CURRICULUM VITAE

BAABAK ASHURI, PH.D., DBIA

Assistant Professor
Chair, Integrated Project Delivery Systems Masters Track
Director, Economics of the Sustainable Built Environment (ESBE) Lab
School of Building Construction, Georgia Institute of Technology
280 Ferst Drive, 1st Floor Atlanta, GA 30332-0680
Phone: (404) 385-7608 Fax: (404) 894-1641
E-mail: baabak.ashuri@coa.gatech.edu Web: http://www.esbe.gatech.edu

I. EDUCATION

Ph.D.	2008	*Georgia Institute of Technology*	Industrial and Systems Engineering
M.S.	2006	*Georgia Institute of Technology*	Operations Research
M.S.	2004	*Georgia Institute of Technology*	Building Construction and Integrated Facility Management
B.S.	2002	*Sharif University of Technology*	Civil Engineering

II. EMPLOYMENT

08/08 - Present	*Assistant Professor*	School of Building Construction, Georgia Institute of Technology, Atlanta, Georgia
08/09-Present	*Director*	Economics of the Sustainable Built Environment (ESBE) Lab, Georgia Institute of Technology, Atlanta, Georgia
06/04- 8/08	*Tennenbaum Research Fellow*	School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, Georgia
05/07 – 7/07	*Intern Analyst*	Chainalytics LLC, Atlanta, Georgia
05/06 – 8/06	*IBM Research Intern*	Business Informatics Group, IBM TJ Watson Research Center, Yorktown Heights, New York
01/04 – 8/08	*Academic Tutor*	Georgia Tech Athletic Association, Atlanta, Georgia
01/03 –05/04	*Graduate Assistant*	Building Construction Program Georgia Institute of Technology, Atlanta, Georgia
09/02-12/02	*Lab Instructor*	Construction Engineering & Management Program, University of Alberta, Alberta, Canada
01/02 – 05/02	*Instructor*	Sharif University of technology, Tehran, Iran

III. RECORD OF ACTIVITIES AS A TEACHER AND EDUCATOR

A. Courses Taught

Term	Course Number and Title	Class Size	Number of Responses	Instructor Was an Effective Teacher (Scale of 1-5)
Spring 2013	BC 6250 Value Management for Integrated Facility Design and Construction	15	15	4.00
Spring 2013	BC 8803 – BA/BC 4803 –BA Productivity Analysis for Solar Contractors	4	4	4.83
Spring 2013	BC 4610 Value Engineering & Building Economics	25	22	3.75
Spring 2013	BC 7200 – BA Advanced Readings in Building Construction	3	–	–
Fall 2012	BC 7100 Quantitative Methods for Construction Research	14	13	4.25
Fall 2012	BC 7200 – BA Advanced Readings in Building Construction	4	–	–
Spring 2012	BC 6250 Value Management for Integrated Facility Design and Construction	29	24	4.08
Spring 2012	BC 4610 Value Engineering & Building Economics	40	35	4.24
Fall 2011	BC 6550 Design & Construction Processes	29	23	4.73
Fall 2011	BC 7100 Quantitative Methods for Construction Research	9	9	4.86
Spring 2011	BC 6250 Value Management for Integrated Facility Design and Construction	41	39	4.30
Spring 2011	BC 4610 Value Engineering & Building Economics	34	32	4.00
Fall 2010	BC 6550 Design & Construction Processes	34	29	4.40
Fall 2010	BC 7100 Quantitative Methods for Construction Research	13	13	4.50
Spring 2010	BC 6250 Value Management for Integrated Facility Design and	30	28	4.50

	Construction			
Fall 2009	BC 8823 – BA Special Topics: Advanced Cost and Financial Management in AEC	6	4	4.80
Fall 2009	BC 7100 Quantitative Methods for Construction Research	18	17	4.70
Spring 2009	BC 4610 Value Engineering & Building Economics	55	53	4.10
Fall 2008	BC 3600A Project Management I	27	24	3.50
Fall 2008	BC 3600B Project Management I	29	28	3.90
Fall 2008	BC 7100 Quantitative Methods for Construction Research	20	17	4.70
			Median	4.30

B. Graduate Student Dissertation, Thesis and Masters Project Advising

Ph.D. Principal Advisor

Hamed Kashani
Beginning Semester: Fall 2009
Graduated: May 2012
Thesis Topic: A Real Options Model for the Financial Valuation of Infrastructure Systems under Uncertainty
School of Building Construction, Georgia Institute of Technology
Currently, Dr. Kashani is an Assistant Professor in the Department of Civil Engineering at Sharif University of Technology in Tehran, Iran.

Seyed Mohsen Shahandashti
Beginning Semester: Spring 2011
Qualifying Paper: Fall 2011
Comprehensive Exam: Spring 2012
Candidacy Exam: Spring 2013
Expected Graduation: Spring 2014
Thesis Topic: Analysis of Construction Cost Variations Using Macroeconomic, Energy and Construction Market Variables
School of Building Construction, Georgia Institute of Technology

Jian Lu
Beginning Semester: Spring 2009
Qualifying Paper: Fall 2010
Comprehensive Exam: Fall 2010
Expected Graduation: Fall 2013
Thesis Topic: A Data Envelopment Analysis Approach for Energy Benchmarking in the Multifamily Industry
School of Building Construction, Georgia Institute of Technology

Kia Mostaan
Beginning Semester: Fall 2011
Expected Graduation: Spring 2015
Thesis Topic: Analysis of Efficiency Enhancement Opportunities for Transportation Design Build Projects
School of Building Construction, Georgia Institute of Technology

Mohammad Ilbeigi
Beginning Semester: Summer 2012
Expected Graduation: Spring 2016
Thesis Topic: Identification and Evaluation of Risk Management Strategies for Construction Material Price Volatility
School of Building Construction, Georgia Institute of Technology

Saman YarMohammadi
Beginning Semester: Spring 2013
Expected Graduation: Spring 2017
Thesis Topic: Productivity Analysis of Design Coordination using Building Information Modeling (BIM)
School of Building Construction, Georgia Institute of Technology

Frank Crittenden
Beginning Semester: Fall 2011
Expected Graduation: TBD
Thesis Topic: TBD
School of Building Construction, Georgia Institute of Technology

Ph.D. Co-Principal Advisor

Mehdi Tavakolan
Beginning Semester: Fall 2009
Graduated: Summer 2011
Thesis Topic: Development of Construction Projects Scheduling with Evolutionary Algorithms
Civil Engineering and Engineering Mechanics, Columbia University
Dr. Tavakolan is an Assistant Professor in the Department of Civil Engineering at the University of Tehran, Tehran, Iran. Currently, Dr. Tavakolan is on sabbatical from the University of Tehran working as Research Scientist I in the Economic of the Sustainable Built Environment (ESBE) Lab in the School of Building Construction at Georgia Tech.

Ph.D. Committee Member

John Fard
Thesis Topic: Decision Support System to Increase Hospital Patient Capacity: Looking at a Cost Analysis of Construction versus Implementing Telehealth
School of Building Construction, Georgia Institute of Technology
Expected Graduation: Spring 2014

Arya Sedehi
Thesis Topic: Cost-Benefit Analysis of RFID Implementation in Hospitals
School of Building Construction, Georgia Institute of Technology
Expected Graduation: Spring 2014

Soheil Rouhi
Thesis Topic: Framework for Owner's Project Requirement for Total Structural System (OPRTSS)
School of Building Construction, Georgia Institute of Technology
Graduated: August 2011

Stephanie C. Thompson
Thesis Topic: Rational Design Theory: A Decision-based Foundation for Studying Design Processes
G.W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology
Graduated: May 2011

Charner Rodgers
Thesis Topic: High Occupancy Toll Lanes Ignoring the Potential for a Violation of Environmental Justice
School of Building Construction, Georgia Institute of Technology
Graduated: May 2011

Junha Kim
Thesis Topic: Artificial Neural Network (ANN) based Decision Support Model for Alternative Workplace Arrangements (AWA): Readiness Assessment and Type Selection
College of Architecture, Georgia Institute of Technology
Graduated: December 2009

Ph.D. Committee Member (Outside Georgia Tech)

Wei Wang
Thesis Topic: Multivariate Stochastic Copula-Based Deterioration Models in Infrastructure Economic Risk Management
Civil Engineering and Engineering Mechanics, Columbia University
Graduated: May 2010

Feng Dong
Thesis Topic: Essays in Advanced Risk Management and Quantitative Strategies in Infrastructure Finance
Civil Engineering and Engineering Mechanics, Columbia University
Graduated: May 2010

Nakhon Kokkaew
Thesis Topic: Risk Flexibility Theory (RFT) in Infrastructure Project Finance
Civil Engineering and Engineering Mechanics, Columbia University
Graduated: May 2010

Post-doctoral Research Fellow – Principal Advisor

Mehdi Tavakolan, Ph.D.
Research Scientist I
Spring 2013-Present
Research Projects: "Streamlining Project Delivery through Risk Analysis"

Du Yon Kim, Ph.D.
Research Topic: Investment Valuation of International Construction Market Entry
Visiting Post-doc from School of Civil & Environmental Engineering, Yonsei University, Korea
Summer 2009-Fall 2010

Xiang Peng Cheng, Ph.D.
Research Topic: A Game Theory Approach to Construction Contract Design
Visiting Post-doc from College of Construction Management and Real Estate, Chongqing University, China
Summer 2009-Summer 2010

Yuan Chen
Research Topic: Performance Assessment of Healthcare Facilities in Multi-inputs, Multi-outputs Environment: A Data Envelopment Approach
Visiting Scholar from College of Construction Management and Real Estate, Chongqing University, China
Fall 2009-Fall 2010

Masters' Thesis - Principal Advisor

David Hannon
Thesis Topic: Environmental Risks and Management Strategies in Design-Build Contracting
School of Building Construction, Georgia Institute of Technology
Expected Graduation: August 2013

Allison Hardy
Thesis Topic: Making the Case for Alternative Project Delivery in Healthcare Construction
School of Building Construction, Georgia Institute of Technology
Expected Graduation: May 2013

Robert Stephenson
Thesis Topic: The Effects of Green Building Certification on Housing Prices in the State of Georgia
School of Building Construction, Georgia Institute of Technology
Graduated: December 2012

Austin Dingwall
Thesis Topic: Multi-Objective Genetic Algorithm Use in Building Energy Analysis
School of Building Construction, Georgia Institute of Technology
Graduated: December 2012

Bryan C. Pope
Thesis Topic: Creating a Framework for the Successful Implementation of Energy Retrofit Projects: a Detailed Case Study of Energy Retrofits in Atlanta's Chastain Park
School of Building Construction, Georgia Institute of Technology
Graduated: May 2012

Melvin B. Whatley
Thesis Topic: Life-cycle Cost-benefit Analysis of Green Roofing Systems: the Economic and Environmental Impact of Installing Green Roofs on All Atlanta Public Schools
School of Building Construction, Georgia Institute of Technology

Graduated: May 2011

Mothusi Phometsi
Thesis Topic: Economic Evaluation of Flexible Partitions
School of Building Construction, Georgia Institute of Technology
Graduated: August 2010

Kenneth Corsini
Thesis Topic: Statistical Analysis of Residential Housing Prices in an Up and Down Real Estate Market: A General Framework and Study of Cobb County, GA
School of Building Construction, Georgia Institute of Technology
Graduated: December 2009

Masters' Thesis - Committee Member

Abbas Rashidi
Thesis Topic: Evaluating the performance of machine learning techniques for recognizing construction materials in digital images and videos
School of Electrical and Computer Engineering, Georgia Institute of Technology
Graduated: August 2013

Laurie Swift
Thesis Topic: A conceptual framework for the assessment of workplace impact on productivity
School of Building Construction, Georgia Institute of Technology
Graduated: December 2011

Geetanjali Ningappa
Thesis Topic: Use of Lean and Building Information Modeling (BIM) in the Construction Process; Does BIM Make It Leaner?
School of Building Construction, Georgia Institute of Technology
Graduated: May 2011

Benjamin David Lee
Thesis Topic: An Investigation of Prescribed Risk Management Practices in Engineering Design
G. W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology
Graduated: May 2010

Riyue Xiong
Thesis Topic: Leadership in Project Management
School of Building Construction, Georgia Institute of Technology
Graduated: December 2008

Masters Students Funded in Dr. Ashuri' s Research Lab

Irma Natalia Quintanilla Tamez
Research Topic: Productivity Analysis for the Solar Installation Industry
March 2013-Present

Yang Hui
Research Topic: Statistical Analysis to Determine Structural Breaks in Historical Asphalt Cement Price Data

June 2012-Present

David Hannon
Research Topic: Environmental Risk Analysis for Transportation Design-Build Projects
January 2012-Present

Masters Students Conducted Independent Studies

Mohammad Ali Kafaee Razavi
Research Topic: Infrastructure Asset Finance
Spring 2013

Dave Patel
Research Topic: Building Information Modeling (BIM) in Landscape Architecture
Spring 2012

James Cox
Research Topic: Public-Private Partnerships: Delivering Infrastructure Projects in the United States Utilizing Public-Private Partnerships
Summer 2011

Ian Hoffman
Research Topic: Evaluation of Procurement Methods for Transportation Project Delivery using Design-Build Project Delivery Systems
Summer 2011

Ryan Howard
Research Topic: Integrated Project Delivery, A look at I.P.D. and its place in the current economy
Summer 2011

Mccoy Jamison
Research Topic: Universal Design: The Cost of Convenience
Spring 2010

Afshin Jonaidi Jafari
Research Topic: Application of Infrastructure Asset Management in Airport Pavement Management System
Fall 2009

Sami Kolahdoozan
Research Topic: Economic Evaluation of Hybrid Heating, Ventilation, and Air Conditioning (HVAC) Systems under Utility Price Uncertainty
Fall 2009

Undergraduate Researchers

Bo-Na Lee
Research Topic: Asphalt Cement Price Prediction
Fall 2012 & Spring 2013

Seungho Shin
Research Topic: State of Practice of Transportation Design-Build in the U.S.
Fall 2012

Hongfan Chen
Research Topic: The Impact of Energy Market on the Construction Market
Spring 2012

Rohit Joshi
Research Topic: Energy Benchmarking Using Data Envelopment Analysis
Spring 2011

Brittany Malnar
Research Topic: Energy Efficient Renovation of Existing Structures
Spring 2011

Eran Mordel
Research Topic: Construction Cost Analysis
Spring 2011

Ritika Thapar
Research Topic: Evaluation of Design-Build Request for Proposals (RFPs) of Utah and Florida Departments of Transportation
Spring 2011

Jingwei Zhou
Research Topic: Detailed Analysis and Optimization of National Design-Build Strategies
Spring 2011

Ian Balmaseda
Research Topic: Linking between Real Estate Asset Performance and Sustainability in terms of Green Building Certification
Fall 2010

Ian Balmaseda
Research Topic: Analyzing and Strengthening Sustainability Initiatives in the City of Atlanta
Fall 2010

Seungho Shin
Research Topic: Regression Analysis Model for Predicting Construction Cost Index
Fall 2009 & Spring 2010

Seungho Shin
Research Topic: Regression Analysis Model for Predicting Construction Cost Index
Fall 2009 & Spring 2010

Trai Nguyen
Research Topic: Life Cycle Cost Analysis Using Real Options Analysis
Spring 2010

Rustann Solomero
Research Topic: Models for Prediction Construction Cost
Fall 2009

C. Curriculum Development

New or Entirely Revised Courses

BC 8803 – BA/BC 4803 – BA – Productivity Analysis for Solar Contractors
The purpose of this course is to understand the fundamentals of solar PV systems, to learn residential and commercial installations of solar PV systems, and to apply building construction methods, such as productivity analysis, cost management, lean construction, etc. to solar PV installation.
This course was developed through a partnership with the Georgia Tech Research Institute (GTRI). Mr. Goodman and Mr. Wren were the co-instructors for this course. Dr. Castro (BC Chair) and Mr. Mohsen Shahandashti (Dr. Ashuri's PhD student) were co-instructors. The development of the course was facilitated through a grant from the Department of Energy's (DOE's) SunShot Initiative to the GTRI.

BC 8823 – BA – Advanced Cost and Financial Management in AEC
Valuation of Flexibilities On/In Systems: A Real Options Approach
A new approach to life cycle cost analysis and risk management for Architecture/Engineering/Construction (A/E/C) Integration. Focus on the theory of Real Options Analysis as an improved approach over Net Present Value (NPV) for pricing Flexibility embedded in planning, design, construction, or operations phase of a built environment asset.

BC 7100 – Quantitative Methods for Construction Research
Decision Analysis and Risk Management
Philosophy, theory, methodology, and professional practices of Decision Analysis and Quantitative Risk Assessment related to built environment assets. Focus on Influence Diagrams, Decision Tree Analysis, Value of Information, Probability, Statistics, and Monte Carlo Simulation, and Risk Management.

BC 8803 – BC 4803 - Productivity Analysis for Solar Contractors
The purpose of this course is to learn the fundamentals of solar PV systems for residential and commercial installations and to apply building construction concepts of scheduling, cost management, lean construction, etc. for solar contractors.

BC6250 Value Management for Integrated Facility Design & Construction
Principles and methodology of value management analysis concepts. Focus on an examination of future values and worth criteria affecting building design, construction, furnishings, and operations performance.

BC6550 – Design & Construction Processes
Sustainable Building Design, Construction, & Delivery
An overview of emerging delivery systems for high performance green buildings and the basis for evaluating sustainability. Focus on The U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) criteria.

BC 3630 - Project Management I
Construction Scheduling and Planning
Construction planning and management techniques for project design and construction. Focus on different scheduling methods and their use.

BC 4610 – Value Engineering & Building Economics
Engineering Economic Analysis Methods and Applications in building project. Focus on the fundamentals of Value Engineering for functional analysis and life cycle costing.

New Post Professional Architecture Masters' Degrees (MS Arch Degrees)

College of Architecture, MS Arch – Health and Design
Worked in the Healthcare and Healthy Environments Task Force under Chair Craig Zimring from 2008-2009 to prepare program description, course work, research requirements, etc.

College of Architecture, MS Arch - Architecture/Engineering/Construction Integration
Worked in the Architecture/Engineering/Construction Integration Task Force under Chuck Eastman from 2008-2009 to prepare program description, course work, research requirements, etc.

D. Interdisciplinary Teaching

"Valuation Methods for Infrastructure Decision Making under Uncertainty"
The webinar proposal was developed by Baabak Ashuri and Mike Garvin (Virginia Tech). It was accepted by the Infrastructure Systems Committee, Transportation and Development Institute (T&DI), American Society of Civil Engineers (ASCE). The webinar is planned to offer sometime in fall 2013.

"Design-Build Institute of America (DBIA) Certified Instructor"
Dr. Ashuri is the certified instructor of the Design-Build Institute of America (DBIA), an association of leaders in the design and construction industry utilizing design-build and integrated project delivery systems to achieve high performance projects.

"Asset Valuation" & "Public-Private Partnerships"
These two course modules were developed jointly with Susan L. Tighe, Professor and Canada Research Chair in Sustainable Pavement and Infrastructure Management at the Department of Civil and Environmental Engineering in University of Waterloo, Ontario, Canada. These courses were offered in the Graduate/PhD Asset Management Boot Camp of the Annual Interuniversity Symposium on Infrastructure Management at the University of Delaware in Newark, DE in June 2010 and Georgia Tech in June 2012.

"Human Decision Making" & "Risk Management"
The proposal was developed by Dr. Ashuri for the Living Learning Communities at Georgia Tech's Campus, fall 2008.

E. Awards and Recognition

Certified educator of the Design-Build Institute of America (DBIA™), August 2013.

Completed the American Council for Construction Education (ACCE) accreditation workshop, AACE Annual meeting, Baton Rouge, LA, February 2013.

Certified reviewer for accreditation of construction management and building construction program, American Council for Construction Education (ACCE), February 2013.

Design-Build Institute of America (DBIA™) Professional Certified, January 2013.

Completed "Successes in Accelerating Project Delivery" Workshop, Transportation Research Board (TRB), 92nd Annual Meeting, Washington D.C., January 13, 2013.

Completed all required courses for the Design-Build Institute of America (DBIA™) Certification (Fundamentals of Project Delivery, Principles of Design-Build Project Delivery, Design-Build Contract and Risk Management, and Post Award Design Build), Atlanta, GA, October 2012.

Class of 1969 Teaching Fellow, 2009-2010 academic year, Georgia Institute of Technology, Atlanta, Georgia, May 2010.

Recipient of a *Thank a Teacher* Certificate, Center for the Enhancement of Teaching and Learning (CETL), Georgia Tech, December 2009.

Completed Lean Construction Education Program, May 2009.

Completed "Transportation Risk Management" Workshop, Transportation Research Board (TRB), 88th Annual Meeting, Washington D.C., January 11, 2009.

F. Student Awards

Three of my PhD students, Jian Lu, Hamed Kashani, and Mohsen Shahandashti, were selected in a competitive process by the Construction Industry Institute (CII) to present their work in 2010, 2011, and 2013 CII annual conferences, respectively. Registration fees were waived for these students to attend CII conferences.

The Student Construction Association's (SCA) Commercial Construction Group won the 2nd place in the 2009 Associated Schools of Construction (ASC) Competition in Jacksonville, Florida. Each year, a competition is hosted by the ASC featuring nearly every school with a construction management degree program in the Southeastern United States. In 2009 competitors were Georgia Tech, University of Florida, Clemson University, Auburn, Virginia Tech, Southern Polytechnic State University, Georgia Southern, UNC Charlotte, University of North Florida, and Western Carolina University. The team was led by the SCA academic advisor Dr. Baabak Ashuri.

My PhD student Mr. Mohsen Shahandashti won the 2011 International Facility Management Association (IFMA) Foundation Scholarship Award. He was selected to receive a $2,000 scholarship award. As a part of his scholarship package, he received a complimentary student registration to attend the IFMA's World Workplace 2011 (October 26-28) in Phoenix, AZ, plus transportation and meal reimbursement, and hotel accommodations.

My Master's student in the School of Building Construction Mr. Derji Thomas won the 2011 Auxiliary Service IMPACT Scholarship Award. There were 151 applications for IMPACT scholarships in Spring 2011.

Undergraduate student Seungho Shin won Outstanding Poster Presentation Award, representing his research on "Regression Analysis Model for Predicting Construction Cost Index," in Georgia Tech's Undergraduate Research Spring 2010 Symposium. SeungHo's work is one of the more than

120 different research projects that Georgia Tech students presented at the Undergraduate Research Spring Symposium on March 16, 2010 in the Student Center Ballroom.

Undergraduate student Seungho Shin won the Fall 2012 President's Undergraduate Research Award (PURA), for the project "Modeling Probabilistic Risk Assessment for Volatility of Transportation Construction Material Prices" (July 2012).

Undergraduate student Jingwei Zhou won the Fall 2010 President's Undergraduate Research Award (PURA), for the project "Life Cycle Cost Analysis and Risk Analysis of Highway Improvement and Expansion" (July 2010).

Undergraduate student Seungho Shin won the Spring 2010 President's Undergraduate Research Award (PURA), for the project "Studying the Impact of Labor Market and Construction Volume on Building Construction Cost" (January 2010).

Undergraduate student Rustann Solomero won the Fall 2009 President's Undergraduate Research Award (PURA), for the project "Models for Predicting Construction Cost" (July 2009).

G. Contributor and Reviewer of Textbooks

Invited as the technical reviewer to critically examine the outline of the second edition of textbook "Management of Construction Projects: A Constructor's Perspective" by J. Schaufelberger and L. Holm Prentice Hall PTR, 2013.

Recognized as contributors to the end of chapter practice problems for the textbook "Engineering Economic Analysis" by D. Newnan, T. Eschenbach, and J. Lavelle, Oxford University Press, 11th edition, 2011.

Recognized as the Technical Reviewer of the content of textbook "Business Analytics: Data Analysis and Decision Making" by S.C. Albright, W.L. Winston, and C.J. Zappe, Cengage Learning, 2011.

Recognized as the technical reviewer of the content of textbook "Management of Construction Projects: A Constructor's Perspective" by J. Schaufelberger and L. Holm Prentice Hall PTR, 2002.

IV. RESEARCH, SCHOLARSHIP AND CREATIVE ACTIVITIES

A. External Proposals and Grants

Title: Valuation of Investments in Building Energy Improvements under Uncertainties
Role: Principal Investigator
Funding: $250,000
Source: Civil Infrastructure Systems Program, Division of Civil, Mechanical and Manufacturing Innovation, National Science Foundation
Duration: August 2013-August 2015
Purpose: The objective of this research is to create an investment valuation model to assess building energy-saving projects under uncertainty that takes into account the future of energy prices and the cost and performance of energy-saving technologies. This investment valuation model will determine the optimal time of investment for the building energy-saving project. The proposed model is based on a real options formulation. An alternative method will be developed to estimate the volatility of the investment that captures the impact of the uncertainty on the value of

the energy-saving project. The proposed investment valuation model will be used to examine how uncertainty potentially influences the behavior of decision makers when dealing with energy-saving projects and in this way provide some theoretical insights. Actual energy-saving projects will be utilized to refine and validate the developed model. If successful, this project will provide the research community with a well-founded investment valuation model that will be tailored for energy-saving investments. This research will assist investors to make hard energy-saving decisions that increase the likelihood of achieving ambitious national energy reduction goals over the long-term. By holding workshops, the research outcomes will be communicated to building energy professionals. This research engages a large number of underrepresented, economically disadvantaged students from the joint program between the Georgia Tech Center for Education Integrating Science, Mathematics and Computing (CEISMC) and the Rockdale High School (a high needs Title I school) that focuses in science, technology, engineering, and mathematics (STEM) learning activities. This activity is intended to raise awareness about energy efficiency of high school students. High school students and their teachers will be hosted in the Georgia Tech Economics of Sustainable Built Environment Lab for a four-week research boot camp in energy-efficient buildings.

Title: Streamlining Project Delivery through Risk Analysis
Role: Principal Investigator (Co-Principal Investigators: Dr. Gordon Kingsley and Dr. Juan Rogers (School of Public Policy, Georgia Tech))
Funding: $499,994
Source: Georgia Department of Transportation
Duration: April 2013-April 2015
Purpose: The major objective of this research is to elevate the current state of practice in risk management through early identification of risk in transportation projects based on project type, complexity, and sourcing decisions. The project will lead to the development of a comprehensive guidebook that advances the adoption of risk analysis tools to enhance the process of project delivery in GDOT. The deliverable will be a set of best practices for risk analysis that helps GDOT reduce undesirable project outcomes (cost overrun and schedule delay) and streamline project delivery.

Title: Managing a Portfolio of Projects – Metrics for Improvement
Role: Co-Principal Investigator (Principal Investigator: Ali Touran (Northeastern University) and Co-Principal Investigator: Ed Minchin (University of Florida))
Funding: $250,000 – Funded ($60,273 is Georgia Tech's budget)
Source: Construction Industry Institute (CII)
CII is a consortium of leading owners, engineering and construction contractors, and suppliers who have a singular mission: to improve the cost effectiveness of the capital facility project life cycle, from pre-project planning through completion and commissioning.
Duration: September 2012-August 2014
Purpose: The primary purpose of this research is to identify, analyze and recommend definitive best practices for effectively managing a portfolio of projects. Examples of specific management areas that will be investigated include resource management, financial management, risk management and portfolio metrics.

Title: Innovative Project Delivery Using Alternative Financing Mechanisms: Assessment of Benefits, Costs, and Risks
Role: Principal Investigator
Funding: $206,164.00
Source: Georgia Department of Transportation
Duration: March 2013-September 2014

Purpose: The overarching objective of this project is to enhance understanding of GDOT regarding the complexity of combining financing into the innovative project delivery process. Especially, the goal of this research is to identify and analyze major opportunities, risks, and best practices for utilizing alternative financing mechanisms in developing surface transportation projects through innovative project delivery system.

Title: Solar, Installation, Mounting, Production, Labor, and Equipment Balance of System (SIMPLE BoS)
Role: Subcontractor to the Georgia Tech Research Institute (GTRI) in year 2 for conducting productivity and time and motion study (The project is led by the Georgia Tech Research Institute (GTRI, Atlanta, Georgia, U.S.) in collaboration with Suniva (Norcross, Georgia, U.S.) and Radiance Solar (Atlanta, Georgia, U.S.).
Funding: $41,006
Source: Department of Energy's (DOE's) SunShot Initiative (The GTRI project is $2.87 Million Federal, $5.87Million Total Project Value)
Duration: January 2013-December 2013
Purpose: Develop a productivity analysis course for preparing students to conduct productivity research, and time and motion study.

Title: A Systematic Approach for the Assessment of Green Opportunities for Electrical Contractors
Role: Principal Investigator
Funding: $7,000 – Funded
Source: ELECTRI International – The Foundation for Electrical Construction
ELECTRI International awarded the PI a $7,000 special research grant through a partnership created by the Atlanta Chapter NECA and Lutron Electronics Company, Inc.
Duration: September 2012-August 2013
Purpose: (a) Develop and present a systematic approach to electrical contractors for the evaluation of major green opportunities based on their main characteristics and potential benefits and risks and (b) Develop an investment valuation tool that can be used by electrical contractors to present green opportunities to prospective clients

Title: Best Practices for Determining Value of Research Results
Role: Principal Investigator
Funding: $30,000 – Funded
Source: The Southeast Transportation Consortium (STC) and the Louisiana Transportation Research Center (LTRC)
Duration: June 2012 – May 2013
Challenges: A need to demonstrate the impact that research has on transportation system safety and cost effectiveness; A variety of methods for determining the qualitative and/or quantitative value of transportation research project results; Facilitate focus groups and Delphi studies to retrieve subject matter experts' opinions.
Outcomes: Identify and compile best practices of determining research value; Specify information required to reasonably determine benefits of implementing research.

Title: Development of Risk Management Strategies for State DOTs to Effectively Deal with Volatile Prices of Transportation Construction Materials
Role: Principal Investigator
Funding: $169,045 – Funded ($76,552 from UTC; $92,493 from GDOT)

Source: Georgia Tech University Transportation Center (UTC), The US Department of Transportation/Research & Innovative Technology Administration, with the matching fund provided by the Georgia Department of Transportation.
Duration: May 2012 – January 2014
Challenges: Despite emerging developments in risk mitigation strategies, transportation agencies require a systematic approach to identify and examine the effectiveness and efficiency of different risk management strategies for their portfolios of transportation projects. There has been no comprehensive research to identify the key features of major risk management strategies and assess their appropriateness considering specific project goals and agencies' strategic objectives. Also, the impact of major risk management strategies on transportation agencies' cost savings profiles is not rigorously quantified. Further, existing risk management strategies are often insufficient since material prices are subject to substantial volatility, which timing and magnitude cannot be predicted accurately by transportation agencies and contractors. Therefore, there is a need for innovative and flexible risk management strategies that can effectively hedge the material price volatility risk.
Outcomes: Enhance transportation agencies' understanding of the opportunities, challenges and best practices for utilizing risk management strategies for the material price volatility in transportation projects; Identify and analyze the latest developments and trends in utilization of risk management strategies for the mitigation of material price risk (e.g., major highway project characteristics, contractual relationships, transportation agencies' objectives, institutional capabilities, enabling legislations and acceptance by highway contractor communities); Identify key features for the most promising risk management strategies and establish their respective potential benefits and limitations; Enhance the assessment of risk management strategies considering the strategic objectives of transportation agencies and unique project goals; Enhance the quantitative assessment of risk management strategies considering their key respective parameters; Devise appropriate risk identification and allocation matrices for the successful adoption of major risk management strategies.
Deliverable: A comprehensive risk management guide that systematically addresses risk management for material price volatility in different types of highway projects at various phases of project development.

Title: How Can Innovative Project Delivery Systems Improve GDOT's Overall Efficiency in Transportation Project Delivery?
Role: Principal Investigator
Funding: $199,976 – Funded
Source: Georgia Department of Transportation
Duration: October 2011 – March 2013
Purpose: The overarching objective of this research project is to develop a best-practices guidebook to show how the effective adoption of Innovative Project Delivery Systems can help GDOT expedite the delivery of transportation projects, enhance the Department's efficiency, and achieve the higher levels of performance and compliance with transparency, legal, and statutory expectations.
We will study how Innovative Project Delivery Systems have contributed to the State DOTs' efficiency in the development and delivery of the transportation projects across the nation and how GDOT can utilize Innovative Project Delivery Systems, in order to enhance its efficiency. Several State DOTs' experiences with innovative program delivery will be studied to identify appropriate mechanisms that the State DOTs have employed to fully utilize the benefits of Innovative Project Delivery Systems and enhance their efficiency at the organizational level. Specifically, we will examine the enabling regulations and statutory provisions that facilitate the adoption of Innovative Project Delivery Systems in other State DOTs. We will conduct research to identify and document the actual benefits that have been realized by State DOTs through the successful utilization of

Innovative Project Delivery Systems. The major issues, challenges and barriers that the State DOTs have faced in the utilization of Innovative Project Delivery Systems will be identified and the mechanisms and strategies that State DOTs have employed to overcome these barriers will be explored.
It is anticipated that the findings of this research project will be used to develop a guidebook describing a set of best practices in implementing Innovative Project Delivery Systems. The Georgia Department of Transportation (GDOT) can use the outcomes of this research, in order to (a) expedite transportation project delivery; and (b) enhance the Department's efficiency to achieve the higher levels of performance in compliance with the transparency, legal, and statutory expectations. This project is proposed in response to these pressing research needs.

Title: Timing of Investments in Building Solar Energy Intervention: A Real Options Framework to Evaluate Investments in Solar Energy for Buildings
Role: Principal Investigator
Funding: $10,337 – Funded
Source: The Education Trust of The Royal Institution of Chartered Surveyors, London, UK
Duration: June 2011 – May 2012
Purpose: We created an investment valuation model, which specifies the best time for the implementation of solar energy systems in existing buildings. Our model characterizes investors' financial risk profiles in solar energy investments under uncertainties. Institutional building owners in the private and public sectors will benefit from our valuation model and make more-informed investment decisions about the viability and proper timing of solar retrofit solutions in existing buildings. We conducted the financial feasibility analysis of solar energy in existing buildings. We analyzed the financial viability of flexible, Solar-Ready Buildings and identified under which economic, technological and environmental conditions it is desirable to invest in delayed solar retrofit solutions. That is: When is it more attractive to delay the implementation of Photovoltaic (PV) panels and instead acquire only the option or flexibility to adopt the PV technology in the future? Property owners can use the findings of our analysis and make smarter investment decisions in renewable energy systems such as PV technologies.

Title: Recommended Guide for Next Generation of Transportation Design Build Procurement and Contracting in the State of Georgia
Recipient of 2013 High Value Research "Sweet Sixteen" Award by the Value of Research Task Force, the American Association of State Highway and Transportation Officials (AASHTO)
Role: Principal Investigator
Funding: $172,242 – Funded
Source: Georgia Department of Transportation
Duration: August 2010 – July 2012
Purpose: The overall objective of the project is to develop a Transportation Design Build Guidebook for use by the GDOT to better implement and expand Design Build contracting in highway construction programs.
The major specific research objectives are:
- Improve assessment procedures for identifying candidate projects for Design Build methodology
- Enhance decision-making processes of evaluating Design Build Teams for a project
- Utilize innovative risk allocation strategies in Design Build contracting and procurement

Title: AUMScore®, Multifamily Property Utility Benchmarking Program
Role: Principal Investigator
Funding: $37,977 – Funded
Source: American Utility Management (AUM), Inc.

Duration: August 2010 – May 2011
Purpose: Analyze Energy Performance in Multifamily Properties and create an Energy Benchmarking Program using Data Envelopment Analysis Methodology.
We developed AUMScore® (SCORE stands for "Statistical Comparison of Relative Efficiency"), a multifamily energy benchmarking tool that will enable property owners to compare their properties' energy usage across their own portfolios and across the multifamily industry. This tool promises to help owners drastically reduce their energy expenses and consumption by benchmarking energy use within a portfolio using continuously updated information from similar peer properties.
AUMScore® employs data envelopment analysis, a statistical model that compares up to 30 variables per property to determine which properties are the most efficient in their peer group. The tool uses a 12-month rolling total of energy and water usage to assure the most current data is utilized and smoothed out seasonally. The most efficient properties will receive an efficiency score of 100, and as they decrease in efficiency, property scores are decreased. AUMScore® is the only benchmarking tool in the multifamily industry with the flexibility to incorporate additional input and output variables as they become more relevant through research and market trending. Additionally, AUMScore® includes specific property trending reports and identifies energy reduction goals while comparing energy efficiency percentages. Property owners now have a tool to track real-time energy use throughout their entire real estate portfolio.

Title: A Time Series Model for Forecasting Construction Cost Index
Role: Principal Investigator
Funding: $7,590.97 – Funded
Source: The Education Trust of The Royal Institution of Chartered Surveyors, London, UK
Duration: August 2009 – July 2010
Purpose: One way to tackle the issue of construction cost variations in surveying is to create an appropriate model for predicting construction cost trends. This is important since the ability to predict construction price variations is necessary for more accurate cost estimation. Therefore, the problem of interest in this proposal is to discuss how time series analysis can be applied to develop predictive models for CCI. This proposal is original since the applicability of time series analysis has never been investigated for CCI in the U.S. Practical benefits of our proposal include:

- It promotes and advances theory and practice of surveying by incorporating expected price variations in cost estimating.
- Contractors can use price forecasts in preparing more accurate bids and reducing construction costs by better timed material purchase.
- International firms can reduce financial risk, increase successful bids, and assure reasonable profits.
- The public will be the ultimate beneficiaries of our work since their taxes will be spend more efficiently and effectively in infrastructure and construction projects by owner organizations.

Title: Development of Computational Models for Analysis of Thermal Conditioning of Materials
Role: Co-Principal Investigator (Principal Investigator: Barry Hojjatie (Valdosta State University) and Co-Principal Investigator: Hamid Garmestani (Georgia Institute of Technology))
Funding: $3,500 – Funded
Source: Valdosta State University
Duration: August 2010 – July 2011
Purpose: The objective of this study is to initiate a collaborate study with Schools of Building Construction and Materials Science and Engineering at Georgia Tech to develop computational models in MATLAB and ANSYS to predict the transient temperature and stress gradients and

residual stresses developed in materials subjected to various thermal conditioning and cooling treatments.

Title: Continuation Education Award
Role: Principal Investigator
Funding: $350 – Funded
Source: The Center for Emerging Technologies in Infrastructure. Bradley University, Peoria, IL.
Purpose: Grant to cover the registration fee and $250 Grant to cover the travel expenses for the International Construction Innovations Conference (ICIC) that was held in October 30-31, 2008 in Bradley University, Peoria, IL.

B. Internal Proposals and Grants Funded

Title: Determine the Impact and Effectiveness of BIM
Role: Principal Investigator
Funding: $32,000 – Funded
Source: Initiatives in Architecture and Building Innovation, Digital Building Laboratory (DBL)
Duration: August 2012 – June 2013
Purpose: The objective of this research is to determine the impact and effectiveness of BIM – in its varied dimensions. The impact of BIM will be quantified on various project variables, such as number of Requests for Information (RFIs) and Change Orders (COs), considering several project characteristics including project type (healthcare, federal, commercial, etc.), region of country, project delivery method, etc. The variables of projects that use BIM will be compared with the variables of projects that do not use BIM. Within the projects that use BIM, we will also compare the relative effectiveness of using BIM considering various project characteristics. For instance, the effectiveness of using BIM is compared between design-build and design-bid-build projects or between healthcare and federal projects.

Title: Pre-Teaching: Summer Undergraduate Research Experience (P-T SURE)
Role: Principal Investigator
Funding: $1,000 – Funded
Source: Subcontract from the general National Science Foundation grant to the CEISMC (Center for Education Integrating Science, Mathematics and Computing) Georgia Intern Fellowships for Teachers (GIFT) Program, Georgia Institute of Technology
Duration: Summer 2012
Purpose: Support Ms. Talia Knapp a Georgia Tech undergraduate student in the College of Computing

Title: Pricing Flexibility in Solar-Ready Homes
Role: Principal Investigator
Funding: $10,041 – Funded
Source: Georgia Tech Foundation (GTF)
Duration: August 2010 – June 2011
Purpose: The main objective of this project is to gain new knowledge about the viability of flexible solar ready retrofit solutions for existing homes: Under which economic, technological and environmental conditions is it desirable to invest in delayed solar retrofit solutions? That is: When is it more attractive to delay the implementation of Photovoltaic (PV) panels and instead acquire only the option or flexibility to adopt the PV technology in the future?

Title: Pre-Teaching: Summer Undergraduate Research Experience (P-T SURE)
Role: Principal Investigator
Funding: $1,000 – Funded
Source: Subcontract from the general National Science Foundation grant to the CEISMC (Center for Education Integrating Science, Mathematics and Computing) Georgia Intern Fellowships for Teachers (GIFT) Program, Georgia Institute of Technology
Duration: Summer 2011
Purpose: Support Mr. James Hite a Georgia Tech undergraduate student in the School of Earth and Atmospheric Science

Title: Undergraduate and Graduate Computer Lab Upgrades/Technology
Role: Co-Principal Investigator with Javier Irizarry and Kathy O Roper
Funding: $40,000 – Funded
Source: Georgia Tech, Technology Fee Fund
Duration: August 2009 – June 2010
Purpose: Upgrade 15 desktops in BC graduate and undergraduate lab

Title: Risk Management & Decision Analysis Software Packages
Role: Principal Investigator
Funding: $4,000 – Funded
Source: Georgia Tech, Technology Fee Fund
Duration: August 2009 – June 2010
Purpose: Software programs are integrated and important components of teaching risk management and decision analysis to students since they provide appropriate computational frameworks to exercise theoretical concepts in practice. Students are taught to use the state-of-the-art software to deal with complex decision situations, identify the sources of risk, analyze, and manage risks in construction projects. We choose the most appropriate software for risk management that are also industry standard.

Title: Project Management Software Packages
Role: Principal Investigator
Funding: $3,000 – Funded
Source: Georgia Tech, Technology Fee Fund
Duration: August 2009 – June 2010
Purpose: Software programs are integrated and important components of teaching project management to students since they provide appropriate computational frameworks to exercise planning, scheduling, and estimating in practice.

Title: Uncertainty Analysis Games for Teaching Construction Risk Management
Role: Principal Investigator
Funding: $1,000 – Funded
Source: Georgia Tech Foundation, Class of 1969 Teaching Fellow
Duration: August 2010 – June 2011
Purpose: Develop customized uncertainty analysis games for teaching risk analysis to construction project managers.

C. Published Books and Parts of Books

(1) Ashuri, B., Rouse W.B., and Augenbroe G. (2007). "Different Models of Work in the Modern Services Enterprise." *Work, workflow, and information systems*, IOS Press, Amsterdam, Netherlands.

D. Published Journal Papers (Refereed)

(2) Ashuri, B., Shahandashti, S.M., and Lu, J. (2012). "Empirical Tests for Identifying Leading Indicators of ENR Construction Cost Index." *Construction Management and Economics*, 30(11), 917-927.

(3) Ashuri, B. and Tavakolan, M. (2012). "A Fuzzy Enabled Hybrid Genetic Algorithm-Particle Swarm Optimization Approach to Solve Time-Cost-Resource Optimization (TCRO) Problems in Construction Project Planning." *ASCE Journal of Construction Engineering and Management*, 138(9), 1065–1074.

(4) Ashuri, B., Kashani, H, Molenaar, K.R., Lee, S. and Lu, J. (2012). "A Risk-neutral Pricing Approach for Evaluating BOT Highway Projects with Government Minimum Revenue Guarantee Options." *ASCE Journal of Construction Engineering and Management*, 138(4), 545-557.

(5) Ashuri, B., Lu, J., and Kashani, H. (2011). "A Real Options Framework to Evaluate Investments in Toll Road Projects Delivered under the Two-Phase Development Strategy." *Built Environment Project and Asset Management*, 1(1), 14-31 (Highly Commended Award Winner at the Emerald Literati Network Awards for Excellence 2012).

(6) Ashuri, B. and Lu, J. (2010). "Time Series Analysis of ENR Construction Cost Index." *ASCE Journal of Construction Engineering and Management*, 136(11), 1227-1237.

(7) Fard, J., Kangari, R., and Ashuri, B. (2010). "The Effects of Organizational Variables on Hospital Costs in Georgia." *International Journal of Facility Management*, 1(2), 1-21.

(8) Ashuri, B. (2010). "Valuation of Flexible Leases for Corporate Tenants Facing Uncertainty in Their Required Workspace." *International Journal of Strategic Property Management*, 14(1), 49-72.

(9) Durmus-pedini, A., and Ashuri, B. (2010). "An Overview of the Benefits and Risk Factors of Going Green in Existing Buildings." *International Journal of Facility Management*, 1(1), 1-15.

(10) Ashuri, B., Rouse W.B., and Augenbroe G. (2007). "Different Models of Work in the Modern Services Enterprise." *Information - Knowledge - Systems Management*, 6(1), 25-59.

(11) Mofid, M., Alizadegan R., Ashuri B., and Yavari A. (2001). "Computing the Kern of a General Cross-section." *Advances in Engineering Software*, 32(12), 949-955.

Accepted for Publication

(12) Kim, D. Y., Han, S. H., and Ashuri, B. "Financial Valuation of Investments in International Construction Markets: A Real Options Approach for Market Entry Decision Making." *ASEC Journal of Management in Engineering* (doi: http://dx.doi.org/10.1061/(ASCE)ME.1943-5479.0000152).

(13) Ashuri, B. and Tavakolan M. "A Shuffled Frog-Leaping Model for Solving Time-Cost-Resource Optimization (TCRO) Problems in Construction Project Planning." *ASCE Journal of Computing in Civil Engineering*.

(14) Shahandashti, S.M., and Ashuri, B. "Forecasting ENR Construction Cost Index using Multivariate Time Series Models." *ASCE Journal of Construction Engineering and Management*.

(15) Ashuri, B., Kashani, H., Lu, J., and Shahandashti, S.M. "Investment in solar energy: An alternative approach." *Royal Institution of Chartered Surveyors (RICS) Land Journal*, September 2013.

Under Review

(16) Sedehi, A., Roper, K., and Ashuri, B. "A Cost-Benefit Case for RFID Implementation in Hospitals: Adapting to Industry Reform." *Facilities*.

(17) Ashuri, B., Kashani, H., Lu, J., and Shahandashti, S.M. "An Investment Valuation Model for Renewable Energy Systems in Buildings." *ASCE Journal of Construction Engineering and Management*.

(18) Ashuri, B., Lu, J., and Shahandashti, M. (2013). "A Data Envelopment Analysis Model for Building Energy Efficiency Benchmarking." *ASCE Journal of Construction Engineering and Management* (in preparation)

E. Research Reports

(19) Ashuri, B., Shahandashti, S.M., and Tavakolan, M. (2013). "Synthesis of Best Practices for Determining Value of Research Results." Final Report LTRC Project No. 12-3PF, *The Southeast Transportation Consortium (STC) and the Louisiana Transportation Research Center (LTRC)*, Baton Rouge, Louisiana, May 2013.

(20) Ashuri, B., Mostaan, K., and Hannon, D. (2013). "How Can Innovative Project Delivery Systems Improve the Overall Efficiency of GDOT in Transportation Project Delivery?" Georgia DOT Research Project RP11-21, *Georgia Department of Transportation*, Atlanta, Georgia, April 2013.

(21) Ashuri, B., Kashani, H., Lu J., and Shahandashti, S.M. (2013). "Evaluation of Investment in Solar Energy." *Royal Institution of Chartered Surveyors (RICS)*, London, United Kingdom, January 2013.

(22) Ashuri, B., and Kashani, H. (2012). "Recommended Guide for Next Generation of Transportation Design Build Procurement and Contracting in the State of Georgia." Georgia DOT Research Project RP10-23, *Georgia Department of Transportation*, Atlanta, Georgia, September 2012. (Recipient of 2013 High Value Research "Sweet Sixteen" Award by the Value of Research Task Force, the American Association of State Highway and Transportation Officials (AASHTO))

(23) Ashuri, B. and Lu J. (2011). "Multifamily Property Utility Benchmarking Program." *American Utility Management (AUM), Inc.*, Lombard, IL.

(24) Ashuri, B. and Lu J. (2010). "Is it possible to forecast the construction costs index in the USA?" *Royal Institution of Chartered Surveyors (RICS)*, London, United Kingdom.

F. Conference Proceedings (Refereed)

(25) Ashuri, B., Ilbeigi, M., and Hui, Y. (2013). "Modeling and Forecasting Fluctuations of Asphalt Cement Price Index." *The Seventh International Structural Engineering and Construction Conference (ISEC-7)*, Honolulu, Hawaii, June 18-24, 2013.

(26) Ashuri, B. and Mostaan, K. (2013). "Challenges and Opportunities for Expediting Delivery of Design-Build Projects" *The Southeast University Transportation Center (UTC) Conference*, Orlando, Florida, April 4-5, 2013.

(27) Ashuri, B., Ilbeigi, M., and Hui, Y. (2013). "Development of Risk Management Strategies for State DOTs to Effectively Deal with Volatile Prices of Transportation Construction Materials." *The Southeast University Transportation Center (UTC) Conference*, Orlando, Florida, April 4-5, 2013.

(28) Shahandashti, S.M. and Ashuri, B. (2013). "Forecasting construction cost index using energy price as an explanatory variable." *49th ASC Annual International Conference Proceedings*, California Polytechnic State University, San Luis Obispo, California, April 9-13, 2013.

(29) Shahandashti, S.M., Mostaan, K., and Ashuri, B. (2013). "Methods for assessing longitudinal variations of energy productions by PV systems." *Proceedings of Architectural Engineering Conference 2013*, pp.113-122, State College, PA, April 3-5, 2013.

(30) Ashuri, B., Kashani, H., Lu, J., and Shahandashti, S.M. (2012). "Investments in Building Solar Energy Systems: Finding Proper Intervention Time." *Royal Institution of Chartered Surveyors Construction, Building and Real Estate Conference (2012 RICS COBRA)*, Las Vegas, Nevada, USA, September 11-13, 2012.

(31) Tavakolan, M., and Ashuri, B. (2012). "Simulation of Absorptive Capacity Impact on the Performance of Project Networks Learning." AEC 2012; 7th International Conference on Innovation in Architecture, Engineering and Construction, Sao Paolo, Brazil, August 15-17, 2012.

(32) Shahandashti, S. M. and Ashuri, B. (2012). "Forecasting Construction Cost Index in the United States Using Bivariate Vector Error Correction Models." *Management of Construction: Research to Practice (MCRP) CIB Conference*, Montreal, Canada, June 26-29, 2012.

(33) Ashuri, B., Shahandashti, S.M., and Lu, J. (2012). "Is the information available from historical time series data on economic, energy, and construction market variables useful to explain variations in ENR Construction Cost Index?" *2012 Construction Research Congress*, ASCE, Purdue University, West Lafayette, Indiana, May 21-23, 2012.

(34) Kashani, H., Ashuri, B., Lu, J., and Shahandashti, S.M. (2012). "A Real Options Model to Evaluate Investments in Photovoltaic (PV) Systems." *2012 Construction Research Congress*, ASCE, Purdue University, West Lafayette, Indiana, May 21-23, 2012.

(35) Tavakolan, M. and Ashuri, B., Tavakolan, R., and Farshchian, M.M. (2012). "Long Term Concessions on Public-Private-Partnership Projects, How to Make This Right?" *2012*

Construction Research Congress, ASCE, Purdue University, West Lafayette, Indiana, May 21-23, 2012.

(36) Tavakolan, M. and Ashuri, B. (2012). "Stochastic Optimization of Construction Projects Planning with Genetic Algorithm" *2012 Construction Research Congress*, ASCE, Purdue University, West Lafayette, Indiana, May 21-23, 2012.

(37) Tavakolan, M. and Ashuri, B. (2012). "Development of Fuzzy Enabled Shuffled Frog Leaping Algorithm with Activity Splitting Allowed in Construction Project Scheduling." *2012 Construction Research Congress*, ASCE, Purdue University, West Lafayette, Indiana, May 21-23, 2012.

(38) Shahandashti, S.M., and Ashuri, B. (2012). "Quantifying the Relationship between Construction Cost Index and Macroeconomic Factors in the United States." *Associated Schools of Construction International Proceedings of the 48th Annual International Conference*, Birmingham, UK, April 11-14, 2012.

(39) Tavakolan, M. and Ashuri, B. (2012). "Comparison of Evolutionary Algorithms in Non-dominated Solutions of Time-Cost-Resource Optimization Problem." *Associated Schools of Construction (ASC), 48th Annual International Conference*, Birmingham City University, April 11-14, 2012.

(40) Ashuri, B., Lu, J., Wang, X.Q., and Kashani, H. (2012). "Optimal Timing of Investment in Highway Expansion." *The Transportation Research Board 91st Annual Meeting*, Washington, D.C., January 22-26, 2012.

(41) Tavakolan, M., Ashuri, B., Chiara, N. (2011). "Development of Scheduling with Hybrid Genetic Algorithm-Particle Swarm Optimization." *2011 CSCE Annual Conference, 3rd International/9th Construction Specialty Conference*, Ottawa, Canada, June 14-17, 2011.

(42) Tavakolan, M., Ashuri, B., Chiara, N. (2011). "Applying the Shuffled Frog-Leaping Algorithm to Improve Scheduling of Construction Projects with Activity Splitting Allowed." *Int. Conference on Mgmt. Innovation Sustainable Built Envir.*, Amsterdam, June 20-22, 2011.

(43) Ashuri, B., Kashani, H., and Lu, J. (2011). "A Real Options Approach to Evaluating Investment in Solar Ready Buildings." *The 2011 ASCE Workshop of Computing in Civil Engineering* organized by University of Florida and Florida International University, Miami Beach Resort, Miami, Florida, USA, June 19-22, 2011.

(44) Ashuri, B. (2011). "An Investment Analysis Framework for Adopting Innovative Energy Retrofit Technologies in Existing Commercial and Industrial Buildings." Researching through the Roadmap: Planning & Design, *FIATECH 2011 Technology Conference & Showcase*, Phoenix, AZ, USA, April 18-20, 2011.

(45) Ashuri, B., Kashani, H., and Lu, J. (2011). "An Investment Analysis Framework for Energy Retrofit in Existing Buildings." *Associated Schools of Construction International Proceedings of the 47th Annual International Conference*, Omaha, Nebraska, April 6-9, 2011 (ASC – 2011 Best Paper Award).

(46) Ashuri, B. and Lu J. (2010). "Forecasting Construction Cost Index in the United States." *COBRA 2010 The Construction, Building and Real Estate Research Conference of the Royal Institution of Chartered Surveyors*, Dauphine Université, Paris, France, 2-3 September 2010.

(47) Ashuri, B., Kashani, H., and Lu, J. (2010). "Financial Valuation of Risk and Revenue Sharing Options in Build-Operate-Transfer (BOT) Highway Projects." *The 2010 Engineering Project Organizations Conference*, November 4-6, 2010.

(48) Kolahdoozan, S. and Ashuri, B. (2010). "Life Cycle Cost Analysis of Hybrid HVACs under Utility Price Uncertainty: A Real Option Approach." *The 6th International Conference on Innovation in Architecture, Engineering and Construction (AEC)*, (CD-ROM), the Pennsylvania State University, University Park, PA. Jane 9-11, 2010.

(49) Lu, J. and Ashuri, B. (2010). "A Real Options Valuation Model of Highway Project under Multistage Construction Mode." *The 6th International Conference on Innovation in Architecture, Engineering and Construction (AEC)*, (CD-ROM), the Pennsylvania State University, University Park, PA, Jane 9-11, 2010.

(50) Ashuri, B. and Kashani, H. (2010). "A Valuation Model for Choosing the Optimal Minimum Traffic Revenue Guarantee (MRG) in a Highway Project: A Real-Option Approach". *The 6th International Conference on Innovation in Architecture, Engineering and Construction (AEC)*, (CD-ROM), the Pennsylvania State University, University Park, PA, Jane 9-11, 2010.

(51) Kim, D. Y., Han, S. H., and Ashuri, B. (2010). "A Financial Market Entry Decision Model for International Construction Business Using Real Option Analysis and Monte Carlo Simulation." *2010 Construction Research Congress*, ASCE, Banff, Alberta, Canada, 1307-1315, May 8-10, 2010.

(52) Ashuri, B. and Lu, J. (2010). "Forecasting ENR Construction Cost Index: A Time Series Analysis Approach." *2010 Construction Research Congress*, ASCE, Banff, Alberta, Canada, 1345-1355, May 8-10, 2010.

(53) Kolahdoozan, S. and Ashuri, B. (2010). "Life Cycle Cost Analysis of Hybrid Chiller Plants under Dynamic Utility Prices." *2010 Construction Research Congress*, ASCE, Banff, Alberta, Canada, 1487-1497, May 8-10, 2010.

(54) Ashuri B., Kashani, H., Molenaar, K. R. and Lee, S. (2010). "A Valuation Model for Choosing the Optimal Minimum Revenue Guarantee (MRG) in a Highway Project: A Real-Option Approach." *2010 Construction Research Congress*, ASCE, Banff, Alberta, Canada, 1244-1253, May 8-10, 2010.

(55) Ashuri, B. and Lu, J. (2010) "Exponential Smoothing Time Series Models for Forecasting ENR Construction Cost Index". *The 46th Annual International Conference of the Associated Schools of Construction (ASC)*, (CD-ROM), Boston, Massachusetts, April 7-10, 2010.

(56) Ashuri, B., Augenbroe, G., Chiara, N., and Paredis, C. (2009) "How Can American AEC Firms Get the Lead in Sustainable Building Design? What a Potential Design Leader Should Know About "Green-Convertible Buildings." *2009 Specialty Conference Leadership and Management in Construction*, (CD-ROM), South Lake Tahoe, CA, November 5-7, 2009.

(57) Chiara, N., Dong F., and Ashuri, B. (2009). "Getting the Right Recipe: The Experiences and Challenges of Long-Term PPP Concessions." *2009 Specialty Conference Leadership and Management in Construction*, (CD-ROM), South Lake Tahoe, CA, November 5-7, 2009.

(58) Ashuri, B. (2009). "Issues Related to Partnerships between Academia, Construction Industry, & Public Sector." *International Conference on Construction Research Funding in the XXI Century*, (CD-ROM), Urbana, IL, July 8-10, 2009.

(59) Ashuri, B., Rouse W.B., & Bodner, D. (2008). "A Real Options Approach to Investment Decisions in Competitive, Dynamic Retail Markets." *2008 Hawaii International Conference on System Sciences*, (CD-ROM), Waikoloa, Big Island, HI, January 7-10, 2008.

(60) Ashuri, B. and Roper K.O. (2006). "Workspace Decision-making in the Era of Transformation." *2006 International Conference on Construction & Real Estate Management*, (CD-ROM), Orlando, FL. October 5-6, 2006.

(61) Ashuri, B., Rouse W.B., and Augenbroe G. (2005). "Data Collection Framework for Strategic Workspace Allocation in Knowledge-based Enterprises", *The 2005 American Society of Engineering Management conference*, (CD-ROM), Virginia Beach, VA, October 22, 2005.

(62) Ashuri, B. and Rouse W.B. (2004). "Framing Strategic Trade Offs between Traditional and Virtual Enterprises and Workplace." *International Federation of Automation Control (IFAC) Conference*, (CD-ROM), Atlanta, GA, June 14-18, 2004.

(63) Mofid, M., Ebrahimi Y., and Ashuri B. (2002). "On the Secondary Kern of a General Sub-section." *The Second International Conference on Advances in Structural Engineering and Mechanics*, (CD-ROM), Busan, Korea. August 21-23, 2002.

G. Conference Presentations

(64) Ashuri, B. (2007). "Investment analysis in competitive, dynamic retail markets." *INFORMS annual meeting, Seattle, WA*, November 2-3, 2007.

(65) Ashuri, B., Iyengar, V., Nigam, A., and Vergo, J. (2007). "Aggregation of expert assessments during IT project portfolio management." *Georgia Tech Graduate Technical Symposium, Atlanta, GA*, March 15-16, 2007.

H. Poster Presentations

(66) Shahandashti, S.M. and Ashuri, B. (2013). "Enhancing Cost Escalation Estimation Using Macroeconomic, Energy and Construction Market Variables", *2013 CII Annual Conference*, Orlando, Fl.

(67) Shahandashti, S.M., Ashuri, B., Kashani, H., and Lee, J. (2012). "Valuation of investments in building energy improvement options under uncertainty", *2012 Construction Research Congress*, West Lafayette, IN, May 21-23, 2012.

(68) Stephenson, R. and Ashuri, B. (2012). "The Effects of Green Building Certification on Housing Prices in Metropolitan Atlanta", *Georgia Tech Research and Innovation Conference*, February 7, 2012.

(69) Hite, J. and Ashuri, B. (2011). "Assessing Building Efficiency and Introducing Concepts to High School Students", *2011 End of Summer Celebration Luncheon*, CEISMC – Center for Education, Integrating Science Math and Computing, Georgia Institute of Technology, July 22, 2011.

(70) Kashani, H., Lu, J., Shahandashti, S.M., and Ashuri, B. (2011). "Optimal timing of investments in energy efficient buildings", *2011 CII Annual Conference*, Chicago, IL.

(71) Phometsi, M. and Ashuri, B. (2011). "Workspace Flexibility Valuation", *Georgia Tech Research and Innovation Conference*, February 8, 2011.

(72) Ashuri, B., Kashani, H., and Lu, J. (2010). "Investment Decision Making about Transportation Infrastructure Systems: A Real Options Model for Evaluating Build-Operate-Transfer (BOT) Highway Projects."*2010 CII Annual Conference, Orlando, FL*, August 3-5, 2010.

(73) Ashuri, B. and Kashani H. (2009). "Flexible Methods for the Development and Preservation of Transportation Infrastructure Systems: A Real Option Approach for Infrastructure Investment Decision Making." *The Conference on Developing a Research Agenda for Transportation Infrastructure Preservation and Renewal, Washington, DC*, November 12-13, 2009.

(74) Ashuri, B., Lu J., and Chiara N. (2009). "Time series forecasting of ENR construction cost index." *2009 CII Annual Conference, Reno, NV*, July 28–30, 2009.

I. Invited Lectures, Keynote Addresses

(75) Ashuri, B. (2013). "Productivity Analysis of Mechanical, Electrical, and Plumbing (MEP) Coordination." *2013 Annual GA Tech Digital Building Laboratory (DBL) Industry Symposium*, Georgia Institute of Technology, Atlanta, GA, May 6, 2013.

(76) Ashuri, B. (2013). "Overview of Economics of the Built Environment (ESBE) Research Lab." *School of Building Construction Ph.D. Seminar*, Georgia Institute of Technology, March 12, 2013.

(77) Ashuri, B. (2013). "Assessment of Current Practices for Determining Value of Research." *2013 Annual Meeting of the Southeast Transportation Consortium (STC)*, Baton Rouge, LA, March 5, 2013.

(78) Ashuri, B. (2013). "Assessment of BIM Projects." *Visit by JE Dunn Construction to the Digital Building Laboratory*, Hinman Conference Room, January 30, 2013.

(79) Shahandashti, M. and Ashuri, B. (2012). "Introduction to Investments in Photovoltaic Systems." *2012 Siemens Competition-High School Workshop*, Georgia Tech, November 16, 2012.

(80) Ashuri, B. (2011). "Timing of Investments in Solar Energy for Existing Buildings." *Building Technology Seminar*, College of Architecture, Georgia Institute of Technology, December 16, 2011.

(81) Ashuri, B. (2011). "Pricing Flexibility in Solar Ready Homes." *College of Architecture Research Forum*, Architecture Library, Georgia Institute of Technology, November 17, 2011.

(82) VanMeter, D. and Ashuri, B. (2011). "Georgia Department of Transportation's Design Build Program." *State DOT Design-Build Users Group Quarterly Meeting*, September 30, 2011.

(83) Ashuri, B. (2011). "Investment Valuation Framework for Energy-Efficient, Sustainable Buildings." Advanced Infrastructure Systems, Department of Civil and Environmental Engineering, *Carnegie Mellon University*, Pittsburg, PA, February 4, 2011 (All expenses for this trip were covered by the CEE Department at CMU).

(84) Ashuri, B. (2011). "Sustainability: Metrics and Tools for Sustainable Capital Facilities." *Second Annual GA Tech Digital Building Laboratory (DBL) Industry Symposium*, Georgia Institute of Technology, Atlanta, GA, May 25, 2011.

(85) Ashuri, B. (2010). "Pricing Methods for Retrofit Decision-making." *Digital Building Laboratory (DBL) Symposium*, Manufacturing Research Center Auditorium, Georgia Institute of Technology, Atlanta, GA, June 15, 2010.

(86) Ashuri, B. (2010). "An Analytic Framework for Lifecycle Facility Costs Analysis." *Digital Building Laboratory (DBL) Member Meeting*, Georgia Institute of Technology, Atlanta, GA, October 29, 2010.

(87) Ashuri, B. (2010). "Real Options Applications in the Built Environment Research." *The First Year Doctoral Seminar*, College of Architecture, Georgia Institute of Technology, Atlanta, GA, March 31, 2010.

(88) Ashuri, B. (2009). "Healthcare Decision-Making under Uncertainty." *Healthcare Design & Planning Research, Health Systems Institute*, Georgia Institute of Technology, October 22, 2009.

(89) Ashuri B. (2009). "Issues Related to Funding Research in Construction." Invited to the International Conference on Construction Research Funding in the XXI Century: A Partnership between Academia, Industry, and the Public Sector, *Sponsored by National Science Foundation*, Urbana, IL, July 8-10, 2009.

(90) Ashuri, B. (2009). "A Real Option Approach to Evaluate Flexibilities in Healthcare Development/Design." *Charles Pankow Foundation*, Claremont, CA, June 4, 2009.

(91) Ashuri, B. (2009). "A Real Option Approach to Evaluate Flexibilities On/In Building Systems." Engineering & Project Management Program, *University of California at Berkeley*, Berkeley, CA, June 3, 2009.

(92) Ashuri, B. (2009). "Valuation of Flexible Options On/In Built Environment Systems." Joint CIFE-CRGP Seminar, *Stanford University*, Stanford, CA, June 1, 2009.

(93) Ashuri, B. (2009). "Valuation of Flexibilities On/In Building Systems." Construction Engineering & Management Program, *University of Colorado at Boulder*, Boulder, CO, May 21, 2009.

(94) Ashuri, B. (2009). "Time Series Analysis Applications in Construction Research." Construction Management Program, *Colorado State University*, Fort Collins, CO, May 20, 2009.

(95) Ashuri, B. (2009). "New Generation Financial Modeling: Decision Making about Healthcare Design & Planning under Uncertainty." *Noblis/Georgia Tech Healthcare Meeting*, *Health Systems Institute*, February 23, 2009.

(96) Ashuri, B. (2009). "Flexibility Management for Handling Project Risks." Department of Decision Science, School of Business, *George Washington University*, Washington, DC, January 15, 2009.

(97) Ashuri, B. (2009). "Flexibility Management for Handling Construction Project Risks." Project Management Program, *University of Maryland*, College Park, MD, January 14, 2009.

(98) Ashuri, B. (2008). "An Overview of Construction Management Profession." *The Common First Year*, College of Architecture, Georgia Institute of Technology, Atlanta, GA, November 19, 2008.

J. Invention Disclosures

GTRC-5807: "Peer-to-peer Energy (Water) Benchmarking Model for the Multifamily Building Industry"

K. Developed Software

Design-Build Project Delivery Assessment, Java Applet Tool, Developed for the Georgia Department of Transportation

Design-Build Risk Allocation, Java Applet Tool, Developed for the Georgia Department of Transportation

L. Research Podcasts

"Georgia Tech researcher sheds light on the creation of AUMScore®." Posted on the American Utility Management (AUM) weblog at:
http://blog.aum-inc.com/2011/12/08/georgia-tech-researcher-sheds-light-on-the-creation-of-aumscore/.

M. External Proposals and Grants (Pending or Not Funded)

Title: CAREER: Investing in Sustainability – Investment Valuation of Building Energy Interventions under Uncertainties
Role: Principal Investigator
Source: Environmental Sustainability Program, Division of Chemical, Bioengineering, Environmental, and Transport Systems, National Science Foundation

Title: Alternative Funding Sources and Innovative Financing Mechanisms for Development of Surface Transportation Projects in Southeast: Assessment of Opportunities and Risks
Role: Principal Investigator (Co-Principal Investigators: Abdol Chini and Ed Minchin (University of Florida))

Source: Southeastern Transportation Research, Innovation, Development and Education Center (STRIDE)

Title: An Empirical Study of Resource Expenditure & Efficiency Impact of Single-Step (Turnkey) Design-Build
Role: Principal Investigator
Source: Design-Build Institute of America (DBIA)

Title: Transportation Asset Management Gap Analysis Tool
Role: Co-Principal Investigator (Principal Investigator: Adjo Amekudzi (School of Civil and Environmental Engineering) and Co-Principal Investigator: Yi-Chang Tsai (School of Civil and Environmental Engineering))
Source: National Cooperative Highway Research Program (NCHRP 08-90), Transportation Research Board (TRB)

Title: Guidelines for Development of Public Private Partnership Procurements in Southeast U.S.
Role: Co-Principal Investigator (Principal Investigator: Abdol Chini (University of Florida), Co-Principal Investigators: Ed Minchin (University of Florida) and Scott Kramer (Auburn University))
Source: Southeastern Transportation Research, Innovation, Development and Education Center (STRIDE)

Title: National Residential Solar Center (NReSC)
Role: Collaborator (Principal Investigator: Joseph Goodman (Georgia Tech Applied Research Corporation (GTARC))
Source: FOA #DE-FOA-0000653 Plug and Play Photovoltaics

Title: Advanced Quantitative Evaluation Services
Role: Co-Principal Investigator (Principal Investigator: Dr. Herbert Barber (Xicon Infrastructure), Co-Principal Investigators: Dr. Santiago Grijalva (Electrical and Computer Engineering, Georgia Tech), Dr. Shi-Jie Deng (Industrial and Systems Engineering, Georgia Tech), Dr. Pat Naidoo (Xicon Infrastructure), and Dr. Jerry Bowers (Advent Consulting))
Source: Sacramento Municipal Utility District (SMUD)

Title: Identifying Leading Indicators of Construction Cost to Enhance Cost Estimation in the United States
Role: Principal Investigator
Source: Royal Institution of Chartered Surveyors (RICS), London, UK

Title: Developing Green Specifications for Road and Bridge Construction
Role: Co-Principal Investigator (Principal Investigator: Abdol Chini (University of Florida), Co-Principal Investigators: Ruth Steiner (University of Florida) and Yimin Zhu (Florida International University))
Source: Southeastern Transportation Research, Innovation, Development and Education Center (STRIDE)

Title: Framework for Investment Dynamics Simulation in Transportation Infrastructure Projects
Role: Co-Principal Investigator (Principal Investigator: Islam El-adaway (Mississippi State University), Co-Principal Investigator: Li Zhang (Mississippi State University))
Source: Southeastern Transportation Research, Innovation, Development and Education Center (STRIDE)

Title: Investment Valuation of Building Energy Improvement Options under Uncertainties about Energy Savings
Role: Principal Investigator
Source: Environmental Sustainability Program, Division of Chemical, Bioengineering, Environmental, and Transport Systems, National Science Foundation

Title: Index-Based Cost Estimation with Accuracy and Precision Analysis
Role: Co-Principal Investigator (Principal Investigator: Jack Faucett Associates, Inc (JFA), Co-Principal Investigators: Oman Systems, Inc (OSI) and Ralph Erickson (a former Division Chief at FHWA)
Source: Office of Acquisition Management, Federal Highway Administration
Title: A Guidebook for Portfolio Management for Transit Agencies
Role: Co-Principal Investigator (Principal Investigator: Ali Touran (Northeastern University))
Source: Transit Cooperative Research Program (TCRP), Transportation Research Board (TRB)

Title: A Framework to Assess the Effectiveness of Financing Instruments for Promoting Energy-Saving Interventions in the Affordable Housing Stock
Role: Co-Principal Investigator (Principal Investigator: Dan Immergluck (School of City and Regional Planning); Co-Principal Investigator: Godfried Augenbroe (College of Architecture))
Source: Department of Housing and Urban Development Transformation Initiative Research Grants: Sustainable Community Research Grant Program

Title: Effectiveness of Job Shadowing as a Tool to Motivate the Workforce (Pending)
Role: Principal Investigator
Source: Georgia Department of Transportation

Title: A Guidebook for Portfolio Management for Airports
Role: Co-Principal Investigator (Principal Investigator: Ali Touran (Northeastern University))
Source: Airport Cooperative Research Program (ACRP), Transportation Research Board (TRB)

Title: Understanding and Modeling the Longitudinal Variations of Energy Savings in Buildings
Role: Principal Investigator
Source: Civil Infrastructure Systems Program, Division of Civil, Mechanical and Manufacturing Innovation, National Science Foundation

Title: Guidebook for Successfully Assessing and Managing Risks for Airport Capital and Maintenance Projects
Role: Co-Principal Investigator (Principal Investigator: Giovanni Migliaccio (University of Washington); Co-Principal Investigators: Ahmed Aziz (University of Washington), Ben Emam (Tetra Tech Inc.), and Christopher Ferrell (CFA Consultants))
Source: Airport Cooperative Research Program (ACRP), Transportation Research Board (TRB)

Title: Assessing Economic Development Fiscal Impacts of Large-scale Transportation Investment Projects on Local Governments
Role: Co-Principal Investigator (Principal Investigator: Jiawen Yang (School of City and Regional Planning); Co-Principal Investigators: Steve French (School of City and Regional Planning) and Pat McCarthy (School of Economics))
Source: Georgia Department of Transportation

Title: Dynamic Investment Valuation Models for Building Energy Improvement Options under Uncertainties
Role: Principal Investigator
Source: Civil Infrastructure Systems Program, Division of Civil, Mechanical and Manufacturing Innovation, National Science Foundation

Title: Development of "Sustainable Property Index" for Commercial Real Estate Investments
Role: Principal Investigator (Co-Principal Investigator: Mani Golparvar-Fard (Virginia Tech) and Edward Pieterick (CH2M HILL))
Source: FIATECH, an international community of passionate stakeholders working together to lead global development and adoption of innovative practices and technologies to realize the highest business value throughout the life cycle of capital assets

Title: CAREER: Investment Valuation of Energy Improvements in Building Portfolios under Uncertainties
Role: Principal Investigator
Source: Civil Infrastructure Systems Program, Division of Civil, Mechanical and Manufacturing Innovation, National Science Foundation

Title: Sustainability Performance Measures for State Departments of Transportation and Other Transportation Agencies
Role: Principal Investigator (Co-Principal Investigator: Daniel Castro and Javier Irizarry (School of Building Construction))
Source: National Cooperative Highway Research Program (NCHRP), Transportation Research Board (TRB)

Title: Empirical Research on Georgia Design-Build Projects to Examine Project Success
Role: Principal Investigator (Co-Principal Investigators: Daniel Castro and Javier Irizarry (School of Building Construction))
Source: Georgia Department of Transportation

Title: Timing of Investments in Sustainability: A Real Options Framework to Evaluate Energy Interventions in Buildings
Role: Principal Investigator (Co-Principal Investigator: Godfried Augenbroe, College of Architecture)
Source: Civil Infrastructure Systems Program, Division of Civil, Mechanical and Manufacturing Innovation, National Science Foundation

Title: An Analytic Framework for Lifecycle Facility Costs Analysis
Role: Principal Investigator
Source: FIATECH

Title: Investing in Sustainability: A Real Options Approach to Evaluate Energy Interventions in Buildings
Role: Principal Investigator (Co-Principal Investigator: Godfried Augenbroe, College of Architecture)
Source: Environmental Sustainability Program, Division of Chemical, Bioengineering, Environmental, and Transport Systems, National Science Foundation

Title: A Life Cycle Return on Investment Analysis of Acuity-Adaptable Rooms:
A Real Option Valuation Approach

Role: Principal Investigator (Co-Principal Investigator: Nicola Chiara (Department of Civil Engineering and Engineering Mechanics, Columbia University))
Source: Research Coalition Funds, The Center for Health Design (CHD)

Title: Pricing Flexible Retrofit Solutions: A Systematic Methodology for Delayed Retrofit Decision-Making in Existing Homes
Role: Principal Investigator (Co-Principal Investigator: Godfried Augenbroe, College of Architecture)
Source: Environmental Sustainability Program, Division of Chemical, Bioengineering, Environmental, and Transport Systems, National Science Foundation

Title: Financing Green Projects: Opportunities & Strategies
Role: Principal Investigator
Source: the ELECTRI International – The Foundation for Electrical Construction

Title: Collaborative Research: Identification, Characterization, and Valuation Of Flexible Technologies And Systems For Green-Convertible Buildings
Role: Principal Investigator (Principal Investigator: Nicola Chiara (Department of Civil Engineering and Engineering Mechanics, Columbia University); Co-Principal Investigator: Godfried Augenbroe, College of Architecture and Chris Paredis, School of Mechanical Engineering)
Source: Environmental Sustainability Program, Division of Chemical, Bioengineering, Environmental, and Transport Systems, National Science Foundation

Title: Decision Support Tool for Adaptive Information Technology Strategic Investments
Role: Principal Investigator (Principal Investigator: Nicola Chiara (Department of Civil Engineering and Engineering Mechanics, Columbia University))
Source: Airport Cooperative Research Program (ACRP), Transportation Research Board (TRB)

Title: Public-Private Partnerships (PPPs) in the E.C. industry: Opportunities & Challenges
Role: Principal Investigator
Source: the ELECTRI International – The Foundation for Electrical Construction

Title: Collaborative Research: Adaptive/Profitable Wind Energy Systems
Role: Principal Investigator (Principal Investigator: Nicola Chiara (Department of Civil Engineering and Engineering Mechanics, Columbia University))
Source: Energy for Sustainability, Division of Chemical, Bioengineering, Environmental, and Transport Systems, National Science Foundation

Title: Incorporating Strategic Flexibility in Airport Design Life Cycle Cost Analysis (LCCA)
Role: Principal Investigator (Principal Investigator: Nicola Chiara (Department of Civil Engineering and Engineering Mechanics, Columbia University))
Source: Airport Cooperative Research Program (ACRP), Transportation Research Board (TRB)

Title: Improving the Accuracy of Project Outcome Predictions
Role: Co-Principal Investigator (Principal Investigator: Ali Touran (Northeastern University))
Source: Construction Industry Institute (CII)

Title: An Option Valuation Approach for the Assessment of Public-Private Initiatives (PPIs) for the Development of Highway Projects
Role: Principal Investigator (Co-Principal Investigator: Kathy Roper (School of Building Construction))
Source: Georgia Department of Transportation

Title: Collaborative Research: Identification, Characterization, and Valuation Of Flexible Systems for Green-Convertible Building Design Projects
Role: Principal Investigator (Principal Investigator: Nicola Chiara (Department of Civil Engineering and Engineering Mechanics, Columbia University))
Source: Environmental Sustainability Program, Division of Chemical, Bioengineering, Environmental, and Transport Systems, National Science Foundation

Title: Time Series Forecasting for Managing Price Fluctuations in the E.C. Industry
Role: Principal Investigator
Source: the ELECTRI International – The Foundation for Electrical Construction

Title: An Option Valuation Approach for Managing Uncertainty in Workspace Planning: A Case of Evaluating Innovative, Flexible Leasing Contracts
Role: Principal Investigator (Co-Principal Investigator: Kathy Roper (School of Building Construction))
Source: Royal Institution of Chartered Surveyors (RICS), London, UK

Title: Enhancing the Value of Healthcare Facilities by Flexible Design
Role: Principal Investigator (Co-Principal Investigator: Craig Zimring (College of Architecture))
Source: Noblis, a nonprofit research corporation headquartered in Falls Church, Virginia

Title: Collaborative Research: a New Design Paradigm to Manage Medium/Long-Term Uncertainty of Educational Facilities Systems
Role: Principal Investigator (Principal Investigator: Nicola Chiara (Department of Civil Engineering and Engineering Mechanics, Columbia University))
Source: Engineering and Systems Design, Division of Civil, Mechanical and Manufacturing Innovation, National Science Foundation

Title: Strategies for Coping with Volatile Materials Costs
Role: Principal Investigator (Co-Principal Investigator: Nicola Chiara (Department of Civil Engineering and Engineering Mechanics, Columbia University))
Source: Proposal for the 2009 William A. Klinger Memorial Award, The Associated General Contractors of America (AGC) Education & Research Foundation

Title: Risk Management: Needs, Opportunities, Benefits, and Challenges for Electrical Contractors
Role: Principal Investigator
Source: Early Career Award from the ELECTRI International – The Foundation for Electrical Construction

Title: Sustainability: The Next Steps for Industrial Capital Facility Delivery
Role: Principal Investigator (Co-Principal Investigators: Mark Hastak (Purdue University) and Sanjiv Gokhale (Vanderbilt University))
Source: Construction Industry Institute (CII)

Title: Collaborative Research: Incorporating Strategic Flexibility in Building Design Life Cycle Cost Analysis (LCCA)
Role: Principal Investigator (Principal Investigator: Nicola Chiara (Department of Civil Engineering and Engineering Mechanics, Columbia University))
Source: Civil Infrastructure Systems Program, Division of Civil, Mechanical and Manufacturing Innovation, National Science Foundation

N. Internal Proposals and Grants (Pending or Not Funded)

Title: GT-FIRE Proposal: An Investment Valuation Tool for Energy Improvements in Building Portfolios under Uncertainties
Role: Principal Investigator
Source: GT-FIRE program – Georgia Tech Fund for Innovation in Research and Education, The Office of the Provost and Executive Vice President for Academic Affairs and the Office of the Executive Vice President for Research (EVPR)

Title: Multi-Scale Models for Energy Management of the Built Environment
Role: Collaborator (Principal Investigator: Godfried Augenbroe, College of Architecture)
Source: Preliminary Proposal for National Science Foundation-Sustainability Research Network (NSF-SRN)

Title: Energy Management and Policy Decisions
Role: Co-Principal Investigator (Principal Investigator: Godfried Augenbroe, College of Architecture)
Source: Internal Submission for Decision Making Under Uncertainty Collaborative Groups (DMUU), National Science Foundation

Title: Economic and Sustainability Assessment of Strategies
Role: Principal Investigator
Source: Digital Building Laboratory (DBL)

Title: Understanding and Modeling Performance of Photovoltaic Systems over Time **Role:** Principal Investigator
Source: Georgia Tech Foundation (GTF)

Title: Understanding the Market of Innovative Financing Mechanisms for Transportation Projects: Unique Opportunities and Risks
Role: Principal Investigator
Source: Georgia Tech University Transportation Center (UTC), The US Department of Transportation/Research & Innovative Technology Administration

Title: An Analytic Framework for Lifecycle Facility Costs Analysis
Role: Principal Investigator
Source: Initiatives in Architecture and Building Innovation, Digital Building Laboratory (DBL)

Title: New Generation Financial Modeling Tool for the Evaluation of Flexible Energy Efficient Building Systems
Role: Principal Investigator
Source: Science Applications International Corporation (SAIC) as part of SAIC's Strategic University Alliance with Georgia Tech

Title: A Time Series Model for Forecasting Construction Cost Index
Role: Principal Investigator
Source: Georgia Tech Foundation (GTF)

V. AWARDS

- Recipient of 2013 High Value Research "Sweet Sixteen" Award by the Value of Research Task Force, the American Association of State Highway and Transportation Officials (AASHTO)

- The Highly Commended Award Winner at the Emerald Literati Network Awards for Excellence 2012 for the paper "A real options framework to evaluate investments in toll road projects delivered under the two-phase development strategy" published in the *Built Environment Project and Asset Management Journal*, May 2012 (The co-authors are two of Dr. Ashuri's PhD students: Jian Lu and Hamed Kashani)

- Finalist for the Early Career Award from the ELECTRI International – The Foundation for Electrical Construction for the proposal "A Systematic Approach for the Assessment of Green Opportunities for Electrical Contractors", July 2012

- The Design-Build Institute of America (DBIA) awarded designated status to Dr. Ashuri upon his successful completion of coursework and formal examination in all aspects of design-build project delivery. By completing these requirements, candidates earn the right to display "DBIA" after their names, identifying them to design-build end-users and the industry at large as professionals experienced in this form of project delivery. DBIA certification demonstrates commitment to design-build done right. These design and construction professionals have mastered the best practices associated with the entire design-build process—from project procurement through post-award. Both A/E/C firms and public agencies train personnel from a variety of disciplines and departments in the best-practices developed by DBIA, December 2012

- Finalist for the Early Career Award from the ELECTRI International – The Foundation for Electrical Construction for the proposal "Business Feasibility Analysis of Electrical Retrofit Projects", July 2011

- The Education Trust of The Royal Institution of Chartered Surveyors, May 2011

- ASC – 2011 Best Paper Award (The Associated Schools of Construction International Proceedings of the 47th Annual International Conference), April 2011

- The Education Trust of The Royal Institution of Chartered Surveyors, May 2009

- National Science Foundation Scholarship, May 2005

- Design Build Institute of America Scholarship, December 2003

- Building Construction Alumni Graduate Fellowship, May 2003

- Georgia Persian Engineers and Scientists Fellowship, December 2002

VI. RECORD OF SERVICE ACTIVITIES

A. Professional Activities

Technical Committee Activities

- Member of the 2012 American Society of Civil Engineers (ASCE) Journal of Construction Engineering & Management (JCEM) Best Paper Committee

- Member of the *2012 Industry Leaders Council (ILC)* for the development of an Infrastructure Business and Financial Model Toolkit, American Society of Civil Engineers (ASCE)

- Technical Committee Member for the Development of *Construction Phase Sustainability Metrics*, Construction Industry Institute Sustainability Community of Practice (CII COP)
- Expert Task Group (ETG) Member of the National Cooperative Highway Research Program (NCHRP) 15-46 "Design-Management Guide for Design-Build and Construction Manager/General Contractor Projects", The Transportation Research Board (TRB) of the National Academies

- Member of WK35212 – New Standard Highway Transportation Elements and Related Sitework UNIFORMAT II, ASTM E06.81 UNIFORMAT II Task Group, Building Economics Subcommittee, American Society for Testing and Materials (ASTM) International

- Invited Expert for the development of a joint position paper "Transparency in Procurement of Alternative Contracting," The American Association of State Highway and Transportation Officials (AASHTO)–The Associated General Contractors of America (AGC)–The American Road & Transportation Builders Association (ARTBA) Joint Committee

- Professional Leader Interviewed for the Corporate Real Estate 2020 Final Report: Sustainability, *CoreNet Global, Inc.*, May 2012

- Professional Leader Interviewed for the Corporate Real Estate 2020 Final Report: Partnering with Key Support Functions, *CoreNet Global, Inc.*, May 2012

- Expert Task Group (ETG) Member, *Strategic Highway Research Program (SHRP 2),* Project C12 "Effect of Public-Private Partnerships and Non-Traditional Procurement Processes on Highway Planning, Environmental Review, and Collaborative Decision Making"

- Member, *Construction Industry Institute Sustainability Community of Practice (CII COP)*

- Member, *Construction Industry Institute Risk Management Community of Practice (CII RM)*

- Member, Academic Committee, *Construction Industry Institute (CII)*

- Member, Academic Committee, *FIATECH Consortium*

- Member, *Associated Schools of Construction (ASC) Research Committee*

- Member, *American Council for Construction Education (ACCE) Research Committee*

- Member, *American Council for Construction Education (ACCE) Graduate Committee*

- Member, *Infrastructure Systems Committee*, ASCE Transportation & Development Institute (T&DI)

- Member, *ASCE Transportation & Development Institute (T&DI) Committee on Sustainability and Environment*

- Friend of the Committee, *Transportation Research Board Project Delivery Methods Committee (TRB AFH15)* of the Transportation Research Board of the National Academies

- Friend of the Committee, *Transportation Research Board Construction Management Committee (TRB AFH10)* of the Transportation Research Board of the National Academies

- Academic Advisor, *ecoInsight* (http://www.ecoinsight.com) the company committed to developing a High Performance Building platform that ensures energy efficiency, occupant comfort and financial performance

- Member, *SAVE International – Piedmont Chapter*, International society devoted to the advancement and promotion of the value methodology, value engineering, value analysis or value management

Society Offices and Memberships

- Construction Research Congress (CRC)
- American Society of Civil Engineering (ASCE)
- Construction Institute (CI)
- Engineering Project Organization Society (EPOS)
- The Institute for Operations Research and the Management Sciences (INFORMS)
- American Society of Engineering Management (ASEM)
- Tennenbaum Institute (TI) for Enterprise Transformation
- International Society of Iranians in Industrial Engineering and Operations Research (ISI - IEOR)
- Georgia Section of the ASCE Construction Institute (CI) (Formal establishment in progress)

Technical Referee – Journals, Conference Proceedings and Panels

- Assistant Specialty Editor of Quantitative Methods on The Editorial Board of the prestigious American Society of Civil Engineers (ASCE) *Journal of Construction Engineering & Management*; (December 2009-Present)

- Proposal Review Panel, *The National Science Foundation's Environmental Sustainability Smart Buildings*, July 2013

- Proposal Review Panel, *The National Science Foundation's Cyber-Physical Systems (CPS) Smart Buildings*, June 2013

- Proposal Review Panel, *The National Science Foundation's Civil Infrastructure Systems (CIS) Program*, May 2013

- Member of Expert Panel, Green Building 2011 – Outlook and Business Strategy *Annual Southface Greenprints Conference*, the Sheraton Atlanta Hotel, March 15, 2011

- Peer Reviewer, National Priorities Research Program (NPRP), *Qatar National Research Fund (QNRF)*

- Reviewer for the Social Sciences and Humanities Research Council of Canada (SSHRC), December 2010

- Member of Expert Panel, "Controlling Events that Impact Project Profitability: Financing–Insurance Strategies–Relationship with the Architect/Engineers–Project Monitoring and Oversight," 14th Annual Construction Industry Conference (2010) of The *Associated Owners & Developers (AOD)*; September 21, 2010

- Technical Panel, Developing a Research Agenda for Transportation Infrastructure Preservation and Renewal at the Technical Workshop Organized by The Transportation Research Board of the National Academies and by Research and Innovative Technology Administration of The U.S. Department of Transportation (2009)

- Reviewer, *20th Annual Conference of the International Group for Lean Construction (IGLC20)*, San Diego, CA, July 18-20, 2012

- Proposal Review Panel, *The National Science Foundation's Cyber-Physical Systems (CPS) Smart Buildings*, July 2012

- Proposal Review Panel, *The National Science Foundation's Cyber-Physical Systems (CPS) Smart Buildings*, July 2011

- Proposal Review Panel, *The National Science Foundation's Civil Infrastructure Systems (CIS) Program*, December 2009

- Editorial Review Panel, *The International Journal of Construction Project Management*

- Reviewer, *Canadian Journal of Civil Engineering*

- Reviewer, *Construction Management and Economics*

- Reviewer, *Computer-Aided Civil and Infrastructure Engineering*

- Reviewer, *ASCE Journal of Computing in Civil Engineering*

- Reviewer, *ASCE Journal of Management in Engineering*

- Reviewer, *Automation in Construction*

- Reviewer, *Construction Innovation*

- Reviewer, *2012 Construction Research Congress*

- Reviewer, *2010 Construction Research Congress*

- Reviewer, *2009 Construction Research Congress*

- Reviewer, *Fifth International Conference on Construction in the 21st Century (CITC-V), "Collaboration and Integration in Engineering, Management and Technology,"* May 20-22, 2009, Istanbul, Turkey

Conference Planning Committees/Session Chair

- Technical Committee Co-Chair of the *2014 Construction Research Congress (CRC 2014)* "Construction in a Global Network", Atlanta, GA, May 19-21, 2014.

- Scientific Committee Member, *2013 Architectural Engineering Institute (AEI) Conference*, The Pennsylvania State University, April 3-5, 2013.
- Technical Committee Member in the *2012 International Conference on Construction and Real Estate Management (2012 ICCREM)*, Kansas City, October 1-2, 2012.

- Technical Committee Member & Chair of Quantitative Methods Track in *The 2012 Construction Research Congress (CRC)* sponsored by The Construction Institute of the American Society of Civil Engineers (ASCE) and Purdue University, West Lafayette, IN, USA, May 2012.

- Technical Committee Member for *the 9th Asia Pacific Transportation Development Conference* and *the 25th ICTPA Annual Conference*, Challenges and Recent Advancements in Sustainable Transportation System – Planning, Design, Build, Management, and Maintenance, Sponsored By T.Y. Lin International (China) Co., Ltd, Chongqing Jiaotong University, and Chongqing University, May 25-28, 2012, Chongqing, China

- Technical Committee Member & Chair of Project Finance Track in *The 2011 Engineering Project Organizations Conference* sponsored by The Engineering Project Organization Society (EPOS), Estes Park (Denver), CO, USA, August 9-11, 2011.

- Technical Committee Member in *The 2011 ASCE Workshop of Computing in Civil Engineering* organized by University of Florida and Florida International University, Miami Beach Resort, Miami, Florida, USA, June 19-22, 2011.

- Session Chair of Researching through the Roadmap: Project Controls and Workforce Management, *FIATECH 2011 Technology Conference & Showcase*, Phoenix, AZ, USA, April 18-20, 2011.

- Session Chair of Graduate Research, the 47th Annual Associated Schools of Construction International Conference, Omaha, Nebraska, April 6-9, 2011

- Co-Chair of Global Project Risk Analysis, Decision and Policy Track in *the ASCE Vulnerability, Uncertainty, and Risk: Analysis, Modeling, and Management*, Sponsored by the Council on Disaster Risk Management (CDRM) of ASCE, the First International Symposium on Uncertainty Modeling and Analysis and Management (ICVRAM 2011) and the Fifth International Symposium on Uncertainty Modeling and Analysis (ISUMA), Hyattsville, Maryland, April 11-13, 2011.

- Technical Committee Member & Chair of Project Finance Track in *The 2010 Engineering Project Organizations Conference* sponsored by The Engineering Project Organization Society (EPOS), November 4-6, 2010.

- Chair of Project Planning and Control Track in *The 2010 Construction Research Congress (CRC)* sponsored by The Construction Institute of the American Society of Civil Engineers (ASCE) and The University of Alberta in Canada, May 8-10, 2010.

- Chair of Innovative Valuation Approaches of Flexible Options in/on AEC Systems in *The 6th International Conference on Innovation in Architecture, Engineering and Construction (AEC)* organized by The Architectural Engineering Department of The Pennsylvania State University in collaboration with the Centre for Innovative and Collaborative Engineering at Loughborough University, UK, June 9-11, 2010.

B. On-Campus Activities

- Elected as a member of the Institute Graduate Curriculum Committee, August 2013-May 2016

- Member of the College of Architecture Dean Advisory Search Committee, August 2012-May 2013

- Member of the faculty search committee for Facility Management, August 2012-May 2013

- Member of the Research Council, College of Architecture, Appointed by Dean Alan Balfour, September 2011-Present.

- Member of the Advisory Committee, College of Architecture, Appointed by Dean Alan Balfour, September 2010-Present.

- Chair, Integrated Project Delivery Systems M.S. Track, August 2010-Present.

- Building Construction Ph.D. Program Coordinator, August 2012-Present.

- Member of the faculty search committee for School of Building Construction that assisted the Chair to recruit three new tenure-track professors, August 2011-May 2012.

- Developer of a proposal for the *Charles Pankow Foundation/Design Build Institute of America (DBIA)* Bootstrapping Design-Build Education Grant, February 2012.

- Participant in the "Campus Colleagues" discussion group at the 2012 New Faculty Orientation, August 15, 2012.

- Provider of the support to the School of Building Construction Chair in preparing for the re-accreditation from the American Council for Construction Education (ACCE) for the undergraduate program, Fall 2011.

- Organizer and host of invited guest speakers to School of Building Construction Distinguished Lecture Series (Dr. Chimay Anumba from Penn State University, Dr. Dulcy Abraham from

Purdue University, and Dr. Keith Molenaar from University of Colorado at Boulder), Spring 2011.

- Presenter of the School of Building Construction Bid to Host the 2013 Associated Schools of Construction International Conference, Omaha, Nebraska, April 10, 2011.

- Member of the Healthcare and Healthy Environments Task Force, College of Architecture (Craig Zimring: Chair), 2008-2009, Appointed by Dean Alan Balfour and Associate Dean Doug Allen.

- Member of the Architecture/Engineering/Construction Integration Task Force, College of Architecture (Chuck Eastman: Chair), 2008-2009, Appointed by Dean Alan Balfour and Associate Dean Doug Allen.

- Faculty Advisor, Student Construction Association (SCA), 2009-2010.

C. Outreach Activity Including Public Service

Georgia Intern Fellowships for Teachers (GIFT) Program

Advisor for two undergraduate students, James Hite (Earth and Atmospheric Science) and Talia Knapp (Computer Science), from the Pre-Teaching: Summer Undergraduate Research Experience (P-T SURE) program in summers 2011 and 2012, CEISMC (Center for Education Integrating Science, Mathematics and Computing), Georgia Institute of Technology

Advisor for three high school teachers through the Georgia Intern-Fellowships for Teachers (GIFT) in summers 2010, 2011, and 2012: Dr. Ashuri hosted these teachers in his ESBE Lab for a 4-week summer research boot camp in building energy efficiency. The GIFT program was founded in 1991 as a program of the Georgia Institute of Technology's CEISMC (Center for Education Integrating Science, Mathematics and Computing).

Advisor for 12 high school students and their teachers hosted in The ESBE Lab for a 4-week summer research boot camp in building energy efficiency in summers 2010, 2011, and 2012: Professor Ashuri established this program in collaboration with the Georgia Tech Center for Education Integrating Science, Mathematics and Computing (CEISMC) and financial support through the Georgia Intern Fellowships for Teachers (GIFT) Program and Georgia Power (local electricity utility company). Students came from South Cobb and Rockdale County High Schools – both are classified as "High Needs" Title I. Students conducted research to better understand: (1) why should homeowners demand energy efficiency interventions with both new and existing homes?; (2) what are current mechanisms (e.g., government incentives, taxation policies, building codes and standards, etc.) to enforce or peruse construction companies to make design/blueprint decisions based on energy efficiency?; and (3) how can one make a business case for investments in energy efficiency interventions?

The ACE Mentor Program of Atlanta

The ESBE Lab has been working as an active mentor with the ACE Mentor Program of Atlanta. The ACE Mentor Program of America http://www.acementor.org/ introduces high school students to possible careers in Architecture, Construction and Engineering. Students come from predominantly minority and underserved high schools and neighborhoods and have

not been exposed to these industries. We created an outreach and engagement module for the ACE Program. This was a one-day event consists of interactive lectures, discussions, and a team-based fun exercise central to the core research topics of energy-efficient buildings and sustainable development. The significance of energy conservation in buildings, as well as appropriate strategies to make energy-efficient and green buildings, was presented to students through several familiar cases in Metro Atlanta. The applicability of incorporating flexibility in building design and its impact on life cycle energy-efficiency were introduced to students through a fun class exercise. This educational module is intended to raise the awareness of students about the importance of buildings in energy conservation and sustainable development and promote innovative, critical thinking in identifying flexible design alternatives for buildings operating in uncertain environment. It encourages a diverse group of students across all cultural, racial, and socio-economic backgrounds to pursue career in engineering fields related to sustainable building design and construction.

The Georgia Tech Undergraduate Research Opportunities Program (UROP)

The ESBE Lab has been working closely with the Georgia Tech Undergraduate Research Opportunities Program (UROP) (http://www.undergradresearch.gatech.edu) to engage undergraduate students in research activities. Through this well-established program, Professor Ashuri has the opportunity to recruit and work with several undergraduate students in civil engineering, building construction, industrial, and mechanical engineering. Three ESBE Lab Undergraduate Students Rustann Solomero, Seungho Shin, and Jingwei Zhou are the recipients of the prestigious President's Undergraduate Research Award. Undergraduate student Seungho Shin also won Outstanding Poster Presentation Award, representing his research on "*Regression Analysis Model for Predicting Construction Cost Index*," in Georgia Tech's Undergraduate Research Spring 2010 Symposium. SeungHo's work is one of the more than 120 different research projects that Georgia Tech students presented at the Undergraduate Research Spring Symposium on March 16, 2010 in the Student Center Ballroom. The ESBE continues to work with many of the UROP's outstanding minority students and plans to reaffirm their support in this project. These students will work under the supervision of Dr Ashuri and the mentorship of the PhD students in various activities such as data collection and model building.

Construction Education Foundation of Georgia (CEFGA)

Dr. Ashuri presented his research to k-12 program students in the 2009 CEFGA Expo and SkillsUSA at Georgia International Convention Center (GICC) on April 16-17. CEFGA is a nonprofit organization dedicated to promoting careers in construction and addressing the industry's skilled worker shortage. CEFGA's mission is to attract, train and motivate the next generation of construction professionals – designers, builders and managers.

2012 Siemens Competition – High School Workshop

Dr. Ashuri and his Ph.D. student, Mr. Mohsen Shahandashti, participated in the 2012 Siemens Competition – High School Workshop at Georgia Tech on November 16, 2012. They presented their research "Evaluation of Investments in Photovoltaic Systems" to high school students and their teachers.

D. Consulting Activity

Holloway Consulting Group LLC
Southern Company
American Utility Management (AUM), Inc.
Xicon Infrastructure
Jack Faucett Associates, Inc.
Oman Systems
The U.S. Department of Energy-Golden Field Office
Office of Energy Efficiency and Renewable Energy | Building Technologies Program