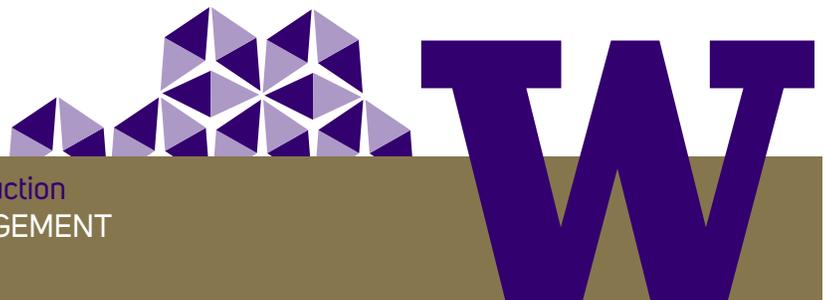




**March 4, 2016**  
**Conference Proceedings**

**NEW FRONTIERS IN CONSTRUCTION**  
**Applied Research Conference**

<http://cm.be.uw.edu/cerc>



Center for Education and Research in Construction  
DEPARTMENT OF CONSTRUCTION MANAGEMENT  
COLLEGE OF BUILT ENVIRONMENTS

## Keynote Presentation



Renée Cheng



Markku Allison

The University of Minnesota research team has been studying integrated project delivery for the past 7 years. In this Keynote, Markku Allison and Renée Cheng will present on recent findings from a 2015 survey on Integrated Project Delivery (IPD) and a collection of case studies from the General Services Administration. Through this research they have found that IPD results in more reliable outcomes when combined with leadership around team building and setting clear goals for the project. They have found that BIM and Lean support integrated delivery when used on concert, but when used alone do not necessarily create stronger teams.

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## “All Hands on Tech”

Stay the full day to experience our afternoon **Technology Showcase** featuring Bluebeam, Autodesk BIM 360 and Pavia Systems as well as demonstrations from local AEC/VR Hackathon organizer/entrepreneur and Laser Scanning demo by Hoffman Construction and UW Campus Engineering.

**Happy Hour!**

**Happy Hour!**

**Happy Hour!**



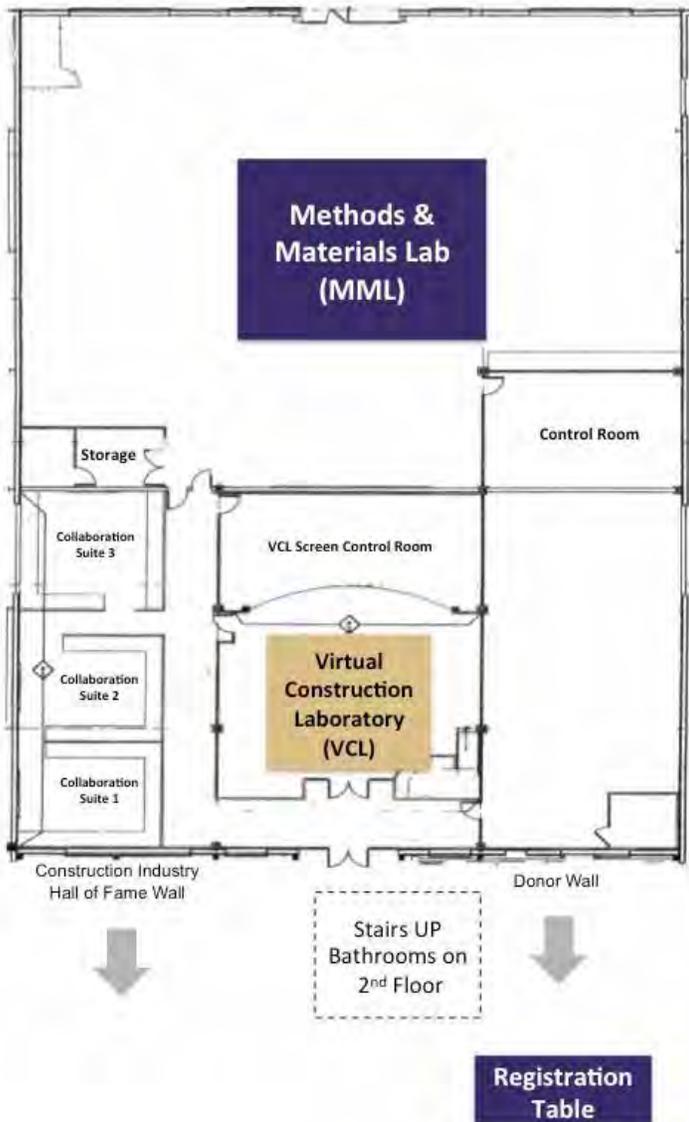
University of Washington  
 Department of Construction Management  
 Center for Education and Research in Construction  
 New Frontiers Conference  
 March 4, 2016

# CONFERENCE AGENDA

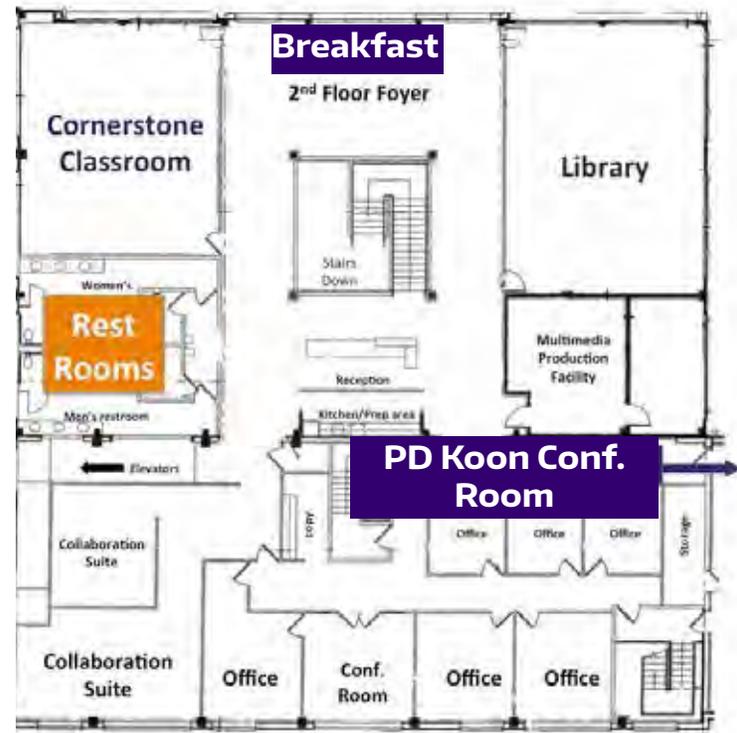
Time	Event	Location	Presenters/Organizer
<b>Special Breakfast Session</b> (2 <sup>nd</sup> Floor Foyer) 7:30 - 9:00 a.m.	CIAC Board Meeting	PD Koon Conference	Bill Bender
	Safety & Health	Cornerstone Classroom	Ken-Yu Lin
	Information Exchange	Library	Carrie Sturts Dossick
9:00 - 9:15 a.m.	Opening Remarks	MML	
<b>SESSION 1:</b> 9:15 - 10:30 a.m.	<b>A</b> Health & Safety: Regional Group Network	MML	<u>Organizer:</u> Ken-Yu Lin <u>Presenters:</u> Jia-Hua Lin, Edmund Seto, Giovanni C. Migliaccio
	<b>B</b> Virtual Design & Construction: BIM for Owners	VCL	<u>Organizer:</u> Carrie Sturts Dossick <u>Presenters:</u> Hamid Abdirad, Puyan A. Zadeh, Sheryl Staub-French, Erik A. Poirier
<b>SESSION 2:</b> 10:45 - 12:00 p.m.	<b>A</b> Integration of Modern Technology in Heavy Civil Construction	PD Koon - (2 <sup>nd</sup> Floor)	<u>Organizer:</u> Kamran M. Nemati <u>Presenters:</u> Julian Yamaura, Mark Holmes, P.E., Kamran M. Nemati
	<b>B</b> Lean Construction	VCL	<u>Organizer:</u> Yong-Woo Kim <u>Presenters:</u> Hyun Woo Lee, Yong-Woo Kim, Jeff Angeley, Chung Ho
12:00 - 12:30 p.m.	Lunch	MML	
12:30 - 1:30 p.m.	Poster Presentation Session	MML	
<b>SESSION 3:</b> 1:45 - 3:00 p.m.	<b>A</b> Sustainable Built Environment	PD Koon - (2 <sup>nd</sup> Floor)	<u>Organizer:</u> Bill Bender <u>Presenters:</u> Bill Bender, Stacy H Smedley, Hyun Woo Lee,
	<b>B</b> Project Delivery & Management	VCL	<u>Organizer:</u> Giovanni C. Migliaccio <u>Presenters:</u> Steve Harrison, Ahmed M. Abdel Aziz, Giovanni C. Migliaccio
3:00 - 4:00 p.m.	Keynote	MML	Renée Cheng and Markku Allison explore IPD adoption in North America and how it combines with IT and Lean for improved project outcomes
4:00 - 5:30 p.m.	Technology Showcase "All Hands on Tech" Happy Hour with BuiltWorlds	MML	

# CONFERENCE MAP

## 1<sup>st</sup> Floor



## 2<sup>nd</sup> Floor



**EVENT WiFi:** Join the **University of Washington** network, login with UW NetID: **event0897** Password: **37EP=43UZ=23EG**



University of Washington  
Department of Construction Management  
Center for Education and Research in Construction  
New Frontiers Conference  
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## **PRESENTATION ABSTRACTS**

### **Session 1A: Safety & Health**

#### **“The First Step to Take Care of Construction Workers: A New Physical Exposure Assessment Checklist”**

In addition to acute and traumatic injuries, chronic musculoskeletal disorders are actually a larger burden to businesses. Physical exposures refer to risk factors contributing to chronic health problems such as strain and pains in various body parts. This presentation will highlight reasons why this should be the focus in construction safety, drawing from past research and our understanding of Washington State workers' comp data. A review of the scientific basis and path covered to derive a new exposure assessment checklist will be included. A demonstration of the checklist will be provided.

**Jia-Hua Li, Ph.D.**

#### **“Physiological Cost of Concrete Construction”**

This presentation will describe a study that relied on wearable technology and a wireless weather station to collect data regarding concrete workers' physiological status and jobsite stressors. Five concrete construction workers were recruited, and individual physiological status data were collected for up to three weeks in summer and autumn. The primary goal was to investigate the physiological cost of concrete construction activities. Additionally, we attempted to analyze if and how some stressors may affect changes in physical strain. To measure the level of physiological cost, alternative methods for defining physiologically acceptable boundaries for heart rate (HR) were evaluated, and a set of emotional HR zones reflecting mental workload as a potential application in construction workers was introduced.

**Giovanni C. Migliaccio, Ph.D., P.Eng.**

#### **“New Instruments for Monitoring and Controlling Construction Dust Exposures”**

This talk will feature the Portable University of Washington Particle (PUWP) monitor, a low-cost (~\$100) real-time air pollution monitor developed in my lab. The monitor is battery operated and small enough to be worn for personal exposure monitoring. The monitor is intended to address particulate matter air pollution and could be used to study the dust exposures in construction.

**Edmund Seto, Ph.D.**

**“Approaching Total Worker Health for Construction”**

Total Worker Health (TWH) is the strategy that integrates occupational safety and health protection with health promotion to prevent worker injury and illness and to advance worker health and well-being. Although TWH has been applied in other industries, it is a fairly new concept in construction. This presentation will introduce TWH and the three threads of research that will inform each other when being completed to weave a holistic set of recommendations for adopting TWH innovations within construction.

**Ken-Yu Lin, Ph.D.**

**Session 1B: Virtual Design & Construction – BIM for Owners**

**“Rebaselining Working Data for Asset Management: Overcoming the Challenges of Data Collection for Existing Facilities and Infrastructure”**

While recent information delivery developments in the construction industry have addressed the need for a systematic approach to data collection and hand-over for new facilities and infrastructure, very little effort has been done for collecting sufficient, accurate, and matching data on existing facilities and assets in a practical and cost-efficient manner. To bridge this gap in the research and practice, this study introduces two workflows developed by the authors in two action research contexts for collecting asset data required for managing two existing facilities. This study clarifies how owners can mitigate aforementioned challenges of collecting and working with data on existing assets by utilizing conventional BIM platforms in customized and innovative ways. This study also highlights processes owners need to define, challenges they might face in the course of developing such workflows, and decisions they need to make to streamline the workflow development.

**Hamid Abdirad, Dr. Carrie Sturts Dossick, P.E.**

**“Degrees of Alignment: Assessing Collaboration in BIM-Enabled Project Delivery Environments”**

Facilitating collaboration amongst project stakeholders in the construction industry is one of the central tenants of Building Information Modeling (BIM). Collaboration, however, remains a complex and ill-defined concept. This dilutes the concept and makes it difficult not only to enact but also to assess and manage. In our presentation, we investigate collaboration in a BIM enabled project delivery setting. We offer a working definition of collaboration and explore strategies to assess and manage it. In this regard, we develop the notion of alignment, and the degree to which it is achieved in the context of a building project, as an indicator of the strength of collaboration amongst project team actors. Based on a longitudinal research project spanning four years and involving multiple case studies, we develop a framework that identifies active indicators to assess collaboration. We find that the transition to BIM-enabled project delivery is causing a shift in the alignments amongst these indicators that are critical in supporting collaboration. We posit that the degree to which project teams foster alignment is critical in ensuring strong collaboration amongst project team actors, especially in the context of BIM enabled project delivery, if they are to reap the much publicized

benefits of BIM. The key takeaways from our presentation are a clear definition of collaboration in the context of the construction industry, and a series of indicators to assess and manage collaboration and a strategy to implement these indicators.

**Erik A. Poirier, PhD, M.Eng, BSc.Arch, LEED AP**

### **“Assessing the Quality of Building Information Models for Facility Operations”**

As we move towards a model-based project delivery process, it is essential for stakeholders in a construction project to be able to assess the quality of building information models (BIMs). However, significant challenges remain in terms of understanding the information needed and the methods for assessing the quality of information in a given BIM, which leads to significant obstacles in using BIMs for facility operations. The aim of this research is to propose an approach for systematic information quality assessment (IQA) of BIMs for facility operations. For this aim, we studied several BIMs from numerous case examples to identify the information needs of building operators, determine the relevant information quality dimensions, and develop suitable IQA tests. In our presentation, we will introduce a framework for systematically creating and performing IQA tests and will give examples from the different case studies. Furthermore, we will also show how IQA can support the industry in creating smart, interactive information management systems for purposes like managing assets, spaces, documents, technical services, or inhabitants' feedback. We will also highlight that IQA tests can prevent costly rework, including extra data collection and remodeling in the operations phase, which will help owners and facility managers to improve the efficiency and cost-effectiveness of their operations.

**Puyan A. Zadeh, Dr.-Ing., Sheryl Staub-French, Ph.D.**

## **Session 2A: Integration of Modern Technology in Heavy Civil Construction**

### **“Integration of Modern Technology in Heavy Civil Construction”**

**Mark Holmes, P.E.**

### **“Use of Maturity Method to Estimate Compressive Strength of Concrete”**

The strength of properly batched, placed and cured concrete can be expressed as a function of temperature–time history that relates to the concrete hydration. Higher curing temperature will speed up the hydration process and the concrete could gain strength faster at early age. This concept is known as the maturity concept.

According to this concept, an empirical relationship can be established between temperature–time history and concrete strength development in order to predict the strength during the curing period by monitoring the in-place concrete temperatures in real time. Consequently, this information can be used to help decision making (e.g. time of formwork removal, time of post-tensioning, or open the pavement to traffic) that save time and reduce the construction cost. Many state transportation agencies in the United States are using the maturity concept mainly as a substitute for early cylinder compressive strength to allow formwork to be removed or pavements to be opened to traffic. Recent

studies show that the predicted in-place concrete strength is always higher than the actual core strength on top surface locations. Results from three different cubes show that core compressive strength from mid-section were within  $\pm 15\%$  of the predicted values and core results from the bottom section were generally higher than the predicted values.

**Kamran M. Nemati, Ph.D., P.E., FASCE, FACI**

### **“Assessing the Impacts of Mobile Technology on Project Inspection”**

As mobile technology becomes widely available and affordable, transportation agencies can use this technology to streamline operations, including those involved within project inspection. A pilot project conducted with three State Departments of Transportation examined project inspection process improvement opportunities using a specific mobile technology named HeadLight (developed by a Seattle-based company). This study compares productivity, accessibility, and quantity/quality of observations made by agency project inspectors. Results indicate productivity gains on the order of 25%, twice as many observations, and improved reporting timeliness as well as improved overall data availability and accessibility throughout a project office and DOT-wide. Currently, this mobile technology has been adopted by the Washington State DOT, and other DOTs are in the process of large-scale adoption

**Julian Yamaura, Ph.D. Candidate, Civil and Environmental Engineering**

## **Session 2B: Lean Construction**

### **“Background Knowledge and Training for Integrated Project Delivery”**

There has been growing interest in the application of Integrated Project Delivery (IPD) to complex and dynamic projects in the building industry. Yet, little research has been aimed at analyzing the background knowledge and training required for the successful completion of IPD projects. In response, the present study employed an online survey to investigate the level and type of education, training, and professional experience for IPD project members. This study yields two notable findings: (1) project members have the highest level of background knowledge on the cultural requirements of IPD, but the lowest level on the technological requirements; (2) the group with more Design-Build experience has more background knowledge. The survey also revealed that the group that received an IPD kick-off training has more background knowledge. The findings are expected to advance the education and training of project participants in preparation for their IPD experience.

**Hyun Woo "Chris" Lee, Ph.D.**

**“Study on Contractual Arrangement to Adopt Lean Principles at UW-CPD”**

One of the major challenges that the construction industry facing is how to improve the effectiveness and performance of construction projects. However it is very difficult to ask contractors to implement "lean principles" such as LPS once the contract is made with current specifications, such as those used by University of Washington. Specifications serve as important components of the contract documentation for controlling and managing works carried out on site. The current specification assumes a command-and-control approach which does not facilitate lean management. Research is carried out to investigate how a public owner ensures lean implementation in their capital projects through specification and contractual documents and what modification can be done to specifications used by UW to ensure and facilitate the implementation of lean principles, especially the Last Planner System.

**Yong-Woo Kim, Ph.D. & Jeff Angeley**

**“Application of Agent Based Modeling in Lean Construction”**

Several researchers and practitioners have adopted supply chain management methodology and innovative practices to facilitate integration in construction projects and improve productivity. Nevertheless, there are still significant gaps in the integration level between the construction industry and other major industries, as well as the demand to embrace both technical and social aspects in improving construction planning and management. To address these issues, we look forward to utilizing agent-based modeling (ABM) to optimize schedule management and resource allocation in the construction supply chain system. ABM facilitates the interaction and collaboration of different agents under their own capabilities and perspectives, while considering the constraints such as required milestones and work sequences. This research will further investigate the evolution of supply chain systems during the collaboration and optimization process in order to gain better insight into the dynamics of construction supply chain systems.

**Chung Ho, LEED AP, Yong-Woo Kim, Ph.D.**

**Session 3A: Sustainable Built Environment**

**“Teaching Sustainability to Construction Management Students”**

The topic of sustainable design and construction has matured to become mainstream in Construction Management curriculum. The purpose of this paper is share what the author has done to develop sustainability curriculum for construction management students and industry. Additionally a survey of Construction Management programs was conducted and information is shared about how other programs teach sustainable construction.

**Bill Bender, Ph.D.**

**“Sustainability in the Construction Industry - Where we are now and what's next”**

The construction and restoration of buildings accounts for 84% of a building's carbon emissions over the course of its lifetime, with operational emissions accounting for the 16% remaining. With 900 billion square feet of new and rebuilt buildings forecasted in just the next 20 years, we are at a tipping point in how we think about a building's role and responsibility in the protection and restoration of our environment. Learn about Skanska's current efforts to truly build what matters for people, place and the environment through a walk through of a completed LEED Platinum and City of Seattle Deep Green Pilot Program project, Stone 34. Also understand how contractors are beginning to quantify, track and benchmark their buildings' embodied carbon.

**Stacy H. Smedley, LEED BD+C, Living Future Accredited**

**“Remote Sensing for Activity-Based Carbon Tracking of Construction Equipment”**

The construction industry is a significant source of greenhouse gas (GHG) emissions. For instance, construction equipment in the U.S. is estimated to produce over 70 million metric tons of carbon-equivalent GHG emissions every year, almost twice more than the railroad industry. To support efforts to reduce the overall carbon footprint of the industry, this study proposes the use of a remote sensing technology to benchmark, track, and monitor construction equipment at the activity level. The study is built upon the premise that the emission profiles of construction equipment can vary significantly depending on their activities (e.g., idling vs. moving vs. digging). Therefore, combining the captured activity-level data with emission data is expected to improve the real-time tracking and management of target construction equipment in terms of their emissions. Further, benchmarking data can help develop a lower emission operation during project planning. The study is presented threefold. First, it will review previous studies aimed at estimating the GHG emissions of construction equipment. Second, it will show the pilot testing result of a prototype remote sensing system developed for the study. Lastly, the next steps of the study will be discussed. This study is expected to support project stakeholders in optimizing the operations of construction equipment in terms of not only productivity but also GHG emissions.

**Hyun Woo Lee, Ph.D.**

**Session 3B: Project Delivery and Management**

**“Private Participation in the Delivery of Public Facilities and Infrastructure – An Overview”**

Private participation in the delivery of public facilities and infrastructure has taken on new dimensions by going beyond design and construction to include financing, marketing, operation and maintenance. This is typically introduced under public-private partnerships (PPP) delivery systems in which a private sector company, usually a consortium or joint venture of companies, gets into a development agreement that can have an extended term, e.g. up to fifty or more years. Revenues from the facilities or from government funds compensate the private company mostly through performance-based payments over the term of the agreement. This presentation provides an overview of PPP and how they are being implemented in the United States.

**Ahmed M. Abdel Aziz, Ph.D.**



## **PRESENTATION ABSTRACTS**

### **“Lessons Learned with Progressive Design Build”**

Recently, public agencies in Washington state have been provided a new option to deliver their projects through design-build. This option is often referred to as Progressive DB to distinguish it from Competitive DB, which was already available. This presentation will describe the UW's first use of PDB for delivering the West Campus Utility Plant, including some lessons learned.

**Steve Harrison, P.E.**

### **“Emergent Approaches to Subcontracting”**

The construction industry is shifting away from the traditional paradigm, one that places users, planners, designers and contractors in different silos while performing design and construction services necessary to deliver construction projects. New contractual schemes, which rely on integration among contractual tiers, are emerging. Some of these schemes close the contractual framework at lower tiers by having multiple upper-tier parties subcontract work to the same lower-tier entity. To date, however, little was known on these emergent approaches, their diffusion, criteria for adoption or expected advantages. This presentation will provide a greater understanding of the occurrence, reasons, and advantages and disadvantages of these emergent contractual schemes.

**Giovanni C. Migliaccio, Ph.D.**



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## POSTER SESSION

<b>Construction</b>	
Badera, Gaurav	Changing Workers Behavior by Focusing on Their Talents
Lin, Li	What About Value Creation? - A New Way to Maximize the Efficiency of Cost Control in Real Estate Projects
Mak, Christopher	Gender Equality in Construction Site Sanitation
Nasif, Hamza Abdulrahman	Causes of Delay in the Construction Industry
Reed, Matthew	Job Performance Indicators
Reyes, Jonathan	Temporary Demountable Structures. Risk Management for Music Venue Construction
<b>Culture</b>	
Christy, Rebecca M	Our Landscape, Ourselves: A Framework for Food Sovereignty for Well Being and Resilience in the Swinomish Tribal Community
Karani, Jash J	Construction Waste Management in India
Malachira, Achaiah Ramesh	How Culture Affects Processes in the Workplace
Patel, Herish B	Technical Risk Analysis of Farming Risk Index
Peerupally, Korlaji Monish	Analysis on Business Plan and Organizational Structure of a Small Scale Construction Company in India
Selvakumar, Mohnish Kumar	Challenges of Performing Construction Work in Developing Countries
<b>Project Delivery Methods</b>	
Abudawood, Amar Mohammednajeab	Comparison of Payment Mechanisms for Public-Private Partnership Projects
Chhabra, Siddharth	Application of Integrated Project Delivery in the Construction Industry
Cuevas, Jose Manuel	Benefits of Web-Based Bidding Systems in Selection of Subcontractors
Elbert, Dennis Millikan	Construction Submittal Process Optimization
Farhangi, Saeed	Comparing Cost of Project Delivery Methods for Transportation Project Based on Critical Delivery Selection Risk Factors
Fortes Schuchovski, Henrique	Managing Risk Management for IPD Method
Furste, Wesley L	Alternate Procurement Benefits for Public Procurement
Gutub, Sohaib Muhammad Zuhair	Framework for the Management of Extreme Events in the Public-Private Partnership Infrastructure Projects
Lou, Yanqing	Efficient Project Management in Public-Private Partnerships
Nagarimadugu, Sravya	Subcontracting Practices: The Owner's Involvement in Selection of Subcontractors
Nevrekar, Vaishnavi V	Effective Use of Integrated Project Delivery Methods
Tsou, Tsung-Hsiu	Payment Policies in Public-Private Partnerships
Wu, Shen-Hua	Maintaining Sustainability Performance in Public-Private Partnership Projects
Yee, Christina M	The Social Reluctance Against Using Integrated Project Delivery

<b>Safety &amp; Health</b>	
Lee, Wonil	Job Demands-Resources, Burnout and Performance of Labor-intensive Workers: An Analysis of Construction Workers at the Task and Individual Levels
Shang, Luming	Analysis of Roadway Safety under the Alternate Project Delivery Systems
Zhu, Wenqi	Developing Construction Safety Training Game Using Minecraft
<b>Sustainability</b>	
Alashari, Mishal A	The Effectiveness and Deficiency of Sustainable HVAC Systems
Ayyalasomayajula, Pramod Chandra	Advantages of Propane-Powered Vehicles
Jin, Xiuqing	Most Energy Efficient and Environmentally Friendly HVAC Systems for Different U.S. Climates
<b>Virtual Design</b>	
Au, Yu Ming Jimmy	3D Printing - Future of Construction Industry
Bordia, Nishant	Effective Communications - A Key to Successful BIM Implementation
Cheruvathur, Mary M	Drones for Unmanned Cargo Transport in the Construction Industry
Kim, Sphoon	Impact of BIM on Digital Technology: Digital Conception
Monson, Christopher	Shifting logics of constructability and design: A study of emerging AEC integrated practices for energy performance
Osburn, Laura	Talking to Non-Experts about Data: Translating and Synthesizing Modeling Data in Design Teams
Patel, Devarshi Rajesh	Augment 2 Field: A D4AR Approach to AEC Industry Problems
Sripathi, Vineeth Vishwas	Scope of BIM in Modular Construction
Zhang, Qisi	The Application of BIM in Construction Project Schedule Management
Zhang, Wenting	Use of Building Information Modeling for Sustainable Design and Construction



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## RESEARCHER PROFILES

### Session 1A: Safety & Health



#### **Ken-Yu Lin, Ph.D.**

Dr. Ken-Yu Lin is a P.D. Koon endowed Associate Professor in the Department of Construction Management at the University of Washington (UW). She is the director for the Construction Management Occupational Safety and Health (CMOSH) program at the Northwest Center for Occupational Health and Health (NCOSH), a National Institute for Occupational Safety and Health (NIOSH) funded Education and Research Center (ERC) in Region X. Dr. Lin also co-directs the SHARE (Safety and Health Advancement through Research and Education) Lab and currently serves on the Executive Committee for the American Society of Civil Engineers (ASCE) Computing and Information Technology Division. Dr. Lin is interested in research areas including technology supported construction safety and health, serious gaming and visualization for construction education and training, information retrieval and classification applications in construction, ontology and knowledge management, and sustainable practices.



#### **Jia-Hua Li, Ph.D.**

Dr. Jia-Hua Li is an ergonomist with SHARP. His expertise includes laboratory research, biomedical instrumentation, motion analysis, and computer programming. Currently, his research involves ergonomics and occupational biomechanics in upper extremities, strength and capacity, human-machine interface (e.g., pallet jack, medicine cart, steering wheel, crank), occupational safety and health, musculoskeletal disorders. Prior to joining SHARP in 2014, he has been active in occupational safety research for more than 13 years. His collaborations extend to domestic and international universities and hospitals. He is an associate editor for the journal Applied Ergonomics. A member of the Human Factors and Ergonomics Society, and a BCPE certified professional ergonomist, Dr. Li graduated from University of Wisconsin-Madison with a Ph.D. and M.S. in industrial engineering. He earned his B.S. in electrical engineering from the National Taiwan University in Taipei, Taiwan.



**Edmund Seto, Ph.D.**

Dr. Edmund Seto received his PhD in Environmental Health Sciences from the University of California, Berkeley. His research focuses on the quantification of exposures and risk as they relate to environmental and occupational health. Using Geographic Information System (GIS) spatial methods, mathematical models, and novel information technologies, Dr. Seto has conducted exposure assessments for built environment studies of air pollution and noise exposures, as well as assessments of exposures to infectious agents in global health contexts. A computer scientist by training, his group explores new technologies such as the use of mobile devices and low-cost sensor systems to infer the relationship between individual and population behaviors and how they relate to exposures to environmental and workplace hazards. Dr. Seto's rapid prototyping lab fosters interdisciplinary collaboration to create new technologies to improve public health. Before coming to the University of Washington, he was Associate Professor of Environmental Health Sciences at UC Berkeley. He co-directed the UC Berkeley Health Impact Group to advance the field of Health Impact Assessment. And, he served as Associate Faculty Director for the UC Center for Information Technology in the Interest of Society (CITRIS).

**Session 1B: Virtual Design & Construction – BIM for Owners**



**Hamid Abdirad,**

Hamid Abdirad is a Ph.D. student in the Built Environments program at the College of Built Environments, University of Washington. He holds a B.Sc. in Architectural Engineering and two masters degrees in Project & Construction Management and Building Construction and Facility Management. His research focuses on information exchange and knowledge management in the AEC industry, BIM implementation, and Integrated Project Delivery. In the past year, he worked on action research projects in areas of asset data exchange for new and existing facilities and BIM/CIM contracting.



**Dr. Carrie Sturts Dossick, P.E.**

Dr. Dossick is Associate Professor, UW Department of Construction Management and the CERC Executive Director. Dr. Dossick's main research interests focus on emerging collaboration methods and technologies such as Integrated Project Delivery (IPD) and Building Information Modeling (BIM). Current projects include (1) technology and collaboration strategies for green building design and construction, (2) global virtual teams, (3) applications of BIM and COBie in operations and (4) bringing BIM to the construction site via iPad. She has received funding from the National Science Foundation, U.S. Army, U.S. Department of Education, Mechanical Contractors Association of Western Washington, University of Washington Royalty Research Fund, University of Washington Capital Projects, the College of Built Environments' BE Lab and was awarded the College of Architecture and Urban Planning 2007 Dean's Development Fund.



**Erik A. Poirier, PhD, M.Eng, BSc.Arch, LEED AP**

Erik Poirier is a postdoctoral research fellow at the BIM TOPiCS Lab at the University of British Columbia. He is also the vice chair of operations and chair of communications at buildingSMART Canada. His research focuses on collaboration in the Architecture, Engineering, Construction and Operations (AECO) Industry, namely developing approaches to support better industry practices through Building Information Modeling (BIM), Lean design and construction and integration. Erik is also investigating information lifecycles in the AECO industry and how they are being transformed in the wake of these innovations. He has co-authored 10 publications in refereed journals and conferences and has participated in the production of many industry reports. Erik graduated with a bachelor’s degree in Architectural Sciences from the School of Architecture at Laval University as well as a Masters and a Ph.D. in Construction Engineering at the École de Technologie Supérieure. He has been working in the construction industry since 2001 and has worked as a project manager and project architect on projects ranging from small refurbishment to large commercial developments in Montreal and in Vancouver.



**Sheryl Staub-French, Ph.D.**

Sheryl Staub-French is an Associate Professor and Goldcorp Professor for Women in Engineering in the Department of Civil Engineering at the University of British Columbia. She received her BS in Civil Engineering from Santa Clara University and her MS and PhD from Stanford University. She has over 15 years of consulting and research experience studying the technological and organizational issues of BIM implementation within organizations and across projects. Her research focuses on developing tools and techniques to better support multi-disciplinary coordination and information management throughout the project lifecycle. She has contributed more than 60 papers in leading journals and conferences on BIM and related topics, and has contributed to the development of guidelines and best practices for BIM adoption and implementation. She is actively engaged with industry to advance BIM adoption, formerly serving as a Director for the Canada BIM Council and currently serving as a member of the Education Committee for BuildingSMART Canada.



**Puyan A. Zadeh, Dr.-Ing.**

Puyan Zadeh is a Postdoctoral Fellow at University of British Columbia (UBC) under supervision of Professor Sheryl Staub-French since November 2013. His current research activities focus on the information quality analysis (IQA) of building information models (BIMs), facility operations and asset management, as well as the role of computational design in constructability of prefabricated building components. He completed his MS and PhD in Informatics in Civil Engineering at the Technical University of Darmstadt (TUDa) in Germany, where he also worked as a Scientific Employee at the Institute for Numerical Methods and Informatics in Civil Engineering until November 2012. In his doctoral dissertation, he worked on holistic model-based engineering methods for high performance fire safety analyses in buildings. During his academic career, he has published the results of his previous and current research in 3 journal papers and 18 conference publications (in English and German).

**Session 2A: Integration of Modern Technology in Heavy Civil Construction**



**Mark Holmes, P.E.**

Project Manager/Construction Engineering Supervisor, Perteet, Inc.

Mark has more than 17 years of roadway design and construction management experience in the Puget Sound area. As one of Perteet's lead technical professionals, Mark has exceptional skills and project management experience in design and construction of public infrastructure projects, including interchanges, arterial and local roads, utility improvements, large site grading, storm drainage design, and project estimating. Mark is well versed in overall construction management, including: coordination of monthly reporting, oversight of progress payments and document control, schedule analysis, change order entitlement, independent cost estimating, and claims analysis. Mark specializes in federally-funded projects. He has successfully passed all federal and state reviews of documentation for projects he has led.



**Kamran M. Nemati, Ph.D., P.E., FASCE, FACI**

Dr. Kamran M. Nemati, P.E. is an Associate Professor at the University of Washington since 1998. Dr. Nemati received his Ph.D. in Civil Engineering from the University of California at Berkeley and holds Master of Science degrees in Civil Engineering in three separate options including Environmental Engineering, Geotechnical and Construction Engineering, and City and Regional Planning. Dr. Nemati is a Fellow in the American Society of Civil Engineers (ASCE), a prestigious honor held by fewer than four percent of ASCE members. He is a registered professional engineer (P.E.) in Washington and several other states, and has more than seventeen years of consulting engineering experience in railways, tunnels, ports, highways and roadways, and stormwater management systems. His research interests are in civil engineering materials and construction engineering, with a primary interest in concrete: application of scanning electron microscopy to microstructure of concrete, durability and repair, and experimental and analytical work associated with plain and reinforced concrete.



**Julian Yamaura, Ph.D. Candidate, Civil and Environmental Engineering**

Julian Yamaura is a graduate student pursuing his Ph.D. in the Civil and Environmental Engineering Department at the University of Washington. He holds B.S. and M.S. degrees in civil engineering from the UW. He currently teaches courses related to pavements and construction materials and works part-time at Pavia Systems, Inc. as an engineering consultant. His main research interests focus on mobile technology systems in construction, pavement construction and rehabilitation, and heavy civil construction. Prior to the UW, he worked for heavy civil construction companies working on public transportation infrastructure projects as well as consultation services focusing on construction scheduling.

### Session 2B: Lean Construction



#### **Jeff Angeley**

Jeff Angeley is a Senior Construction & Program Manager at the University of Washington's Capital Planning and Development office. He serves as lead owner representative to construction implementation on complex, technical projects. With over 25 years of varied experience in the construction industry, he specializes in working with teams to optimize the transition from construction to sustainable occupancy, operations and maintenance.



#### **Yong – Woo Kim, Ph.D.**

Yong-Woo Kim is an Associate Professor and P.D.Koon Endowed Professorship holder in the Department of Construction Management in the College of Built Environments. Dr. Kim's main research interests include project-based production management, lean construction, supply chain management, sustainable construction, and project overhead cost management. His current research projects include (1) project delivery process for sustainable infrastructure, (2) integrated project delivery: visioning an ideal project delivery system, (3) project delivery system for high-performance building, and (4) process-based cost and environmental impact analysis of curtain-wall supply chain.

His research has been supported by the Construction Industry Institute, National Electrical Contractors Association, U.S. Department of Transportation, National Research Foundation of Korea, State University of New York Research Foundation, University of Washington Royalty Research Fund, Various Construction Contractors, and was awarded 2008 National Electrical Contractors Association's CAREER and the College of Built Environments 2009 Dean's Development Fund. He has more than 50 publications in international journals and conferences.



#### **Chung Ho, LEED AP**

Chung Ho, LEED AP is a PhD Student in Construction Department at the University of Washington. She has 10-year experience working in design and project management services. Her research interest is lean construction, focusing on applying supply chain management methods and computer science to assist the integration of project delivery. She has additional interests in project management, risk management, building systems, construction technologies, and sustainability.



**Hyun Woo Lee, Ph.D.**

Hyun Woo Lee is currently an Assistant Professor in the Department of Construction Management at the University of Washington (UW). Prior to joining UW, he spent 3.5 years as an Assistant Professor at Oregon State University, and 7 years in the U.S. and Korean construction industries. His research interests center on developing an interdisciplinary view of integrating advanced financial analysis, project development, and management strategies, which is used during the delivery of energy-efficient commercial buildings and sustainable infrastructures. His areas of expertise include advanced risk assessment for energy efficiency investments, “Lean” design and development of sustainable built environments, IT innovation in project management, and construction safety. Prof. Lee received his Ph.D. in Civil and Environment Engineering at the University of California, Berkeley in 2012, and B.S. in Architectural Engineering at Seoul National University in 1999.

**Session 3A: Sustainable Built Environment**



**Bill Bender, Ph.D.**

Dr. Bender is Professor and Chair at the UW Department of Construction Management. He has over 30 years of experience in the construction industry as an owner’s representative, consultant, and academic. He teaches project management, estimating, and sustainability. His research interests include sustainable construction, project risk and management.



**Stacy H. Smedley, LEED BD+C, Living Future Accredited**

Director of Sustainability, Skanska USA Building  
 CEO, The SEED Collaborative

Stacy has a Bachelor of Arts in Architecture from the University of Washington, and 12 years in the architecture and construction professions. Her resume includes the first LEED for Homes Platinum certified project in Washington State as well as the first project in the world to be certified under Living Building Version 2.0 standards, the Bertschi School Living Science Building in Seattle. At Skanska, Stacy serves as Director of Sustainability, focusing on creating sustainable initiatives and opportunities office wide, as well as progressing sustainable construction methods. She is also the co-founder and Executive Director of the SEED Collaborative, a non-profit committed to creating environmentally restorative learning spaces that educate and inspire children to be the next generation of environmental stewards. Stacy is committed to educating and engaging children and her community on sustainable design and has served in various volunteer and mentorship roles, including a founding

member of Washington Businesses for Climate Action, Membership Chair for the Seattle Branch of Cascadia Green Building Council, Regional Emerging Professionals Recruitment Chair for USGBC, Sustainable Design and Curriculum Consultant to Northshore School District, and 2013 Scholar in Residence for the National Association of Independent Schools Summit on the Environment. She also volunteers at various K-12 public and private schools, offering sustainable design workshops that engage students to think creatively and apply Living Building Challenge principles to design spaces that they would like to learn in and from. Stacy was named a Living Building Challenge Hero in 2012.

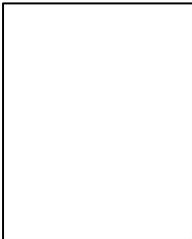
**Hyun Woo Lee, Ph.D.** (see above in Lean Construction)

### Session 3B: Project Delivery and Management



**Ahmed M. Abdel Aziz, Ph.D.**

Ahmed Abdel Aziz is an associate professor in the Department of Construction Management, where he has taught since 2003. He teaches undergraduate and graduate courses on a variety of topics, including project planning and control, project risk and economic analysis, construction cost estimating and project management. His primary research interests are in developing public-private partnerships for infrastructure development, quantitative modeling and risk analysis, and project planning and control.



**Steve Harrison, P.E.**

Mr. Harrison is a civil engineer by license and a project manager in practice. He has 30 years of experience shared among consulting, private industry and the public sector. Mr. Harrison has been a project manager at the University of Washington since 2008. He has successfully delivered more than 60 projects for the University including utility renewal, environmental remediation and building system upgrades. He is currently managing the delivery of a new central utility plant via Progressive Design Build.



### **Giovanni C. Migliaccio, Ph.D.**

Giovanni C. Migliaccio joined the CM Faculty at UW in August 2010. He was previously an assistant professor with the Department of Civil Engineering of the University of New Mexico at Albuquerque. He holds a M.S. and a Ph.D. in Civil Engineering from the University of Texas at Austin and a master-level degree from Politecnico di Bari in Italy.

Prior to moving to the U.S., he worked in Italy in the construction management of telecommunication projects under Nortel Networks and Nokia Networks. At UW, Giovanni has taught project management, construction materials and methods, utility system construction, introduction to construction, project scoping and risk management, construction firm management, and construction equipment management. Dr. Migliaccio has an established and diverse research portfolio.

His areas of specialization and research include: (1) innovative procurement, and delivery practices for infrastructure projects, (2) project management, (3) ergonomics and physiological demand of construction work, (4) sustainable asset management, and (5) continuous quality improvement and benchmarking of construction projects. His research uses a combination of methods, including qualitative and quantitative data collection and analysis. He is active in various industry organizations, including the Transportation Research Board (TRB) and the Construction Industry Institute (CII). He is also a member of the editorial board of the ASCE Journal of Construction Engineering and Management, and the Project Delivery Methods and Native American Transportation Issues committees at TRB.

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# W

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