

**Fadi Antoun Karaa, Ph.D., MBA** NJIT, University Heights, 274 Colton Hall Newark, NJ 07102  
**Associate Professor of Critical Infrastructure**  
**Principal Investigator, Flood Mitigation Engineering Resource Center Project**  
**Graduate Program Director, Critical Infrastructure Systems**  
**Graduate Advisor, BS/MBA Program**  
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Fadi A. Karaa, Ph.D. is an expert in enterprise management and business intelligence systems, critical infrastructure systems, infrastructure performance and risk analysis, water resource systems and construction management, with emphasis on computer-based simulation and analytical applications. He is an Associate Professor in the Department of Civil and Environmental Engineering and the Director and founder of the Critical Infrastructure Systems multi-disciplinary graduate program. His expertise and research focus is in decision support systems, critical infrastructure systems lifecycle, resilience and security management systems, utility infrastructure integrated models and strategies, and large-scale project management and construction management systems.

Dr. Karaa has led a range of research and development projects and developed several management systems sponsored by the University Transportation Research Center, the New Jersey Department of Environmental Protection, the New Jersey Department of Transportation, the US Army Corps of Engineers Construction Engineering Research Laboratory, the Massachusetts Water Resources Authority, the Massachusetts Department of Transportation and the National Science Foundation on decision support and expert systems for capital improvement planning, large-scale program planning and scheduling systems, integrated risk and resilience modeling for combined cost-effective multi-hazard flood protection and mitigation strategies, and underground infrastructure asset management, performance and condition assessment, predictive modeling and risk assessment.

Under the sponsorship of federal and state agencies, he undertook the multi-criteria evaluation and lifecycle analysis of two of the largest pipeline projects in the Greater Boston Area, and developed decision support systems for capital improvement planning and maintenance management of key underground infrastructure network projects for the US Army Corps of Engineers, and water and wastewater agencies and municipalities. He managed the requirements analysis, design and development of a permitting management system integrated with the master planning system for the Central Artery project, developed a database of a worldwide Army Installation inventory of water supply chain facilities and a compliance management system for water treatment planning and budgeting. He also developed a hierarchical asset connectivity model and management system for Intelligent Transportation systems fiber-optic communication networks. He led a post-Sandy large multi-disciplinary team in the development of multi-tiered structural and non-structural flood protection strategies for the Hackensack/Meadowlands area.

His current research includes the design and development of sustainable resilient large-scale infrastructure systems integrating lifecycle and security management systems with a focus on coastal and flood-prone areas, regional and urban infrastructure and dam systems.

Dr. Karaa has developed and taught graduate and undergraduate courses at NJIT, Northeastern University, MIT and Tufts University covering performance, security and risk analysis of infrastructure systems, construction management, and project evaluation, financing and controls. He has authored and co-authored papers in key Journals such as ASCE Journals of Pipeline Systems, Water Resources Planning and management, Professional Issues in Engineering, Management in Engineering, Performance of Constructed Facilities, Construction Engineering and Management, the Journal of Applied Mathematics and computation, and other project management and professional journals.

His past experiences in industrial management and systems consulting include serving as Vice President for Oracle Corporation, where he led the Northeast Consulting group and a national data warehousing practice for the Industrial Sector, designing and implementing enterprise solutions for Fortune 100 companies across a number of sectors. He led the development of a strategic sourcing enterprise management and decision support system. He undertook several capacity building assignments for large corporations and international agencies. He was the keynote Speaker for major events such as the Construction Roundtable of NJ in 2007 and the 2nd Annual Electronic Commerce Conference in 2000.

Dr. Karaa received his PhD in Civil Engineering (Water Resource Systems), MS in Management (Finance and MIS) and MS in Civil Engineering Systems all from MIT; he was awarded an Engineer Diploma from Ecole Polytechnique, Paris. He was awarded the Excellence in Teaching Awards at the College of Engineering and the overall university levels. He was also the recipient of the Arthur T. Ippen Award, from MIT and the Boston Society of Civil Engineers President's Appreciation Award.

## **SUMMARY OF APPOINTMENTS**

**New Jersey Institute of Technology**, Associate Professor, 2006 - current.

**MIM**, Academic Dean, 2006-2008.

**PDA**, Principal, 1988-1995, and 2002 - 2006

**Zero Stage Capital**, Venture Advisor, 2003 – 2005

**Oracle Corporation**, Vice President, Northeast Consulting, National Data Warehousing and Exchange Solutions, and Strategic Accounts, 1998 – 2002

**Oracle Corporation**, Senior Practice Director, Enterprise Solutions, 1995 – 1998

**Strategic Systems Group**, Management Consultant, 1995

**Information Resources**, Director and Vice President, 1991 - 1995

**Northeastern University**, Assistant Professor and Director, Construction Management Graduate Program, 1984 – 1991.

## **EDUCATION**

B.Sc (Ingénieur), Engineering and Sciences, Ecole Polytechnique, Paris, France 1980

S.M, Civil Engineering, Civil Engineering Systems, MIT, June 1982.

S.M., Management, MIS and Finance, MIT, 1984

Ph.D., Civil Engineering, Infrastructure Systems (Water Resource Systems), MIT, 1984

## **QUALIFICATIONS**

Dr. Karaa has a 30 year academic, consulting and industrial experience in infrastructure engineering and systems, management consulting and technology solutions development.

He is the Director of the multi-disciplinary Flood Mitigation and Engineering Resource Center (FMERC), and an inter-disciplinary Graduate Program in Critical Infrastructure Systems (CIS) at NJIT, combining performance, life-cycle and security management and systems aspects of infrastructure networks and inter-dependencies.

His areas of expertise include:

***Flood Mitigation and Coastal Resilience:*** He is currently leading the FMERC Center and project team sponsored by the State of New Jersey, on the development of a dynamic planning model and architecture, for the simulation and evaluation of structural and non-structural flood protection and mitigation strategies for vulnerable areas, focusing on risk reduction and resiliency improvement objectives.

***Project Management Systems, Executive Training:*** His research and consulting has emphasized integrated computerized applications for project and program management in a range of industries including engineering/construction, technology development, large-scale systems (power systems lifecycle management projects). He developed the functional requirements and design of a permit management system interfaced with the master scheduling system of the Central Artery Project. He developed and delivered executive

training programs for a large selection of public and private organizations, including Citigroup, the World Bank, the MBTA, MWRA, APWA and the ADL Management Education Institute. He developed a hierarchical database for cost estimating and analysis of the International Terminal at Boston's Logan Airport, which was used by the project construction management Team.

***Critical Infrastructure Systems:*** His research and consulting has emphasized computerized applications to solve a wide range of civil engineering, critical infrastructure and urban systems problems, including flood mitigation planning solutions, underground utility asset management, oil and gas supply chain systems and dam safety technology solutions. He led the design and development of computerized management and decision support systems for infrastructure condition assessment, risk analysis, maintenance management and capital improvement planning.

***Water/Wastewater Lifeline Systems and Dam Safety:*** He developed computerized applications for the management of underground water and wastewater systems which were implemented for the Massachusetts Water Resources Authority, commercialized and marketed to New England municipalities and agencies, as well as federal agencies. He developed a data warehousing and analytical framework for improving dam safety, event detection and response management, including sensor data acquisition, analytical failure probabilistic modeling, and early warning systems.

He led the development of a NSF-sponsored expert system for water distribution system maintenance, rehabilitation and reconstruction decisions. Under a US Army Corps of Engineers grant, he developed a decision support/expert system that automates the Infiltration and inflow quantification, detection and compliance management problem, and optimizes construction mitigation strategies in wastewater systems, using an integrated systems approach consistent with EPA standards. This system environment was successfully tested and applied in several large-scale Army installations, including Fort Devens, Fort Hood, Fort McLellan and Fort Belvoir.

As a consultant to the Massachusetts Water Resources Authority, he managed the design and development of its first operational maintenance management and condition assessment systems for its 260 mile regional water distribution network, and 230 mile sewer collection system. He also developed for the US Army an integrated information system for the inventory of worldwide water supply chain facilities interfaced with a decision support module for SDWA-compliant treatment selection and costing system for Army facilities across its source water, stored, treated and distributed water. He led multi-criteria life-cycle analysis and technical evaluation studies for two of the largest pipeline projects in the Greater Boston Area (North Metropolitan and Wellesley extension).

***Data Warehousing and Analytics:*** As an Executive at Oracle Corporation, he led the development of the Northeast Consulting Group within the Industrial Sector and a National Data Warehousing and Decision Support Team. Key assignments included the implementation of enterprise transactional and analytical solutions for Fortune 100 industrial corporations in areas ranging from program management, quality and risk management and

strategic sourcing. He also worked on strategic solutions in other Industry Verticals, such as Financial Services, Telecommunications, Public Sector and Utilities.

As a Vice President at Information Resources, he implemented and developed enterprise management, analytical information models and decision support systems, and led a technology transfer project to the French subsidiary/division.

***Communication/ITS Systems:*** Under the sponsorship of NJDOT and UTRC, he worked on the optimization of location technologies for fiber optic ITS communication networks, and developed a connectivity-based inventory system that helps reduce the risk of accidents from construction activities across utility systems.

## **ACADEMIC EXPERIENCE**

**New Jersey Institute of Technology (NJIT)**

2006- Present

*Newark, NJ*

***Associate Professor of Critical Infrastructure,***

*Director, Critical Infrastructure Systems inter-disciplinary Graduate Program*

*Department of Civil and Environmental Engineering*

Developed new MS inter-disciplinary degree Program in Critical Infrastructure Systems. Cross-Faculty Research initiatives in Inter-dependent Critical Infrastructure Systems, resiliency and sustainability, large-scale infrastructure lifecycle and multi-hazard security/risk management, with focus on infrastructure networks, underground utilities location and condition assessment, and integrated multi-hazard detection, monitoring, protection, prevention and mitigation strategies of flood Storm and dam failures events.

Developed decision model for location technology selection and inventory systems for connectivity-based underground fiber optic networks. Developed exchange system framework for safe excavation across multiple stakeholders in utility location information management.

Led multi-faculty post-Sandy strategic Center project for integrated information-based structural, non-structural and green infrastructure protection strategies, using combined simulation models, risk reduction and resiliency assessment and optimization.

**Manhattan Institute of Management (MIM)**

2006- 2008

*New York, NY*

***Academic Dean:*** *wide-reaching Advisory and Executive role to School President and Owner*

Program and curriculum development, faculty hiring, accreditation planning.

## **Northeastern University**

*Boston, MA*

***Assistant Professor and Program Director, Boston, MA***

1984-1991

Directed Graduate Construction Management Program. Overhauled graduate curriculum for project management and controls. Developed computer-based project management training, and delivered Executive programs nationally and internationally. Adjunct Teaching in Project Management at MIT and Tufts University. Developed graduate courses in decision and risk analysis, construction management, project organization and control and project evaluation and financing.

Performed NSF, US Army Corps of Engineers, MWRA, Massachusetts Land Court and World Bank research and consulting work in water distribution capital improvement planning and wastewater I&I decision support and infrastructure management, project management systems and integrated set maintenance reconstruction and rehabilitation prioritization.

**Massachusetts Institute of Technology**

1980-1984

*Cambridge, MA*

***Research Assistant***

Performed EPA and NSF-sponsored research on water distribution infrastructure rehabilitation and capital improvement planning. Developed large-scale statistical performance and risk assessment models and integrated water resources infrastructure planning and prioritization models. Developed large-scale models for the expansion of regional water supply systems.

## **INDUSTRIAL (NON-ACADEMIC) EXPERIENCE**

**PDA**

1988-1995

2002-2006

*Belmont, MA*

***Principal***

Led practice focused on construction management and infrastructure management systems, IT/business strategy and development of enterprise Decision Support Systems.

Led the development of SIMMS and SIMMS-IIC, wastewater infrastructure maintenance management and I&I control decision support framework. Applied tools to multiple infrastructure analysis studies at Fort Hood, Fort Belvoir, Fort McLellan and Fort Devens. Developed water distribution, road inventory, traffic signs and signals inventory and maintenance management systems. Led Central Artery project on the development of a permit management system interfaced to the Master Scheduling System. Led the computerized estimating team for database design for the cost estimating of the International Terminal at Logan Airport.

As Vice-Chair of Axxis Board of Directors, developed Product Strategy for energy systems platform and data analysis firm. Developed knowledge management and business intelligence framework platform for investment management firm. Venture Advisor at Zero Stage Capital.

**Oracle Corporation** 1995-2002  
Boston, Massachusetts

*Vice President* 1998-2002

*Enterprise and E-Business Strategy Group, OSI* 2000-2002

*Regional Vice President, DW Group, OPI* 1998-2000

Built Consulting Practices for enterprise applications and data warehousing/ business intelligence in the Industrial Sector. Positioned, supported and generated strategic account license and services sales of enterprise-wide applications and decision support systems. Areas covered include strategic sourcing, program/project management CRM, financial planning and budgeting, supply chain management and quality management.

Defined major e-Business and B2B Vertical strategy components and sales collateral for Services industries. Delivered executive IT strategy blueprints to Customers and Partners.

*Senior Practice Director, DW and Applications* 1995-1998

Launched and developed Northeast Industrial applications and technology consulting business. Delivered solution blueprint for enterprise business intelligence in several industrial segments. Led large program teams on multi-million enterprise strategic consulting and IT solution implementation. Interfaced with Development, sales and marketing for product and solution design, development and launch activities.

**Information Resources, Inc.** 1991-1995

*Vice President, Paris, France* 1994-1995

Reported to President, Data Systems Division at HQ in Chicago. Managed key technology transfer and reengineering projects at European startup subsidiary of CPG market research/analysis firm. Redesigned work processes for critical products, implemented DSS application layer and quality control systems for data acquisition and integration. Helped streamline and improve French operations.

*Director of Financial Consulting, Boston, MA* 1991-1994

Led financial budgeting solution development and consulting. Designed and built several multi-dimensional analytical enterprise models, and financial planning and budgeting solutions interfaced to enterprise systems across several industries. Performed strategic acquisition and

technology analysis study, and led the strategic positioning, pre-sales and implementation of financial decision support systems.

## **SUMMARY OF PAST AND CURRENT RESEARCH AREAS**

Research is focused on flood mitigation risk management systems, civil urban and regional infrastructure systems and the optimization of the enterprise and program management environment with advanced analytical, managerial and systems solutions, including:

- 1) Infrastructure asset management systems and performance models, and multi-functional data warehousing and decision support systems of critical infrastructure, urban and regional systems, using GIS multi-sourced real-time workstations, advanced analytics and technologies such as sensors, ground penetrating radar and CATV to identify and assess risk and mitigation, expansion, rehabilitation or remediation options.
- 2) Analytical models and applications for simulation of multi-hazard infrastructure and community performance under various protection and mitigation strategies.
- 3) Information exchange technologies for inventory and connectivity of ITS underground communication networks and highway construction utility-related safety improvement.
- 4) risk reduction and optimal data acquisition strategies for detection (e.g. sensor network location, etc.), protection, mitigation and response management under simple and combined events of Storm and dams and infrastructure resources hazards, using a data warehousing and Bayesian risk analysis framework.

## **SELECTED PUBLICATIONS:**

### **Critical Infrastructure and Civil Engineering Systems, and Project Management**

#### ***Under Preparation:***

Karaa, F., A. Shabarek, T. Marhaba and J. Lee, “A Hierarchical Network Model for the Evaluation of Mass Transit Transportation Resilience”, to be submitted to the Journal of Infrastructure Systems, ASCE, October 2017.

Karaa, F., N. Dalwadi, R. Dresnack and J. Miima, “A Heuristic Model for the Identification of Extreme Combined Storm Surge and Dam Break Events”, to be submitted to Natural Hazards Review, ASCE, November 2017.

Karaa, F., J. Schuring, W. Konon, R. Dresnack, J. Meegoda, T. Marhaba, et al. “A Generalized Risk Model for the Mitigation of Multiple Flood Hazards ”, to be submitted to the Journal of Performance of Constructed Facilities, ASCE, January 2018.



**Published:**

Karaa, F., “*Optimizing Mass transit Transportation Resilience: Model, Implementation and Policy Implications*”, 2017 Frontiers in Resilience Symposium, sponsored by the Center for Infrastructure Protection and Homeland Security and the Sandia National Laboratories, George Mason University, Arlington, Virginia, May 2017.

Karaa, F., N. Dalwadi, R. Dresnack and J. Miima, “*Mitigation of Multiple Flood Hazards from Combined Storm Surge and Dam Break Events*”, Presented at the 11th Annual Conference of the New Jersey Association for Floodplain Management's (NJAFM), October 2015.

Karaa, F., N. Dalwadi, R. Dresnack and J. Miima, “*Development of an Empirical Approach for Identifying and Mitigating Risk from Combined Flood Events: A Case Study in the Meadowlands*”, Presented at the Critical Infrastructure Symposium, Baltimore, MD, April 2015.

Karaa, F., “*Short-Term and Long-Term Integrated Flood Protection and Mitigation Strategies in the Meadowlands*”, Presented at the 10th Annual Conference of the New Jersey Association for Floodplain Management's (NJAFM), October 2014.

Karaa, F., Potts, L., Miima, J. B. and Data, B., “*Development of a Post-Sandy Community Protection and Resiliency Improvement Program in the Meadowlands*,” The Infrastructure Security Partnership (TISP), 2014 Critical Infrastructure Symposium, Colorado Spring, Colorado, April 2014).

Karaa, F., Katz, A., and Niver, E. (2013). “*Decision Analysis of Preferred Methods for Locating Underground Conduits*” Journal of Pipeline Systems Engineering and Practice, 10.1061/ (ASCE) PS.1949-1204.0000162 , 04013017.

Karaa, F., “*Decision Support Systems in Infrastructure Management*”, International Journal of Information Technology and Management (IJITM), Special Issue on: Framework for Modeling Global Supply Chain Risks, accepted for publication 2012 (in press), (Editor and peer-reviewed).

Karaa, F., “*A Graduate Research and Education Model for Managing the Critical Infrastructure of the 21st Century*”, The Infrastructure Security Partnership, Critical Infrastructure Symposium, April 2013, West Point, NY.

Karaa, F. and S. Banerji, “*Development of Connectivity-Based Underground Fiber-Optic Network Inventory Systems*”, Proceedings of Transportation Research Board, 2013, pp. 1-17.

Karaa, F.A., “*Role of Modeling and Simulation in Critical Infrastructure Information Management*”, FAA Modeling, Simulation & Analysis Summit, Professional Development and Continuing Education Carnegie Library Center, Stockton College, May 2009.

Karaa, F.A., “*Risk-Based Management System Framework for Contaminant Migration Control in Water and Wastewater Infrastructure*”, Water Research Forum NSF I/U CRC Planning Meeting, May 2009.

Karaa, F.A., “**Risk-Based Management System Framework for Contaminants in Water and Wastewater Infrastructure**”, NSF I/U CRC Planning Meeting, July 2008.

Karaa, F.A., “**Research and Education Directions in Critical Infrastructure Systems**”, Provost’s Faculty Forum, NJIT, July 9, 2008.

Karaa, F.A., “**Risk-Based Life Cycle and Security Management of Critical Infrastructure**”, Keynote Speaker presentation to the New Jersey Construction Roundtable, Annual Meeting, Johnson and Johnson Headquarters, May 2007.

Karaa, F.A., “**Interdisciplinary Graduate Programs in Critical Infrastructure and Emergency Management**”, proposal for graduate program curriculum, NJIT, May 2007.

Zaghloul, H. and F. Karaa “**Infiltration/inflow Mitigation and Control for Army Wastewater Collection Systems**”, Champaign, Ill., US Army Corps of Engineers Technical Report, Construction Engineering Research Laboratories, National Technical Information Service, distributor, 1995.

Karaa, F.A., H. Zaghloul and R. Scholze ,“ **Expert System for Wastewater Collection system Infiltration and Inflow Mitigation**”, Eighth Conference on Computing in Civil Engineering and Geographic Information Systems Symposium, pp. 121-128, June 1992.

Zaghloul, H., F.A. Karaa, J. Clark and M. Korfist, “**Army Water Supply Management System for Installations Drinking Water Facilities**”, Eighth Conference on Computing in Civil Engineering and Geographic Information Systems Symposium, pp. 145-152, June 1992.

Karaa, F.A. and D.H. Marks, “**Performance of Water Distribution Networks: An integrated Approach**”, *Journal of Performance of Constructed Facilities*, ASCE, Vol. 4, No. 1, February 1990.

Karaa, F.A. and S. Alam, “**Knowledge-Based Expert System for Planning Water Distribution Reconstruction and Rehabilitation**”, proceedings of the Computing in Civil Engineering Conference and Symposium on Data Bases, New York: ASCE, 0-87262-803-5, 1991, 948 pp., pp.448-459.

Karaa, F. and J. Paul, “**Design of Large Project Permit Management System**”, Preparing for Construction in the 21st Century, Construction Congress, 1991; April 13-16, 1991, pp. 311- 317, Cambridge, Massachusetts.

Karaa, Fadi A. and B. Abdallah, “**Coordination Mechanisms During the Construction Project Life Cycle**”, *Project Management Journal* 22:45-53, September 1991.

“**Microcomputer Configurations for Project Management**”, Karaa, F.A and J.K. Hughes, Civil Engineering Practice, *Journal of the Boston Society of Civil Engineers*, vol. 4, No. 1, ISSN: 0886-9685, pp. 9-24, Spring 1989.

Karaa, F.A., “**Infrastructure Maintenance Management System Development**”, *Journal of Professional Issues in Engineering*, ASCE, vol. 115, No. 4, pp. 422-432, October 1989.

Karaa, F.A., A. Touran, and R.L. Meserve, “**Operations Management in the Engineering Office**”, *Journal of Management in Engineering*, ASCE, vol. 5, No. 4, pp. 400-416, October 1989.

Karaa, F. and D. Birch, “**Maintenance and Capital Improvement Management Systems for Water Distribution and Sewer Interception**”, proceedings of the Urban Regional Information System Association '89 Conference, August 1989.

Karaa, F.A. and K. Sundaravel, “**Operational/Financial Interface for Effective Project Management Integrating Scheduling and Spreadsheet Systems**”, PMI International Symposium, September 1989.

Mattera, L. and F.A. Karaa “**Risk Management Specifications for Working with Hazardous Materials**”, PMI Expert Seminar on Risk Analysis, PMI International Symposium, September 1989.

Karaa, F.A., “**Maintenance Management Systems for Water and Sewer Infrastructure**”, *Computing in Civil Engineering: Computers in Engineering Practice*, New York: ASCE, 0-87262-722-5, 1989, 961 pp., pp. 645-652.

Karaa, F.A. and K. Sundaravel, “**Systems Integration for Effective Project Planning**”, Sixth Conference on Computing in Civil Engineering and Symposium on Expert Systems in Civil Engineering, Atlanta, GA, September 1989.

Mattera, L. and F.A. Karaa, “**Contractor Selection Via Automated Performance Tracking and Evaluation System**”, PMI International Symposium, September 1989.

Karaa, F.A. and A. Touran, “**Integration of Microcomputer Software for Construction Management Education**”, ASEE Specialty Conference, Portland Oregon, June 1988.

Karaa, F. “**Large-Scale Project Planning Models**”, Third Canadian Seminar on Systems Theory for the Civil Engineer, Montreal, Canada, June 1987.

Karaa, F.A., D.H. Marks and R.C. Clark, “**Budgeting of Water Distribution Improvement Projects**”, *Journal of Water Resources Planning and Management*, ASCE, vol. 113, No.3, pp. 378-391, May 1987.

Karaa, F.A. and A. Nasr “**Resource Management in Construction**”, *Journal of Construction Engineering and Management*, ASCE, vol. 112, No.3, pp. 346-357, September 1986.

Karaa, F.A. and R. Krzysztofowicz, “**Bayesian Decision Analysis of Dam Safety**”, *Applied Mathematics and Computation*, Elsevier, 14: 357-380 (1984).

Karaa, F.A. and D.H. Marks, "*A Planning Process for the Dynamic Expansion of Regional Water Supply Systems*", ASCE Specialty Conference, Tampa, Florida, March 1983.

### **Decision Support Systems, Data Warehousing and Exchanges (Professional publications)**

Karaa, F. "*Financial Services Exchange Strategies*", Keynote speaker presentation, Third Annual E-Commerce Conference, October 2000, Bermuda.

Karaa, F. "*The Role of B2B exchanges in the New Economy*", CEO Seminar Series, Booz-Allen and Hamilton, Tyson's Corner, VA, May 2001.

Karaa, F.A. and A. Leidner, "*Raising the Bar with Effective Supply Management, Oracle Purchasing Analysis and Warehouse*", white paper/brochure on Oracle's Strategic Sourcing solution, Waltham, Massachusetts, 1997.

Karaa, F. "*Trends in IT Strategy and Transformations and the Role of Data Warehousing in the Design and Implementation of Enterprise Systems*", presented at INSEAD, Fontainebleau, France, February 1998.

Karaa, F.A., "*Decision Support Systems in the Industrial Sector*", strategy/white paper, Oracle Corporation, 1998.

Kadifa, G. and F.A. Karaa, "*The Transformation Imperative*", Oracle enterprise strategy paper, presented to Ford Motor Company, October 1997.

Karaa, F. "*Making Data Warehousing the Centerpiece of an Effective IT Strategy*", Oracle Corporation paper, position paper, September 1997.

Karaa, F. "*Decision Support Systems for Time-Based Strategies*", F.A. Karaa, Information Resources, White Paper for enterprise decision support marketing and positioning, June 1993.

Karaa, F., "*Financial Coverstory: An Enterprise Intelligence System*", Information Resources Software Division, White Paper for Executive Marketing, Wall Street Journal Campaign, September 1992.

### **SELECTED REPORTS/PRESENTATIONS:**

Karaa, F.A., "*Requirements, Model and Prototype for a Multi-Utility Locational and Security Information Hub*" - Project 49997-28-25 (pp. 65), University Transportation Research Center, Final Report, Submitted November 2015.

Karaa, F. A., Schuring, J. R., Konon, W., Marhaba, T. F., Dresnack, R., Meegoda, J. N., Potts, L., Golub, E. B., Altinakar, M., Ding, Y. (2014). “***Flood Mitigation Engineering Resource Center (FMERC)***” - PROJECT EC14-005 (pp. 84 (without Appendices C,D,E,F,G,H)). NJDEP/State of New Jersey. Final Report, Submitted June 18, 2014.

Karaa, F.A , “***Development of a Comprehensive Inventory Management System for Underground Fiber Optic Conduits***”, comprehensive inventory of fiber optic external and internal facilities, UTRC, Final Report, March 2013.

Karaa, F., Shenodah, M. “***Development and Implementation of a Segment/ Junction Box Level Inventory Database for the ITS Fiber Optic Conduit Network***”: Connectivity-Based upgraded inventory system with drill-down and relationship-based query capabilities, implemented prototype for NJ DOT, Final Report, 2011.

Katz, A., F. Karaa and E. Niver, “***Innovative and Effective Techniques for Locating Underground Conduits***”, Final Report, Submitted to NJDOT/UTRC: Decision Model for the selection of the most effective locating techniques for underground infrastructure, Final Report 2010.

Karaa, F. “***Development of Permit Management System for Central Artery/Tunnel Project, Requirements analysis***”, under contract to the BSC Group, template development, linkage to master schedule, automatic generation of permit schedules and impact analysis, 1992.

Nichols, M. and F. Karaa, “***Analysis techniques and Advanced Remote Sensing of Deteriorating Water and Sewer Distribution Systems***”: Supervised student and report development, which led to the comparative analysis of a range of technologies, including GPR, GT, acoustic methods and Infrared Thermography in sub-surface utility applications, 1991.

Karaa, F. “***Development of Change Management Procedures, Massachusetts Water Resources Authority***”, change claim analysis, reporting, value of work reporting, change order identification, 1987.

Karaa, F., and D. Birch, “***Development of Water Inventory and Maintenance Management System (Massachusetts Water Resources Authority, Boston, MA)- IHIS later named WIMMS***”: Activities related to the automation of the diagnosis and maintenance management of water distribution facilities for the whole MWRA network, including problem identification and response, pro-active preventative maintenance of water distribution facilities, and the prioritization of condition assessment and maintenance/capital improvement facilities, 1986-1987.

Karaa, F. and V. Sundaravel, “***Development of Road Inventory and Traffic Signs and Signals System (Town of Mansfield, Storrs, CT)- RITTS***”: Activities related to the automation of the inventory, positioning and maintenance management of all

transportation above-ground facilities in the jurisdiction. System enabled convenient cross-referencing of all signs, signals and hazards in roadway sections, 1990.

Karaa, F. and V. Sundaravel, “***Development of Sewer Inventory and Maintenance Management System (Massachusetts Water Resources Authority, Boston, MA)-SIMMS***”: Automation of the diagnosis and maintenance management of wastewater collection facilities for the whole MWRA network, including problem identification and response, maintenance history, and work scheduling and tracking, 1988.

Karaa, F. and J. Aoude, “***Development of US Army Water Supply Integrated Database Management System***”: Worldwide facilities inventory, assessment and contamination tracking, including sources, storage, pumping, treatment and distribution systems. Developed integrated data model, with SDWA-based cost-effective treatment modeling and costing, 1992.

Karaa, F. and V. Sundaravel , “***SIMMS-IIC: Development of Expert Decision Support System for Infiltration and Inflow Control for US Army Installations***”: A new system design and computational methodology for capital improvement planning was devised, enabling dynamic development of SSES, I&I Mitigation Control, compliance management and rehabilitation and reconstruction planning, 1994.

Karaa, F. “***Performance of Infiltration/Inflow (I/I) Analysis for Fort Devens Wastewater Collection System***” (Phase II)”, Submitted to US Army Base, Fort Devens, MA and USACERL, August 1995.

Karaa, F. “***Technical Evaluation Report of North Metropolitan Sewer Rehabilitation Project Phase II***”, Submitted to MWRA, August 1995.

### **SELECTED PROJECT EXPERIENCE**

***Requirements, Model and Prototype for a Multi-Utility Locational and Security Information Hub***: Information architecture for Safe excavation exchange system, University Transportation Research Center, March 1, 2014 to August 31, 2015.

***Flood Mitigation Engineering Resource Center***: Currently Leading Multi-disciplinary effort for the Development of cost-effective Risk Mitigation strategies from flood related hazards, to help improve system and community resiliency, New Jersey DEP, June 2013 to January 2014.

***Development of a Comprehensive Inventory Management System for Underground Fiber Optic Conduits***: Comprehensive inventory of fiber optic external and internal facilities, UTRC, Final Report, March 2013.

***Development and Implementation of a Segment/Junction Box Level Database for the ITS Fiber Optic Conduit Network:*** In cooperation with Dr. Michael Shenoda, Assistant Prof. Civil Engineering Department The College of New Jersey, NJDOT/UTRC, 2011.

***Innovative and Effective Techniques for Locating Underground Conduits (NJDOT/UTRC):*** Decision Model for the selection of the most effective locating techniques for underground infrastructure, 2010.

***Development of Enterprise Resource Planning Solutions:*** Led large consulting teams in definition, planning and implementation of integrated enterprise resource planning across functions, including sales, supply chain management, manufacturing, distribution and logistics, finance and accounting, and sector-specific applications.

***Development of Data Warehousing and Enterprise Decision Support Solutions in the Industrial and Manufacturing Sectors:*** Led at Oracle Corporation the development of Analytical Data Warehousing Solutions for Strategic Sourcing and Project Management, 1995-1998. Implemented analytical solutions at a number of Fortune 100 corporations.

***Development of Water Inventory and Maintenance Management System (Massachusetts Water Resources Authority, Boston, MA)- IHIS later named WIMMS***  
Activities related to the automation of the diagnosis and maintenance management of water distribution facilities for the whole MWRA network, including problem identification and response, maintenance history, and work scheduling and tracking. The goal of the work was to develop a system for pro-active preventative maintenance of water distribution facilities, and the prioritization of condition assessment and maintenance/capital improvement facilities, 1988.

***Development of Sewer Inventory and Maintenance Management System (Massachusetts Water Resources Authority, Boston, MA)- SIMMS©:***Activities related to the automation of the diagnosis and maintenance management of wastewater collection facilities for the whole MWRA network, including problem identification and response, maintenance history, and work scheduling and tracking. The goal of the work was to develop a system for pro-active CCTV-based sewer line profiling and defect summarization and aggregation, and help implement preventative maintenance of sewer collection facilities, and the prioritization of condition assessment and maintenance/capital improvement facilities, 1989.

***Development of US Army Water Supply Integrated Compliance Management System:*** Worldwide facilities inventory, assessment and contamination tracking across water supply chain, including sources, storage, pumping, treatment and distribution systems. Developed integrated data model, with SDWA-based cost-effective treatment modeling and costing, 1992.

***Development of Expert Decision Support System for Infiltration and Inflow Control for US Army Installations- SIMMS-IIC©:*** Dr. Karaa devised a new system design and computational methodology for capital improvement planning. Enables dynamic

development of SSES, I&I Mitigation Control, compliance management and rehabilitation and reconstruction planning. Sub-system analysis, flow isolation support and defect analysis, are examples of the many features of this comprehensive decision support system, 1995.

***Analysis techniques and Advanced Remote Sensing of Deteriorating Water and Sewer Distribution Systems:*** Master's thesis by Douglas Nichols, Northeastern University: Supervised student and report development, which led to the comparative analysis of a range of technologies, including GPR, GT, acoustic methods and Infrared Thermography in sub-surface utility applications, 1991.

***Development of Road Inventory and Traffic Signs and Signals System (Town of Mansfield, Storrs, CT)- RITTS:*** Activities related to the automation of the inventory, positioning and maintenance management of all transportation above-ground facilities in the jurisdiction. System enabled convenient cross-referencing of all signs, signals and hazards in roadway sections, 1991.

## **FUNDED RESEARCH AND DEVELOPMENT GRANTS**

Karaa, Fadi A. (Principal), "Requirements, Model and Prototype for a Multi-Utility Locational and Security Information Hub," Sponsored by UTRC- University Transportation Research Center, Federal and Matching Funds, \$96,700.00, Date Submitted: December 20, 2013. (Contract: March 1, 2014 - May 31, 2015).

Karaa, Fadi A. (Principal), Marhaba, Taha F. (Co-Principal), Dresnack, Robert (Co-Principal), Schuring, John R. (Co-Principal), Saadeghvaziri, Mohamad A. (Co-Principal), Konon, Walter (Co-Principal), Olenik, Thomas J. (Co-Principal), Potts, Laramie (Co-Principal), Miima, John B. (Supporting), Golub, Eugene B. (Co-Principal), Zhang, Wen (Co-Principal), "Flood Mitigation Engineering Resource Center," Sponsored by New Jersey Department of Environmental Protection, State, \$289,872.00, Date Submitted: May 23, 2013. (Contract: July 1, 2013 - June 18, 2014). 2013-2014.

Karaa, Fadi A. (Principal), " Development of a Comprehensive Inventory System for Underground Fiber Optic Conduits," Sponsored by UTRC- University Transportation Research Center, Federal and Matching Funds, \$73,419.00, Award Date: March 2012.

Karaa, Fadi A. (Principal), " Development and Implementation of a Segment/ Junction Box Level Database for the ITS Fiber Optic Conduit Network," Sponsored by NJ Department of Transportation, under contract to The College of New Jersey, State Funds, \$28,599.00, Award Date: June 2011.

Karaa, Fadi A. (Principal), Niver, Edip (Co-Principal), "Innovative and Effective Techniques for Locating Underground Conduits," joint project and under contract to the College of New Jersey (Al Katz Principal Investigator) as the Prime Contractor/Partner, Sponsored by New Jersey Department of Transportation/UTRC, University



Transportation Research Center, Federal and State Funds, \$109,159, Award Date: June 2011. (Contract: July 1, 2013 - June 18, 2014). 2013-2014.

Karaa, Fadi A. (Principal), "Design and Development of Worldwide inventory, compliance management and treatment budgeting System of Army water supply chain facilities," under contract to US Army Corps of Engineers, Construction Engineering Research Laboratory (USACERL), \$50,000, Award Date: June 1993.

Karaa, Fadi A. (Principal), "Design and Development of Decision support system for wastewater infrastructure infiltration and inflow control, rehabilitation planning, Fort Devens case study," under contract to US Army Corps of Engineers, Construction Engineering Research Laboratory (USACERL), \$50,000, Award Dates: September 1990, contamination tracking project extension in 1995.

Karaa, Fadi A. (Principal), "Design and Development of Permit Management System, Integration with Master Scheduling and Control System for Central Artery/Tunnel Project," under contract to BSC Group/Bechtel Parsons Joint Venture, \$25,000, Award Date: 1991.

Karaa, Fadi A. (Principal), " Multi-Criteria Life cycle Analysis of 2 Large Pipeline (Water and Wastewater) projects in Greater Boston," under contract to the Massachusetts Water Resources Authority, \$30,000 (2 task orders), Award Dates: 1991, 1992.

Karaa, Fadi A. (Principal), "RIA: Expert System for Water Distribution Infrastructure Strategies," sponsored by the National Science Foundation, \$59,812, Award Date: 1989.

Karaa, Fadi A. (Principal), "Design and Development of Inventory and Maintenance Management Systems for Water and Wastewater Infrastructure Networks," under contract to the Massachusetts Water Resources Authority, \$30,000 (2 task orders), Award Dates: 1987, 1988.

Karaa, Fadi A. (Principal), Touran, Ali (co-Principal), Meserve, Robert (co-Principal) " Operations Analysis of Land Court Engineering Division," under contract to the Massachusetts Land Court, \$26,600, Award Date: 1988

## **MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS**

Founding Member, SARMA, Security Analysis and Risk Management Association, 20007

Member, American Society of Civil Engineers (ASCE)

Member, Society of American Military Engineers (SAME)

TISP, The Infrastructure Security Partnership, Institute Membership, 2011, 2012, 2013  
TRB, 2011, 2012, 2013

Past Memberships: APWA (1985), Chairman, Administrative Management Committee  
New England Chapter, 1989; ASEM (1986)

Construction Research Council, Project Management Institute, the Planning Forum

American Water Works Association, New England Water Pollution Control Association

## **HONORS/AWARDS**

Received NCE Excellence in Teaching Award, 2014  
Received Excellence in Graduate Teaching Award, NJIT, 2014  
Candidate for Excellence in Graduate Teaching Award, 2013  
Keynote Speaker, Construction Roundtable of NJ, 2007  
Keynote Speaker, 2<sup>nd</sup> Annual Electronic Commerce Conference, September 2000.  
BSCES Engineering Management Technical Group, Chairman Executive Committee  
1988-1989 Infrastructure Executive Committee, Construction Division  
Boston Society of Civil Engineers President's Award Certificate, "Making the Change from Engineer to Manager" Lecture Series, 1990  
Arthur T. Ippen Award, MIT, 1981

## **SERVICE ACTIVITIES**

Development of a new Inter-Disciplinary MS Degree in Critical Infrastructure Systems and a new Certificate in Critical Infrastructure Systems (CIS)  
Director and Graduate Advisor, Critical Infrastructure Systems Program.  
Member, NJ Homeland Security Technology Committee  
Member, University Sabbatical, ADHC Dean's Search, CEE Teaching Awards Committee  
Graduate Advisor, BS/MBA Program, Newark College of Engineering.  
Critical Infrastructure Protection Decision Support System Seminar, co-Sponsored with UMDNJ School of Public Health, June 2007  
Seminar on Issues in Critical Infrastructure Protection, Co-Hosted with UMDNJ and S&T Directorate, DHS, March 2007.