet advertising, including banner advertising and pay-per-click, or PPC campaigns. A strong background in web applications a working knowledge of web analytics and web applications software used by Internet marketers and Internet advertising companies were vital characteristics and areas of expertise for the expert in this case.

#### February 2007 – January 2008

I served as an expert consultant to the firm of Hennigan, Bennett and Dorman, LLP of Los Angeles, California. The case involved the misuse of trade secrets. The litigants in the case were Cogent Systems, Inc., and the Northrop Grumman Corporation.

The litigation involved two large-scale systems that use both client-server as well as Internet-based service-oriented architectures with Web services. I wrote a report comparing and contrasting the two systems involved in the litigation: NAFIS and IDENT1. I provided a 6-hour deposition testimony with regards to my report.

The case was recently settled out of court. Here is a link describing the details of the settlement: [http://www.contractormisconduct.org/ass/contractors/42/cases/795/917/northrop-grumman-fingerprint\\_pr.pdf](http://www.contractormisconduct.org/ass/contractors/42/cases/795/917/northrop-grumman-fingerprint_pr.pdf)

#### July 2005 - June, 2006

I served as an expert consultant to the firm of Wilmer Cutler Pickering Hale and Dorr on a patent case that involved four patents, two from each litigant. I provided a 7.5-hour deposition on the claim construction and definitions of the four patents. The case was eventually decided in favor of OutlookSoft, the client represented by Wilmer Cutler Pickering Hale and Dorr.

#### July 2005 - June, 2006

I was retained as an expert consultant by the firm of Gibson, Dunn & Crutcher LLP. The litigants were McKesson Information Solutions, LLC versus The Trizetto Group, Inc. The case involved a patent infringement case in the medical claims processing area, in which my MEDCLAIM System – designed and built in 1984-1985 – was argued as ‘prior art’. I wrote a prior-art report and gave a 7-hour deposition on the report. This case was settled.

January 2000 – June 2000

I served as a consultant and expert witness for the law firm of Arder and Hadden on an Intellectual Property case involving the theft and reuse of a database schema from one client to another by a software development firm. I provided expert advice on the database schema, its role in the development of applications, and how it can be reused from one project to another. I also sat in on depositions and provided advice as to the questions that were asked during the deposition. The case was settled out of court.

## **7. Technical Consulting**

### October 2005 – May 2007

Dr. Kerschberg served on an Expert Panel for the US Department of Transportation's, Federal Highway Administration (FHWA) project entitled "Electronic Freight Manifest." The goal of the project is to define, design and deploy a web-services based virtual enterprise to track freight shipments from their point-of-origin to their destination, across multiple carriers and diverse modes of transportation, by enabling the sharing and interoperation of information among all stakeholders in the shipping transaction.

### February 2005 to 2008

KRM worked with Global InfoTek, Inc., on the COORDINATOR project for the Defense Advanced Projects Agency (DARPA). Dr. Kerschberg will be responsible for the ORACLE subsystem that computes all possible solutions of coordinator tasks schedules, as well as metrics and systems engineering concepts.

### October 2002 – August 2004

KRM was a subcontractor to Global InfoTek, Inc., providing knowledge management and agent-based architectural guidelines, specifications and designs for the OmniSeer system sponsored by the Intelligence Community.

### June 2001 – June 2002

Consultant to Communication Technology, Inc., writing papers on topics such as Network Convergence and Network Planning.

### October 1999 – June 2001

Consultant to Lockheed Martin Management and Data Systems in the area of Knowledge Management. KRM developed new knowledge management concepts and proposed a Knowledge Management Framework.

### April 1997 – July 2002

Board of Regents, State of Louisiana, Consultant and Mentor to the NSF-sponsored EPSCOR Program. I advise the joint project between the University of Southwestern Louisiana (USL), Lafayette, LA, and historically-black Southern University, Baton Rouge, in a joint faculty and research program in "Harnessing Diverse Information Sources."

October 1997

EDS, Electronic Data Systems. Member of the “Kitchen Cabinet” for the Chief Information Officer of the Central Intelligence Agency. Advising on Information Architectures and Knowledge Management.

September 1996- September 1997

Tax Systems Modernization Institute (TSMI), providing consulting services, writing reports and reviewing documents. The major efforts were the Systems Development Life Cycle document for the IRS, A report on the Migration and Modernization of Legacy Systems, the Treasury Information System Architecture Framework (Version 1.0), and Architectural Design Guidance Document for the Department of Treasury.

November 1995

TASC, The Analytical Sciences Corporation. Consultant in Data Mining and Knowledge Discovery.

August 1989 - May 1991

Dove Electronics, Rome New York. Consultant to Dove Electronics on “The Active Data/Knowledge Dictionary” project. Technical director of contract to evaluate architectures for active data/knowledge dictionary environments for facilitate the specification, design, and development of applications using both data-based and knowledge-based technologies.

June 1987 - July 1989

Consultant to the Software Productivity Consortium of Reston, Virginia. Studying architectures for Knowledge-Based Requirements Gathering, Specification, and Design.

January 1987 - December 1990

Consultant to Computer Sciences Corporation, Falls Church, Virginia. Studying the issues of ADA<sup>™</sup> Interoperability, Enterprise Analysis and Modeling, and Knowledge/Data Integration.

September 1983 - May 1984

Project Member, “An Information Locator System for South Carolina State Government,” Institute of Information Management, Technology and Policy, University of South Carolina.

This study was done for the Division of Information Resources of the South Carolina State Government. The idea was to study the feasibility of creating a dictionary/directory of State Agency information resources, holdings and services with the goal of providing various degrees of access to information.

September 1982 - January 1983

Consultant to Ellett Bros., Chapin, SC in Information Resources Management.

Performed systems analysis of the Sales Department and recommended an on-line system for monitoring sales promotions. The system has been implemented and is operational.

March 1980 - September 1980

Internal consultant at Bell Laboratories to a development organization that used the Functional Data Model to model the semantics of telephone connections to central offices.

September 1976 - May 1977

Participated in a research grant as a consultant to the Navy Bureau of Personnel (BUPERS) in the development of a simulation model of their on-line teleprocessing network.

May 1975 - December 1975

Data Processing Company of the Banco Real (Royal Bank) of Sao Paulo, Brazil.

Developed the Functional Data Base Model (see Publications). This model has received considerable attention in the literature, and the Computer Corporation of America in Cambridge, MA, developed a prototype called DAPLEX.

August 1973 - December 1975

American School of Rio de Janeiro.

Developed and taught "Introduction to Computing" to high school juniors and seniors.

## **8. Professional Activities**

### **8.1. Tutorial Presentations**

Tutorial Speaker on Web Services, Web Information Systems Engineering (WISE) Conference, Kyoto, Japan, December 2001.

Tutorial Speaker on Knowledge Management, Entity-Relationship Conference, November 2001, Yokohama Japan.

Tutorial Speaker on “Knowledge Management: Managing Knowledge Resources for the Intelligent Enterprise.” XXIII Congress on Systems Engineering, University of Chile, July 18-21, 2000, Santiago, Chile.

Tutorial Speaker on “The Role of Intelligent Agents in Advanced Information Systems,” XXI Congress on Systems Engineering, University of Chile, June 2-5, 1998.

EDBT Summer School, Short Course on Active Information Architectures and Systems, Isle of Capri, Italy, September 8-13, 1997.

Tutorial Speaker on “Expert Database Systems,” International Conference on Data Engineering, Kobe, Japan, April, 1991.

Tutorial Speaker on “Expert Database Systems,” International Symposium on Intelligent Network Management, Washington D.C., April, 1991.

Speaker on “Data and Knowledge Engineering,” IBM Television Education Center, Thornwood, NY, January, 1991.

Tutorial Speaker on “Expert Database Systems,” CIPS Edmonton, Edmonton, Alberta, Canada, October, 1990.

Tutorial Speaker on “Expert Database Systems,” Canadian Conference on Artificial Intelligence, Ottawa, Canada, April, 1990.

Speaker on “Expert Database Systems,” IBM Television Education Center, Thornwood, NY, January, 1989.

Tutorial Speaker on “Expert Database Systems,” International Conference on Data Engineering, Los Angeles California, February, 1990.

Tutorial Speaker on “Expert Database Systems,” IEEE Systems, Man and Cybernetics Conference, Alexandria, Virginia, October, 1987.

Tutorial Speaker on “Expert Database Systems,” International Conference on Very Large Data Bases, Brighton, England, September, 1987.

Presented a 15-hour, 5 day short course on “Building Expert Systems” for the IBM Latin American Systems Research Institute, Rio de Janeiro, Brazil, February 25 - March 1, 1985.

## **8.2. Professional Organization Activities**

### **Chairmanships**

Workshop Co-Chair, Workshop on Information Just-in-Time (WIJIT 2005), Kaiserslautern, Germany, April 10-13, 2005.

Program Chairman, International Conference on Scientific and Statistical Database Management, Fairfax, Virginia, July 18-21, 2001.

Program Co-Chairman, International Workshop on Cooperative Information Agents (CIA-2000), Boston, July 7-9, 2000.

General Chairman, International Workshop on Advanced Transaction Models and Architectures (ATMA) Goa, India August 31-September 2, 1996

General Chairman, ACM SIGMOD Conference, held in Washington D.C., May 1993.

Chairman, IEEE Computer Society's Technical Committee on Data Engineering.(1989 - 1991)

Program Chairman and Organizer, *Second International Conference on Expert Database Systems*,. April 25-27, 1988, Sheraton Premiere Hotel, Tysons Corner, Virginia.

This event was sponsored by George Mason University in cooperation with the Association for Computing Machinery (ACM), American Association for Artificial Intelligence (AAAI), and the IEEE Computer Society.

Program Chairman and Organizer, *First International Conference on Expert Database Systems*, April 1-4, 1986, Charleston, South Carolina.

The conference was sponsored by the Institute of Information Management, Technology and Policy, University of South Carolina, in cooperation with the Association for Computing Machinery (ACM), American Association for Artificial Intelligence (AAAI), IEEE Computer Society, and the Agence de l'Informatique, France.

### **Editorial Responsibilities**

Founding Editor-in-Chief, *International Journal on Intelligent Information Systems: Integrating AI and Database Technologies*, Springer, Boston and Amsterdam, 1992- Present.

Editorial Board Member, *Journal of Data Semantics*, Springer.

Guest Editor, Database Track, *IEEE Expert*, IEEE Computer Society Publication.

Referee for: *Journal of the ACM*, *ACM Transactions on Database Systems*, *ACM Computing Surveys*, *IEEE Transactions on Software Engineering*, *Data and Knowledge Engineering*, *Decision Sciences*.

Proposal Reviewer, National Science Foundation, 1985, 1987, 1988, 1989, 1990, 1991, 1992

Member, IFIP Working Group 2.6 on Knowledge Representation.

### **Panel and Program Committee Activities**

Program Committee Member, ODASE 2016, The 15th International Conference on Ontologies, DataBases, and Applications of Semantics, Rhodes, Greece, 25-26 October, 2016.

Program Committee Member, ASONAM 2013, The 2013 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining, Niagara Falls, Canada.

Program Committee Member, ASONAM 2011, The 2011 International Conference on Advances in Social Network Analysis and Mining, Taiwan.

Panelist, STIDS 2013 — Semantic Technologies and Big Data, George Mason University, November 14, 2013.

Panelist, National Science Foundation, Reviewed proposal for funding, 2010-2011.

Program Committee Member, SSDBM 2011 – Scientific and Statistical Database Management Conference, Portland Oregon, July 20-22, 2011.

Program Committee Member, 30th International Conference on Conceptual Modeling (ER 2011) Brussels, Belgium, October 31 – November 3, 2011.

Program Committee Member, The 2011 International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2011), Kaohsiung, Taiwan, July 25-27, 2011.

Steering Committee Member, ICCBR 2007 - Seventh International Conference on Case Based Reasoning, Belfast, Northern Ireland, August 13-16, 2007.

Program Committee Member, 20th International Conference on Industrial, Engineering & Other Applications of Applied Intelligent Systems (IEA/AIE-2007), to be held in Kyoto, Japan, June 26-29, 2007.

Program Committee Member, TRMA 2006 - Topic Map Research and Applications, Leipzig, Germany, October 11-12, 2006.

Program Committee Member, NGITS 2006 -- 6th International Workshop on Next Generation Information Technologies and Systems. Kibbutz Shefayim, Israel, July 4-6, 2006.

Program Committee Member, Conference on Ontologies, Databases and Semantics (ODBASE-2006), Montpellier, France from October 31 - November 2, 2006.

Program Committee Member, International Conference on Data Warehousing and Knowledge Discovery, DaWaK 2004, Zaragoza, Spain, September 1-3, 2004.

Program Committee Member, Workshop on Theory and Applications of Knowledge Management, TAKMA 2004, Zaragoza, Spain, August 30 - September 3, 2004.

Program Committee Member, 2004 IEEE/WIC/ACM International Conference on Intelligent Agent Technology (IAT 2004), Beijing, China, September 20-24, 2004.

Program Committee Member, RIDE Workshop (Research in Data Engineering), Theme of Engineering E-Commerce/E-Business Systems, February 2002.

Program Co-Chair, International Workshop on Cooperative Information Agents, Modena, Italy, September, 2001.

Program Committee Member, Workshop on Open Enterprise Solutions, Italy, September 2001.

Program Committee Member, CODAS (Cooperative Database Systems for Advanced Applications, Beijing, April 2001.

Program Committee Member, Data Warehousing and Knowledge Discovery Conference, September 2000.

Program Co-Chair, Second International Workshop on Cooperative Information Agents (CIA-98), Cite de Sciences - La Vilette, Paris, France, July 3-8, 1998.

Panel Organizer, AFCEA First Federal Data Mining Symposium, "Data Mining and the Government: Are they Ready for a Relationship?" December 17, 1997.

Kerschberg, L., Scientific Databases: A Challenge in Interdisciplinary Education, International Conference on Statistical and Scientific Database Management, SSDBM, Olympia, WA, IEEE Computer Society Press.

Program Committee Member, 1998 International Conference on Statistical and Scientific Database Management, Isle of Capri, Italy, 1998.

Program Committee Member, International Conference on Knowledge and Information Management, Baltimore, Maryland, 1996.

Program Committee Member, International Conference on Knowledge Discovery in Databases, Portland, Oregon, 1996.

Program Committee Member, International Conference on Knowledge Discovery in Databases, Montreal, Canada, 1995.

Program Committee Member, IFIP DS-6 Conference, Atlanta, Georgia, May 1995.

Program Committee Member, IEEE Workshop on Research Issues in Data Engineering -- Active Database Systems, April 1994.

Program Committee Member, Workshop on Knowledge Discovery in Databases, Washington, D.C., 1993.

Program Committee Member and Panel Coordinator, ACM Conference on the Management of Data, SIGMOD, 1992.

Program Committee Member, Data Engineering Conferences, IEEE Computer Society, 1988-1992.

Program Committee Member, Entity-Relationship Conferences, 1989, 1990, and 1991.

Program Committee Member, International Workshop on Interoperability in Database Systems, Kyoto, Japan, April, 1991.

Panel Member, "Does Loose Coupling Stand a Chance," International Conference on Data Engineering, Los Angeles, February 6-10, 1989.

Panel Organizer and Chairman, "Expert Database Systems," *Expert Systems in Government Conference*, Washington D.C., October 21, 1987.

Panel Member, "Experiences With Knowledgebases," *1987 SIGMOD International Conference on Management of Data*, San Francisco, California, May 28, 1987.

Panel Member, "Future Information Systems," *IFIP Congress 1986*, Dublin, Ireland, September 1-5, 1986.

Program Committee Member, *1988 IFIP Conference on the Role of Artificial Intelligence in Database Systems and Information Systems*, Canton, China, July 1988.

Program Committee Member, *1988 Avignon Workshop on Expert Systems and Their Applications*, Avignon, France, May 1987.

Program Committee Member, *1987 Avignon Workshop on Expert Systems and Their Applications*, Avignon, France, May 1987.

Program Committee Member, *1986 ACM SIGMOD International Conference on Management of Data.*, Washington, D.C., May 1986.

Program Chairman and organizer, *First International Workshop on Expert Database Systems*, October 24-27, 1984, Kiawah Island, South Carolina.

Panel Member, "Issues in New Technologies," *Conference on Information Systems*, Tucson AZ, December, 1984.

Program Committee Member, *1985 ACM SIGMOD International Conference on Management of Data*, Austin, Texas, May 1985.

Panel Organizer and Chairman, "Expert Database Systems - Report of the Workshop on Expert Database Systems," *1985 ACM SIGMOD International Conference on Management of Data*, Austin, Texas, May 1985.

Program Committee Member, *Eleventh Very Large Data Base Conference*, Stockholm, Sweden, September 1985.

Program Committee Member, *1984 ACM SIGMOD International Conference on Management of Data*, Boston, MA, May 1984.

Program Committee Member, *Eighth Very Large Data Base Conference*, Mexico City, Mexico, September, 1982.

Panel Organizer and Chairman, "The Data Dictionary - Database System Interface," *Eighth Very Large Data Base Conference*, Mexico City, Mexico, September, 1982.

Program Committee Member, *Second International Conference on Computer Science*, Santiago, Chile, August, 1982.

Working Group Leader for "Logical Design and Information Modeling," *Data Base Directions III Workshop*, sponsored by ACM and NBS, Fort Lauderdale, Florida, October 20-22, 1980. The final report appears in "Data Base Directions: Information Resource Management - Strategies and Tools," (A.H. Goldfine, editor), NBS Special Publication 500-92, September, 1982.

Program Committee Member, *Sixth Very Large Data Base Conference*, Rio de Janeiro, Brazil, 1979.

Panel Member for "The Future of Database Systems," *NYU Symposium on Database Design*, New York City, 1978.

Panel Member for "The Operating System - Database Management System Interface," *National Computer Conference*, New York City, 1978.

Panel Organizer for “Performance Modeling and Evaluation of Database Management Systems,” *National Computer Conference*, New York City, 1978.

### **8.3. Invited Presentations**

#### **General Invited Talks**

Keynote Speaker, “The Role of Context in Social Semantic Search and Decision Support”, Tools with AI Conference, Washington DC, November 4, 2013.

Keynote Speaker, “The Role of Context in Social Semantic Search and Decision Support”, Workshop on Analyzing Social Networks for Decision Support (MSNDS 2013) and Workshop on the Semantic and Dynamic Analysis of Information Networks (SDAIN 2013), co-located with the 2013 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2013), Niagara Falls, Canada, August 25-28, 2013.

Keynote Speaker, First International Workshop on Semantic Social Network Analysis and Design Workshop, Istanbul Turkey, August 26, 2012.

Invited Speaker, ICCBR 2007 - Seventh International Conference on Case Based Reasoning, Belfast, Northern Ireland, August 13-16, 2007.

Keynote Speaker, “Just-in-Time Knowledge Management,” 3rd Conference on Professional Knowledge Management, April 10-13, 2005, Kaiserslautern, Germany.

"A Service-oriented Knowledge Management Framework over Heterogeneous Sources," invited talk at NASA's Information Science and Technology Colloquium Series, Goddard Space Flight Center, Greenbelt MD, March 10, 2004

Keynote Speaker, “Knowledge Management in Heterogeneous Data Warehouse Environments,” Conference on Data Warehousing and Knowledge Discovery, Munich, Germany, September 6, 2001.

“Establishing Scientific Databases for Forensic Laboratories,” *International Symposium on Setting Quality Standards for the Forensic Science Community*, Sponsored by the Federal Bureau of Investigation, US Department of Justice, San Antonio, Texas, May 3-7, 1999.

#### **Invited Talks During JSPS Fellowship in Japan, February 27 to April 27, 1998**

“The Role of Intelligent Agents in Advanced Information Systems,” Kyushu University, Professor Setuo Arikawa (host), April 6, 1998.

“The Role of Intelligent Agents in Advanced Information Systems,” Hiroshima City University, Professors Matatoshi Arikawa and Shaoying Liu (hosts), April 7, 1998.

“The Role of Intelligent Agents in Advanced Information Systems,” Hiroshima University, Professor Tadao Ichikawa (host), April 8, 1998.

“The Engineering of Large-Scale Scientific Databases,” NARA Institute of Technology, Professors Syunsuke Uemura and Masatoshi Yoshikawa (hosts), April 14, 1998.

“The Role of Intelligent Agents in Advanced Information Systems,” Kyoto University, Professor Yahiko Kambayashi (host), April 17, 1998.

“The Role of Intelligent Agents in Advanced Information Systems,” Tsukuba University, Professor Hiroyuki Kitagawa (host), April 21, 1998.

### **General Invited Talks.**

“The Engineering of Large-Scale Scientific Databases,” Tokyo University, Professor Masaru Kitsuregawa (host), April 23, 1998.

“Knowledge Rovers: Configurable Agents to Support Enterprise Information Infrastructures,” Proceedings of the Data Mining Summit, Miller-Freeman Publishing Co., San Francisco, CA, February 21, 1997.

Kerschberg, L. (1997). Knowledge Rovers: Cooperative Intelligent Agent Support for Enterprise Information Architectures, International Workshop on Cooperative Information Agents, Kiel, Germany, February 26-28, 1997.

“Knowledge Rovers: Configurable Agents to Support Enterprise Information Infrastructures,” 1997 MITRE Software Engineering and Economics Conference, April 2-3, 1997.

Keynote Lecture, “The Role of Intelligent Agents in Advanced Information Systems” 15th British National Conference on Databases, BNCOD 15, London, July 7-9, 1997

Invited Talk, “Expert Database Support for Distributed Materials Properties Databases,” Workshop on Materials and Processes Research and the Information Highway, Sponsored by the National Materials Advisory Board, National Research Council, Stanford, University, April 12-13, 1996.

Invited Talk, “The Engineering of Large-Scale Data-Intensive Information Systems,” TRW, March 1996.

Invited Talk, “Architectures for Intelligent Information Systems,” TASC Technology Council, December 5, 1995.

Invited Talk, “The Engineering of Large-Scale Data-Intensive Information Systems,” Distinguished Speaker Series, Center for Applied Information Technology, NIST (National Institute for Standards and Technology), Gaithersburg, MD, April 21, 1995

Invited Talk, “The Engineering of Large-Scale Data-Intensive Information Systems,” Distinguished Lecture Series on Data-Intensive Systems, Data-Intensive Systems Research Center, Oregon Graduate Institute and Portland State University, Portland Oregon, March 10, 1995.

Invited Talk, “Distributed Heterogeneous Information Systems: Data Heterogeneity -- Research Issues and Solutions,” at the Defense Information Systems Agency Workshop on Heterogeneous Distributed Information Systems, 1993.

Invited Talk, “Information Integration and Interchange in the Modern Enterprise,” at the Data Administration Manager’s Association’s annual symposium, held May 17-18, 1994 at NIST.

Invited Lecture, “Multi-Paradigm Reasoning for Database Query Optimization,” *Conference on Artificial Intelligence and Symbolic Mathematical Computations*, Karlsruhe, Germany, August 3-6, 1992.

Invited Speaker, “Knowledge-Based Approach for Generating Target System Specifications from a Domain Model,” 25th Anniversary Celebration of the founding of the Computer Science Department, Pontifical Catholic University of Rio de Janeiro, Brazil, August 1992.

Inaugural Symposium Speaker, “A Multiparadigm Approach to Query Optimization using Structural, Behavioral and Historical Sources of Information,” Intelligent Systems Cluster of the University of North Dakota, Fargo, ND, March 1992.

Invited Symposium Speaker, “A Multiparadigm Approach to Query Optimization using Structural, Behavioral and Historical Sources of Information,” Computer Science Department, University of New Mexico, Albuquerque, NM, March 1992.

Invited Speaker, “Methodologies for Data/Knowledge/Information Engineering: Will the Twain Meet?,” *International Symposium on Methodologies for Intelligent Systems, ISMIS’91*, Charlotte, North Carolina, October, 1991.

“A Methodology for Building Expert Database Applications,” UMIACS Lecture Series on Modern Databases, March 25, 1988, University of Maryland, College Park.

Invited Seminar Speaker, “A Methodology for Building Expert Database Applications,” Artificial Intelligence Center, George Mason University, April, 1988.

Speaker and respondent, “The Role of Artificial Intelligence in Libraries,” *The Library Catalog: Bringing Order the Universe of Knowledge*, a symposium sponsored by the Gelman Library of George Washington University, September 23, 1987.

“Knowledge-Based Systems,” Distinguished Lecturer Series, Florida Atlantic University, Boca Raton, FL, June 20, 1985.

**Keynote Address**, “Expert Database Systems: Evolutionary and Revolutionary Approaches,” *Fifth International Workshop on Expert Systems and Their Applications*, Avignon, France, May 13-15, 1985.

“Building Expert Systems,” Distinguished Speaker Series, IBM Scientific Center, Brasilia, Brazil, March 11, 1985.

“Query Optimization in Distributed Relational Databases,” Invited Speaker, *1984 Colloquium Series on Distributed Processing*, Centre de Recherche Informatique de Montreal, McGill University, Montreal, Canada, March 9, 1984.

“Database Design,” Invited Tutorial Lecturer, *First International Conference on Computer Science*, Santiago, Chile, August 22-24, 1981.

“Update Semantics for the Functional Data Model,” Computer Science Seminar, Princeton University, Princeton, New Jersey, February 1981.

“A Taxonomy of Data Models,” *International Symposium on Methodologies for the Specification of Hardware and Software Systems*, Rio de Janeiro, July 1976.

“Synthetic English: A Query Language for the Functional Data Model,” Computer Science Seminar, University of California at Los Angeles, 1976.

“The Functional Data Model,” *Symposium on Computational Linguistics*, University of Campinas, Sao Paulo, Brazil, 1975.

## **9. Publications**

### **9.1. Patents**

L. Kerschberg, W. Kim, and A. Scime, “Personalizable semantic taxonomy-based search agent,” USA: Patent Number 7,117,207, George Mason Intellectual Properties, Inc. (Fairfax, VA), 2006.

L. Kerschberg, W. Kim, H. Jeong, Y.U. Song, “Case-Based Framework For Collaborative Semantic Search,” USA: Patent Number 8,386,485, George Mason Intellectual Properties, Inc. (Fairfax, VA), issued on February 26, 2013.

### **9.2. Books**

P. M. D. Gray, L. Kerschberg, P. King, and A. Poulouvassilis (Editors), “The Functional Approach to Data Management: Modeling, Analyzing, and Integrating Heterogeneous Data.” Heidelberg, Germany: Springer-Verlag, 2003.

L. Kerschberg and M. Kafatos (Editors), “International Conference on Scientific and Statistical Database Management.” George Mason University, Fairfax, VA: IEEE Computer Society, 18-20 July 2001, pp. 277.

M. Klusch and L. Kerschberg (Editors), “Cooperative Information Agents IV: The Future of Information Agents in Cyberspace, Fourth International Workshop,” in *Lecture Notes in Artificial Intelligence*, vol. 1860. Boston: Springer, 2000, pp. 283.

S. Jajodia and L. Kerschberg (Editors), “*Advanced Transaction Models and Architectures*,” Norwall, MA: Kluwer Academic Publishers, 1997.

*Expert Database Systems: Proceedings from the Second International Conference* (L. Kerschberg, editor), The Benjamin/Cummings Publishing Company, Menlo Park, CA, December 1988.

*Expert Database Systems: Proceedings from the First International Conference* (L. Kerschberg, editor), The Benjamin/Cummings Publishing Company, Menlo Park, CA, July 1987.

*Expert Database Systems: Proceedings from the First International Workshop*, (L. Kerschberg, editor), The Benjamin/Cummings Publishing Company, Menlo Park, CA, February 1986.

### **9.3. Chapters in Books**

L. Kerschberg, H. Jeong, Y.U. Song, W. Kim, A Case-Based Framework for Collaborative Semantic Search in Knowledge Sifter. 2007 International Conference on Case-Based Reasoning (ICCBR 2007), LNAI 4626, R.O. Weber and M.M. Richter (Eds.) Belfast, UK, August 13-16, 2007, pp. 16-30.

L. Kerschberg, M. Chowdhury, A. Damiano, H. Jeong, S. Mitchell, J. Si, and S. Smith, “Knowledge Sifter: Agent-Based Ontology-Driven Search over Heterogeneous Databases using Semantic Web Services,” in *Semantics for a Networked World, Semantics for the Grid Databases*, LNCS 3226, vol. 276-293, *Lecture Notes in Computer Science*, M. Bouzeghoub, C. Goble, V. Kashyap, and S. Spaccapietra, Eds., LNCS 3226 Paris, France: Springer, 2004, pp. 278-295.

- J. Yoon and L. Kerschberg, "A Functional Approach to XML-Based Dynamic Negotiation in E-Business," in *The Functional Approach to Data Management*, P. M. D. Gray, L. Kerschberg, P. King, and A. Poulouvasilis, Eds. Heidelberg: Springer, 2003, pp. 393-416.
- L. Kerschberg, W. Kim, and A. Scime, "A Semantic Taxonomy-Based Personalizable Meta-Search Agent," in *Innovative Concepts for Agent-Based Systems*, vol. LNAI 2564, *Lecture Notes in Artificial Intelligence*, W. Truszkowski, Ed. Heidelberg: Springer-Verlag, 2003, pp. 3-31.
- L. Kerschberg, "Functional Approach to in Internet-Based Applications: Enabling the Semantic Web, E-Business, Web Services and Agent-Based Knowledge Management," in *The Functional Approach to Data Management*, P. M. D. Gray, L. Kerschberg, P. King, and A. Poulouvasilis, Eds. Heidelberg: Springer, 2003, pp. 369-392.
- L. Kerschberg, "Knowledge Management in Heterogeneous Data Warehouse Environments," in *Third International Conference on Data Warehousing and Knowledge Discovery, DaWaK 2001, LNCS 2114*, Y. Kambayashi, W. Winiwarer, and M. Arikawa, Eds., 2114 ed. Munich, Germany: Springer-Verlag, 5-7 September 2001, pp. 1-10.
- Larry Kerschberg, "Knowledge Rovers: Cooperative Intelligent Agent Support for Enterprise Information Architectures," in *Cooperative Information Agents*, vol. 1202, *Lecture Notes in Artificial Intelligence*, P. Kandzia and M. Klusch, Eds. Berlin: Springer-Verlag, 1997, pp. 79-100.
- Larry Kerschberg, "The Role of Intelligent Agents in Advanced Information Systems," in *Advanced in Databases*, vol. 1271, *Lecture Notes in Computer Science*, C. Small, P. Douglas, R. Johnson, P. King, and N. Martin, Eds. London: Springer-Verlag, 1997, pp. 1-22.
- Jongpil Yoon and Larry Kerschberg, "Semantic Update Optimization in Active Databases," *Proceedings IFIP WG2.6 Working Conference on Database Semantics (DS-6)*, Chapman, Atlanta, 1995.
- Chris Bosch, Hassan Gomaa and Larry Kerschberg, "Design and Construction of a Software Engineering Environment: Experiences with Eiffel." In *Readings in Object-Oriented Systems and Applications*, (Rine, D. editor), IEEE Computer Society Press, 1995.
- Seligman, L. and Kerschberg, L. , "Federated Knowledge and Database Systems: A New Architecture for Integrating of AI and Database Systems," In *Advances in Databases and Artificial Intelligence, Vol. 1: The Landscape of Intelligence in Database and Information Systems* (L. Delcambre and F. Petry, editors). JAI Press (1995).
- Kaufman, K.A., Michalski, R.S. and Kerschberg, L., "Mining for Knowledge in Databases: Goals and General Description of the INLEN System," *Knowledge Discovery in Databases*, G. Piatetski-Shapiro and W.J. Frawley, (Eds.), AAAI Press / The MIT Press, Menlo Park, CA 1991.
- Kerschberg, L., Baum, R., and Hung, J., "KORTEX: An Expert Database System Shell for a Knowledge-based Entity Relationship Model," in *Entity- Relationship Approach to Database Design and Querying*, F.H. Lochovsky (Editor), North Holland, 1990, pp. 255-268.
- Kerschberg, L., "Expert Database Systems," *Concise Encyclopedia of Information Processing in Systems and Organizations*, Pergamon Press, England, 1989.
- Kerschberg, L., Foreword to the book, *Expert Database Systems*, edited by Keith Jeffries, 1991.

Potter, W.D. and Kerschberg, L., "The Knowledge/Data Model: An Integrated Approach to Modeling Knowledge and Data," in *Data and Knowledge (DS-2)*, (R.A. Meersman and A.C. Sernadas, editors), North Holland, 1988.

Kerschberg, L and Dickinson, J., "FINEX: A Personal Computer-Based Expert Support System for Financial Analysis, in *Management Expert Systems*, C. Ernst (editor), Addison-Wesley, Ltd., December, 1988.

Kerschberg, L and Dickinson, J., "Un système expert d'aide à l'analyse financière," in *Les Systemes Experts de Gestion: Banque, Finance, Marketing*, C Ernst (editor), Eyrolles, Paris, France, 1988.

### **Invited Papers**

L. Kerschberg, "The Role of Context in Social Semantic Search and Decision Making," *International Journal on Artificial Intelligence Tools*, 23 (6) 2014.

L. Kerschberg and Z.W. Ras, "Special Issue on future directions for Intelligent Information Systems, *Journal of Intelligent Information Systems*, 43 (3), pp. 409-410, 2014.

Peter M.D. Gray, Peter J.H. King and Larry Kerschberg, Foreword: Functional Approach to Intelligent Information Systems, *Journal of Intelligent Information Systems*, vol 12 issues 2/3, 1999.

L. Kerschberg, Foreword to the book, *Intelligent Information Agents*. (Matthias Klusch, editor), Springer-Verlag, ISBN 3-540-65112-8, March, 1999 (to appear).

I. Imam and L. Kerschberg, "Adaptive Intelligent Agents; Guest Editor Introduction," *Journal of Intelligent Information Systems*, vol. 9, pp. 211-214, 1997.

"Expert Database Systems," Guest Editor Introduction, *IEEE Expert*, Fall 1988.

"Expert Database Systems," *The Computer Bulletin*, The British Computer Society, June, 1987, pp.7-9.

### **9.4. Refereed Journal Publications**

S. Muthaiyah and L. Kerschberg, "Achieving interoperability in e-government services with two modes of semantic bridging: SRS and SWRL" *Journal of Theoretical and Applied Electronic Commerce Research (JTAER)*, 2008.

S. Muthaiyah and L. Kerschberg. "A Hybrid Ontology Mediation Approach for the Semantic Web." *International Journal of E-Business research* 4, no. 4 (2008): 79-91.

S. Muthaiyah and L. Kerschberg. "Virtual Organization Security Policies: An Ontology-Based Integration Approach." *Information System Frontiers* 9, no. 5 (2007): 505 - 514.

L. Kerschberg, H. Jeong, and W. Kim, "Emergent Semantics in Knowledge Sifter: An Evolutionary Search Agent based on Semantic Web Services," in *Journal of Data Semantics VI*, S. Spaccapietra, Ed.: Springer Berlin/Heidelberg, 2006, pp. 187-209.

R. Howard and L. Kerschberg, "A Framework for Dynamic Semantic Web Services Management," *International Journal of Cooperative Information Systems, Special Issue on Service Oriented Modeling*, vol. 13, 2004.

- W. Kim, L. Kerschberg, and A. Scime, "Learning for Automatic Personalization in a Semantic Taxonomy-Based Meta-Search Agent," *Electronic Commerce Research and Applications (ECRA)*, vol. 1, 2002.
- J. P. Yoon, V. Raghavan, V. Chakilam, and L. Kerschberg, "BitCube: A Three -Dimensional Bitmap Indexing for XML Documents," *Journal of Intelligent Information Systems*, vol. 17, pp. 241-254, 2001.
- L. Kerschberg and D. Weishar, "Conceptual Models and Architectures for Advanced Information Systems," *Applied Intelligence*, vol. 13, pp. 149-164, 2000.
- H. Gomaa, L. Kerschberg, V. Sugumaran, I. Tavakoli, and L. O'Hara, "A Knowledge-Based Software Environment for Reusable Software Requirements and Architectures," *Journal of Automated Software Engineering*, vol. 3, 1996.
- L. Seligman and L. Kerschberg, "A Mediator for Approximate Consistency: Supporting "Good Enough" Materialized Views," *Journal of Intelligent Information Systems*, vol. 8, pp. 203 - 225, 1997.
- H. Gomaa, D. Menascé, and L. Kerschberg, "A Software Architectural Design Method for Large-Scale Distributed Information Systems," *Journal of Distributed Systems Engineering*, 1996.
- Yoon, J.P. and Kerschberg, L., "A Framework for Knowledge Discovery and Evolution in Databases," *IEEE Transactions on Knowledge and Data Engineering*, 5(6), December 1993.
- Seligman, L. and Kerschberg, L. "An Active Database Approach to Consistency Management in Heterogeneous Data- and Knowledge-based Systems," *International Journal of Cooperative and Intelligent Systems*, 2(2), October, 1993.
- Kerschberg, L., Baum, R., Waisanen, A., Yoon, J., Huang, I., "A Taxonomy of Knowledge-Based Approaches to Fault Management for Telecommunications Networks," *Journal of Computers and Electrical Engineering*, 1993.
- Michalski, R.S., Kerschberg, L., Kaufman, K. and Ribeiro, J., "Mining for Knowledge in Databases: The INLEN Architecture, Initial Implementation and First Results" *International Journal of Intelligent Information Systems*, Kluwer Academic Publishers, August 1992.
- Gomaa, H., Kerschberg, L. and Sugumaran, V., "Knowledge-Based Approach to Domain Modeling: Application to NASA's Payload Operations Control Centers," *Telematics and Informatics*, Vol 9, Nos 3/4, Pergamon Press, pp. 281-296, 1992.
- Kerschberg, L., "Expert Database Systems: Knowledge/Data Management Environments for Intelligent Information Systems," *Information Systems*, Vol. 15, No. 1, Pergamon Press, 1990, pp. 151-160.
- Weitzel, J.R. and Kerschberg, L., "Developing Knowledge-Based Systems: Re-organizing the System Development Life Cycle," *Communications of the ACM*, Vol. 32, No. 4, April 1989.
- Weitzel, J.R. and Kerschberg, L., "A System Development Methodology for Knowledge-Based Systems, Special Issue on Knowledge Engineering," *IEEE Systems, Man, and Cybernetics*, Vol 19, No. 3, May/June 1989.

Sen, A., and Kerschberg, L., "Enterprise Modeling for Database Specification and Design," *Data and Knowledge Engineering*, Number 2, 1987.

Navathe, S., and Kerschberg, L., "The Role of Data Dictionary Systems in Logical Database Design," *Information and Management*, Vol. 10, No. 1, January 1986.

Powers, G., Kerschberg, L., and Marchand, D.A., "Internal Corporate Videotex Systems," *Spectrum*, Society for Information Management, Chicago, Illinois, November, 1985.

Kerschberg, L., Ting, P.D., and Yao, S.B., "Query Optimization in Star Computer Networks," *ACM Transactions on Database Systems*, December, 1982.

## 9.5. Refereed Conference Proceedings

J. McDowall and L. Kerschberg, "Ontology application to the problem of maritime traffic analysis and understanding," *Ontological Approaches to Sensor Data Analysis Conference*, Buffalo NY, May 19-20, 2016.

J. McDowall, A. Brodsky and L. Kerschberg, "A Formal Model for Optimizing Dynamic Service Composition," *14<sup>th</sup> INFORMS Computing Society Conference*, Richmond, Virginia, January 11-13, 2015, pp. 149-160.

J. McDowall and L. Kerschberg, "Leveraging Social Networks to Improve Service Selection in Workflow Composition," *Int. Conf. on Advances in Social Networks Analysis and Mining, ASONAM 2012*, IEEE Computer Society, August 26, 2012, pp. 1278-1283, Istanbul Turkey.

J. McDowall and L. Kerschberg, "Agent Negotiation Strategies for Composing Service Workflows," *Workshop on Data-Driven Decision Support and Guidance Systems (DGSS)*, 28<sup>th</sup> IEEE International Conference on Data Engineering, Arlington, VA, April 1, 2012.

J. McDowall and L. Kerschberg, "Optimizing Service Selection in Dynamic Workflow Composition: Using Social Media to Develop Recommendations," *2012 Annual SRII Global Conference*, San Jose, CA, USA, July 24-27, 2012, pp. 535-543

T. Morrell and L. Kerschberg, "Personal Health Explorer: A Semantic Health Recommendation System," *Workshop on Data-Driven Decision Support and Guidance Systems (DGSS)*, 28<sup>th</sup> IEEE International Conference on Data Engineering, Arlington, VA, April 1, 2012.

M. Omar Nachawati, Rasheed Rabbi, Genong (Eugene) Yu, Larry Kerschberg and Alexander Brodsky, "Social Sifter: An Agent-Based Recommender System to Mine the Social Web," *STIDS 2012: Proceedings of the Seventh International Conference on Semantic Technologies for Intelligence, Defense, and Security*, Fairfax, VA, USA, October 23-26, 2012, pp 125-128.

M. Awad and L. Kerschberg, "Patient-Centric Secure-and-Privacy-Preserving Service-Oriented Architecture for Health Information Integration and Exchange," *STIDS 2010 – Semantic Technology for Intelligence, Defense and Security*, George Mason University, October 22, 2010.

J. McDowall and L. Kerschberg, "A Multi-Agent Approach for Generating Ontologies and Composing Services in Executable Workflows," *EDBT/ICDT Workshops*, ACM Press, March 22, 2010.

S. Muthaiyah, M. Barbulescu, and L. Kerschberg. "Managing an Evolving Shared Knowledge Repository: The Upgrade Process Via Semantic Mediation." Paper presented at the 4th International Conference on Computer Science and Information Systems (ICCSIS), Athens, Greece, 2008.

S. Muthaiyah, M. Barbulescu, and L. Kerschberg. "A Hybrid Similarity Matching Algorithm for Mapping and Upgrading Ontologies Via a Multi-Agent System." Paper presented at the 12th WSEAS International Conference on Computers, Heraklion, Crete Island, Greece, 2008.

S. Muthaiyah, M. Barbulescu, and L. Kerschberg. "A Semantic Bridging Framework for Developing a Consistent Knowledge Model Across Enterprises Using SRS and SWRL." Paper to be presented at the Hawaii International Conference on System Sciences (HICSS), 2009.

- G. Emami, J. Cheng, D. Cornwell, M. Feldhousen, C. Long, V. Malhotra, I. Starnes, L. Kerschberg, A. Brodsky, X. Zhang: "ACTIVE: agile coordinator testbed integrated virtual environment", International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS 2006) pp. 1580-1587.
- S. Muthaiyah and L. Kerschberg. "Virtual Organization Security Policies: An Ontology-Based Mapping and Integration Approach." Paper presented at the Second Secure Knowledge Management Workshop (SKM) 2006.
- S. Muthaiyah and L. Kerschberg. "Dynamic Integration and Semantic Security Policy Ontology Mapping for Semantic Web Services (SWS)." Paper presented at the First International Conference on Digital Information Management (ICDIM'06), Bangalore, India, 2006, pp. 116-120.
- R. Morikawa and L. Kerschberg, "MAKO-PM: Just-in-Time Process Model," presented at Professional Knowledge Management: Workshop on Information Just-in-Time, Kaiserslautern, Germany, 2005.
- L. Kerschberg and H. Jeong, "Just-in-Time Knowledge Management," presented at Third Conference on Professional Knowledge Management, Kaiserslautern, Germany, 2005.
- L. Kerschberg and H. Jeong, "Ubiquitous Data Management in Knowledge Sifter via Data-DNA," presented at Workshop on Ubiquitous Data Management, Tokyo, Japan, 2005.
- J. Cheng, R. Emami, L. Kerschberg, E. Santos, Jr., Q. Zhao, H. Nguyen, H. Wang, M. Huhns, M. Valtorta, J. Dang, H. Goradia, J. Huang, and S. Xi, "OmniSeer: A Cognitive Framework for User Modeling, Reuse of Prior and Tacit Knowledge, and Collaborative Knowledge Services," presented at Hawaii International Conference on Systems Science (HICSS-38), Island of Hawaii, 2005.
- L. Kerschberg, M. Chowdhury, A. Damiano, H. Jeong, S. Mitchell, J. Si, and S. Smith, "Knowledge Sifter: Ontology-Driven Search over Heterogeneous Databases," presented at SSDBM 2004, International Conference on Scientific and Statistical Database Management, Santorini Island, Greece, 2004.
- R. Morikawa and L. Kerschberg, "MAKO: Multi-Ontology Analytical Knowledge Organization based on Topic Maps," presented at Fifth International Workshop on Theory and Applications of Knowledge Management, Zaragoza, Spain, 2004.
- R. Howard and L. Kerschberg, "A Knowledge-based Framework for Dynamic Semantic Web Services Brokering and Management," presented at International Workshop on Web Semantics - WebS 2004, Zaragoza, Spain, 2004.
- R. Howard and L. Kerschberg, "Brokering Semantic Web Services via Intelligent Middleware Agents within a Knowledge-Based Framework," presented at Intelligent Agent Technology (IAT 2004), Beijing, China, 2004.
- R. Howard and L. Kerschberg, "Using Facets of Security within a Knowledge-based Framework to Broker and Manage Semantic Web Services," presented at Workshop on Secure Knowledge Management (SKM 2004), Amherst, New York, 2004.

- R. Howard and L. Kerschberg, "Dynamically Managing the Delivery of Web Services via Workflow and Feedback," presented at International Conference on Information Systems, Workshop on E-Business (Web2004), Washington, DC, 2004.
- L. Kerschberg, W. Kim, and A. Scime, "Intelligent Web Search via Personalizable Meta-Search Agents," presented at International Conference on Ontologies, Databases and Applications of Semantics (ODBASE 2002), Irvine, CA, 2002.
- W. Kim, L. Kerschberg, and A. Scime, "Personalization in a Semantic Taxonomy-based Meta-Search Engine," presented at International Conference on Electronic Commerce, Vienna, Austria, October 2001.
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- J. P. Yoon and L. Kerschberg, "An Aggressive Aggregation of XML Documents for Summary Data Generation," presented at Fifth World Multi-Conference on Systemics, Cybernetics and Informatics, SCI 2001, Orlando, Florida, 22-25 July 2001.
- L. Kerschberg, W. Kim, and A. Scime, "WebSifter II: A Personalizable Meta-Search Agent Based on Semantic Weighted Taxonomy Tree," *The 2001 International Conference on Internet Computing*, IC 2001, Las Vegas, Nevada, 25-28 June 2001.
- A. Scime and L. Kerschberg, "WebSifter: An Ontological Web-Mining Agent for E-Business," *Proceedings of the 9th IFIP 2.6 Working Conference on Database Semantics (DS-9): Semantic Issues in e-Commerce Systems*, Hong Kong, 25-28 April 2001.
- A. Scime and L. Kerschberg, "WebSifter: An Ontology-Based Personalizable Search Agent for the Web," *2000 Kyoto International Conference on Digital Libraries: Research and Practice*, Kyoto University, 13-16 November 2000.
- H. Gomaa, L. Kerschberg, and G. K. Farrukh, "Domain Modeling of Software Process Models," presented at *IEEE International Conference on Engineering of Complex Computer Systems*, Tokyo, Japan, 11-14 September 2000.
- L. Kerschberg and S. Banerjee, "An Agency-based Framework for Electronic Business," in *Cooperative Information Agents III*, vol. 1652, *Lecture Notes in Artificial Intelligence*, M. Klusch, O. Shehory, and G. Weiss, Eds. Berlin, et al.: Springer-Verlag, 1999, pp. 254-279.
- A. Brodsky, L. Kerschberg, and S. Varas, "Resource Management in Agent-based Distributed Environments," in *Cooperative Information Agents III*, vol. 1652, *Lecture Notes in Artificial Intelligence*, M. Klusch, O. Shehory, and G. Weiss, Eds. Berlin, et al.: Springer-Verlag, 1999, pp. 50-74.
- Jongpil Yoon and Larry Kerschberg, "Query-Initiated Discovery of Interesting Association Rules," *International Conference on Discovery Science*, Fukuoka, Japan, December 14-16, 1998.
- Seok-Won Lee and Larry Kerschberg, "A Methodology and Life Cycle Model for Data Mining and Knowledge Discovery in Precision Agriculture," *Proceedings of the IEEE International Conference on Systems, Man and Cybernetics (SMC '98)*, San Diego CA, October 1998.

- B. Zeeberg, K. Wantanabe, S. Goto, R. Overbeek, L. Kerschberg, and G. Michaels, "Metabolic Pathway Interface to Molecular Biology Databases," ,” *International Conference on Statistical and Scientific Database Management*, Isle of Capri, Italy, 1998.
- J. Ribeiro, K. Kaufman, and L. Kerschberg, "Knowledge Discovery in Multiple Databases," Proceedings First International Conference on Knowledge Discovery and Data Mining, Montreal, CA, 1995.
- J. Ribeiro, K. Kaufman, and L. Kerschberg, "Knowledge Discovery in Multiple Databases," presented at ISMM International Conference on Intelligent Information Management Systems, Washington D.C., 1995.
- L. J. Milask, T. Guynup, C. Hammel, L. Kerschberg, and G. Michaels, "An Integrated Scientific Database System and Value-Added Support Center: Application to Ecological Research of the Forest Canopy and Biosphere Interface," *International Conference on Statistical and Scientific Database Management*, SSDBM, Olympia, WA, 1997.
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- Menascé, D., H. Gomaa, and L. Kerschberg, "A Performance-Oriented Design Methodology for Large-Scale Distributed Data Intensive Information Systems," *Proc. First IEEE International Conference on Engineering of Complex Computer Systems*, November 7-10, 1995, Fort Lauderdale, FL (Outstanding Paper Award in Systems Engineering Track).
- Gomaa, H. and Kerschberg, L., "Domain Modeling for Software Reuse and Evolution." *Proc. Computer Assisted Software Engineering Workshop (CASE 95)*, Toronto, July 1995.
- Yoon, J.P. and Kerschberg, L. "Semantic Update Optimization in Active Databases," *Proceedings IFIP DS-6 Conference*, Atlanta, Georgia, May 1995.
- Hassan Gomaa, Larry Kerschberg, Vijay Sugumaran, Chris Bosch, Iraj Tavakoli, "A Prototype Domain Modeling Environment for Reusable Software Architectures." *IEEE International Conference on Software Reuse*, Rio de Janeiro, Brazil, November 1994.
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- Seligman, L., and Kerschberg, L., "Knowledge-base/Database Consistency in a Federated Multidatabase Environment," *IEEE RIDE-IMS '93 Workshop*, Vienna, Austria, April 1993.
- Seligman, L., and Kerschberg, L., "Approximate Knowledge-base/Database Consistency: An Active Database Approach," *Proceedings of the ISMM International Conference on Information and Knowledge Management*, Baltimore, MD, November 1992.

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- Gomaa, H., Kerschberg, L. and V. Sugumaran, "A Knowledge-Based Approach to Generating Target Systems Specifications from a Domain Model," in Algorithms, Software, Architecture, J. van Leeuwen (Editor), *Information Processing 92*, Volume I, Elsevier Science Publishers, Amsterdam, September 1992.
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- Gomaa H and L. Kerschberg , "An Evolutionary Domain Life Cycle for Domain Modeling and Target System Generation", *Proc. Workshop on Domain Modeling for Software Engineering*, International Conference on Software Engineering, Austin, Texas, May 1991.
- Kaufman, K., Michalski, R.S. and Kerschberg, L., "An Architecture for Integrating Machine Learning and Discovery Programs into a Data Analysis System," *Proceedings of the AAAI-91 Workshop on Knowledge Discovery in Databases*, July 1991.
- Sugumaran, V., Gomaa, H., and Kerschberg, L., "Generating Target System Specifications from a Domain Model Using CLIPS," *Proc. of Second Annual Clips Conference*, Houston, TX., September 1991
- Kaufman, K., Michalski, R.S. and Kerschberg, L., "Knowledge Extraction from Databases: Design Principles of the INLEN System," *Proceedings of the Sixth International Symposium on Methodologies for Intelligent Systems (ISMIS'91)*, October 1991.
- Kerschberg, L., Baum, R., et al., "A Taxonomy of Knowledge-Based Approaches to Fault Management for Telecommunications Networks," *IEEE Conference on Systems, Man and Cybernetics*, Charlottesville, VA, October 1991.
- Gomaa, H., Kerschberg, L., Bosch, C., Sugumaran, V., and Tavakoli, I. "A Prototype Software Engineering Environment for Domain Modeling and Reuse," *Proc. Fourth Annual Workshop on Methods and Tools for Reuse*. Herndon, VA., November 1991.
- Gomaa, H., Kerschberg, L., et al., "A Prototype Software Engineering Environment for Domain Modeling and Reuse," *NASA/Goddard Sixteenth Annual Software Engineering Workshop*, December 1991.
- Weishar, D. and Kerschberg, L., "Data/Knowledge Packets as a Means of Supporting Semantic Heterogeneity in Multidatabase Systems," *ACM SIGMOD Record*, December 1991.
- Kerschberg, L., Baum, R., DeJong, K., Waisanen, A., Yoon, J., Huang, I., "Intelligent Network Management: A Heterogeneous Knowledge Source Approach," *IEEE Conference on Systems, Man and Cybernetics*, Los Angeles, CA, October 1990.
- Kerschberg, L., Baum, R., DeJong, K., Waisanen, A., Yoon, J., Huang, I., Eisgruber, K, Utz, B., "Knowledge and Data Engineering of a Telecommunications Network," *1990 Entity-Relationship Conference*, Lausanne, Switzerland, 1990.

Gomaa H, R. Fairley and L. Kerschberg, "Towards an Evolutionary Domain Life Cycle Model", *Proc. Workshop on Domain Modeling for Software Engineering*, at OOPSLA 89, New Orleans, October 1989.

Shepherd, A. and Kerschberg, L., "Constraint Management in Expert Database Systems," *Expert Database Systems: Proceedings from the First International Workshop*, (L. Kerschberg, editor), The Benjamin/Cummings Publishing Co., Menlo Park, CA, 1986.

Muthuswamy, B. and Kerschberg, L., "A Detailed Database Statistics Model for Relational Query Optimization," *1985 ACM Annual Conference*, Denver, CO, October 14-16, 1985.

Kerschberg, L. and Dickinson, J., "FINEX: An Expert Support System for Financial Analysis," *Fifth International Workshop on Expert Systems and Their Applications*, Avignon, France, May 13-15, 1985.

Shepherd, A. and Kerschberg, L., "PRISM: A Knowledge-Based Approach to Semantic Integrity Specification and Enforcement in Database Systems," *Proceedings ACM SIGMOD International Conference on Management of Data*, Boston, MA, June 18-21, 1984.

Kerschberg, L., Marchand, D.A., and Sen, A., "Information System Integration: A Metadata Management Approach," *Proceedings International Conference on Information Systems*, Houston, Texas, December 15-17, 1983.

Hsu, P.L., and Kerschberg, L., "The Role of Personal Information Systems in Office Information Systems," *Proceedings 1983 American Institute of Decision Sciences Conference*, San Antonio, Texas, November, 1983.

Trueblood, R.P., Lin, T.Y., and Kerschberg, L., "Analyzing Computer Security Using Petri Net Theory," *Proc. Second International Conference on Computer Science*, Santiago, Chile, August, 1982.

Kerschberg, L. P.D. Ting, S.B. Yao, "Query Optimization in Star Computer Networks," *ACM Transactions on Database Systems*, Vol. 7, No. 4, pp. 678-711, 1982.

Sibley, E.H., and Kerschberg, L., "Data Architecture and Data Model Considerations," *Proc. NCC*, AFIPS Press, Dallas, Texas, pp. 85-96, 1977.

This paper was included in the tutorial volume, *Data Management in the 1980's*, (Larson and Freeman, editors) IEEE Computer Society, 1983.

Furtado, A.L., and Kerschberg, L., "An Algebra of Quotient Relations," *Proceedings of the International Conference of Management of Data (SIGMOD)*, Toronto, June 1-8, 1977.

Kerschberg, L., Ozkarahan, E.A., and Pacheco, J.E.S., "A Synthetic English Query Language for a Relational Associative Processor," *Proc. Second International Conference on Software Engineering*, San Francisco, Calif., pp. 505-519, October 1976.

Kerschberg, L., Klug, A., and Tsichritzis, D., "A Taxonomy of Data Models," in *Systems for Large Data Bases*, Proceedings of the Conference on Very Large Data Bases, Brussels, Belgium, 1976, P. C. Lockemann and E. J. Neuhold, editors, North-Holland Publishing Co., Amsterdam, pp. 44-64, 1976.

Kerschberg, L., "The Characteristic Polynomial of Graph Products," *Proc. Seventh Asilomar Conference of Circuits, Systems, and Computers*, Pacific Grove, CA, November 1973.

Skandera, R., and Kerschberg, L., "Urban Traffic Under Computer Control," *Journal of Public Administration*, Getulio Vargas Foundation, Rio de Janeiro, June 1972.

Kerschberg, L., "Multilinear Systems: Theory and Applications," *Proc. First Iberian-American Conference on Informatics*, Buenos Aires, Argentina, 1972.

Saboia, J., and Kerschberg, L., "A Method for Canonically Decoupling Multivariable Linear Systems," *Proc. IEEE Conf. on Computers, Systems, and Networks*, Oaxtepec, Mexico, 1971.

Veloso, P.A.S., and Kerschberg, L., "A Decomposition for a Class of Multilinear Systems," *Proc. IEEE Conf. on Computers, Systems, and Networks*, Oaxtepec, Mexico, 1971.

Kerschberg, L., and Happ, W.W., "Eigenfunction Propagation in Interconnected Systems," *Proc. Allerton Conf. on Circuit and System Theory*, Allerton, Illinois, 1970.

## **10. Research Supervision**

### **10.1. Ph.D. Students**

#### **George Mason University**

Below are the names and dissertation topics of students I have directed.

Anthony Waisanen, “An Approach to Query Processing by Integrating Historical, Structural, and Behavioral Sources of Information” Defended March 18, 1992, at Shaw Air Force Base.

Vijayan Sugumaran, “A Knowledge-Based Approach for Generating Target System Specifications from a Domain Model,” Defended March 9, 1993, now Professor of Management Information Systems, Oakland University, Rochester Michigan.

Jongpil Yoon, “Constraint Management in Active Database Systems,” Defended Spring 1993, now at Mercer College, NY.

Doyle Weishar, “A Knowledge Based Architecture for Query Formulation and Processing in Federated Heterogeneous Databases,” Defended Spring 1994, now at i\_SW Corporation.

Leonard Seligman, “A Mediated Approach to Consistency Management among Distributed, Heterogeneous Information Systems,” Defended Fall 1994, Lead Scientist at the MITRE Corporation.

Richard Bechtold, “Model-Compliant Process Engineering using Knowledge Repositories,” Defended Fall, 1995, now Instructor, ISE Department, George Mason University.

Wiput Phijaisanit, “Dynamic Meta-Data Support for Information Integration and Sharing Across Heterogeneous Databases,” Defended 1997, now in private enterprise in Thailand.

Anthony Scime, “Taxonomic Information Retrieval (TAXIR) from the World Wide Web: Site Ranking Based on User Preferences,” Defended Spring 1997, Assistant Professor, SUNY-Brockport.

Stanley Wozniak, “Knowledge Evolution in Active Database Systems via Fuzzy Constraint Management,” Defended May 1998 and currently employed at The Analytical Sciences Corporation (TASC).

Samuel Varas, (Co-director Dr. Alexander Brodsky) “On Optimal Constraint Decomposition, Monitoring, and Management in Distributed Environments”, July 28, 1998, at the Catholic University, Santiago, Chile.

Willa Pickering, “Assessing the Role and Conduct of Online Collaborative Projects in E-Learning”, July 24, 2003, now at Lockheed Martin Corporation.

Riki Morikawa, A Framework for an Advanced XML Topic Map Knowledge Base, July 26, 2004, now at Research Division, Central Intelligence Agency.

Randy Howard, “A Knowledge Based Framework for Dynamic Semantic Web Services within Virtual Organizations”, October 31, 2004, now Director of Semantic Technologies, at SRA Corporation.

Saravanan Muthaiyah, “A Framework and Methodology for Ontology Mediation through Semantic and Syntactic Mapping” March 19, 2008, now at Multimedia University, Kuala Lumpur, Malaysia. <http://hdl.handle.net/1920/3070>

Hanjo Jeong, “Hybrid filtering in Semantic Query Processing” December 10, 2010, now at LG Group Research Labs, Seoul, Korea.

John McDowall, “Methods and Models to Enable Optimal Automated Service Composition” December 18, 2014. (Co-directed with Dr. Alexander Brodsky).

### **University of South Carolina**

Mr. Balakrishnan Muthuswamy, “A Detailed Database Statistics Model for Relational Query Optimization,” Defended December, 1984.

## **10.2. M.Sc. Students**

### **University of South Carolina**

Mr. Ju-Hung Hung (Computer Science), “KORTEX: A Methodology for Data and Knowledge Modeling,” Defended March, 1987.

Mr. Hao Kuo (Computer Science), “MEDCLAIM: An Expert Support System for Medical Claims Review,” Defended August 8, 1986.

Mr. Tim Ammons, “XPC -- A Personal Computer Diagnostic Advisor,” Defended July 10, 1986.

Mr. Walter Johnstone, “An Expert Loan Advisor,” Defended, July 11, 1986.

Ms. Jane Thesing, “Information Retrieval and the User Interface in Videotex Home Information Systems: A System Review Approach,” Defended July, 1985.

Mr. Wuu-Yueh Tasy, “A PROLOG-Based Expert Database System that Supports the Relational Data Model,” Defended May, 1984.

Mr. George Powers, “A South Carolina Information Resource Strategy: A Videotex Network to Enhance Economic and Business Development,” Defended April, 1984.

Mr. Allan Shepherd (Computer Science), “PRISM: A Constraint-Based Prototyping Information Systems Manager,” Defended December, 1983, at Hewlett-Packard, Palo Alto, CA.

## **11. Administrative and Committee Duties**

### **Community at Large**

Panel Member for National Science Foundation’s EFRI SEED Full Program, whose theme was Green Building Research, May 26-28, 2010.

Panel Member for NSF’s IGERT Interdisciplinary Research Program, September 10-11, 1998.

Member, ACM SIGMOD Advisory Panel, 1993 - 1998

Review Panel Member, "Networks and Database Research Programs," Rome Laboratory, US Air Force, Rome NY, October 1993.

Review Panel Member, Artificial Intelligence Doctoral Program Proposal, University of Georgia, Athens, Georgia, October 1993.

Review Panel Member, National Science Foundation, Presidential Young Investigators Awards, 1992.

### **George Mason University**

#### September 2015 – Present

Member of the GMU Faculty Senate

#### September 2014 – Present

Faculty Representative to the Research Committee of the Board of Visitors of George Mason University.

#### October 2009 – December 2009

Chair, Reappointment Committee for the Chair of the Systems Engineering Department, Volgenau School of IT & Engineering.

#### January 2008 – July 2009

Associate Chair for Graduate Studies, Computer Science Department. My responsibilities as Associate Chair for Graduate Studies cover for all aspects of graduate studies in the department. I also am responsible for course scheduling, the CS portion of the Graduate Catalog, the *Computing News* Newsletter, and to advise the Chair on strategic matters.

#### December 2007 – April 2008

Member, Resource Allocation Committee. The Dean invited this committee to review the allocation of resources within the Volgenau School. The initial premise was that the allocations were FTE-based, but we learned otherwise. We met seven times to review various aspects of the budget, and presented our findings in a PowerPoint presentation to the Dean on April 14, 2008. The direct result of our recommendations has implications for all Departments, which now have a budget. There is also more "transparency" in the allocation of resources within the Volgenau School

#### August 2006 – May 2007

University Committee on Research Misconduct. This committee is writing the policy for research misconduct for federally-funded research at George Mason University.

#### August 2005 - Present

Director, E-Center for E-Business, <http://eceb.gmu.edu/>

Director, MS in E-Commerce Program, <http://ite.gmu.edu/msecomm/>

#### June 2001 – August 2005

Co-Director, E-Center for E-Business, George Mason University, <http://eceb.gmu.edu/>.

ISE Departmental Administrative Council, assisting the Chair in strategic planning and performance evaluation.

June 1999 – Present

PhD. Coordinator for INFT Program, Department of Information and Software Engineering.

June 1989 - June 1997

Chairman, Department of Information and Software Systems Engineering, School of Information Technology and Engineering, George Mason University.

September 1996 - 1998

GMU Federal Relations Committee

September 1992 - Present

Member of Core Faculty and Executive Committee, School of Computational Sciences and Informatics (CSI).

May 1994 - 2001

Director, Center for Information Systems Integration and Evolution, School of Information Technology and Engineering, George Mason University.

January 1995 - Present

Chairman, Research Policy Committee, Institute for Computational Sciences and Informatics.

February 1989 - April 1989

Member, Search Committee, Graduate Dean position.

March 1988 - June 1988

Member of the Instructional Methods Planning Group for the Prince William Center for Higher Education. This planning group was set up by the Office of the President at George Mason University. The Prince William Institute is now in operation.

June, 1987 - May, 1990:

Member, Advisory Committee, Washington Research Library Consortium.

September 1987 - June, 1989:

Tenure and Promotion Committee, School of Information Technology and Engineering, George Mason University.

September 1986 - August 1987:

Committee on Committees, School of Information Technology and Engineering, George Mason University.

**University of South Carolina**

August 1983 - May 1986:

Faculty Senate

April 1984 - January 1985:

Management Science representative for the IBM Proposal writing committee on “Teaching and Research in the Management of Information Systems.”

The College of Business Administration was awarded a Planning Grant of \$12,000 from IBM based on a pre-proposal that was submitted. However, the College was not one of the thirteen schools (of the 250 that applied) awarded a final grant.

September 1983 - May 1984:

Coordinator of the Management Science Colloquium Series (weekly).

September 1982 - May 1983:

Committee on Ethics of Research Involving Human Subjects