

## HYUN WOO "CHRIS" LEE, Ph.D.

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Department of Construction Management                      University of Washington  
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### EDUCATION

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#### UNIVERSITY OF CALIFORNIA, BERKELEY

**Ph.D.**, Engineering and Project Management Program in Civil Engineering                      2012  
**M.S.**, Engineering and Project Management Program in Civil Engineering                      2004

#### SEOUL NATIONAL UNIVERSITY, Seoul, Korea

**B.S.** in Engineering (Architectural Engineering)                      1999

### ACADEMIC POSITIONS

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|                                    |                                    |              |
|------------------------------------|------------------------------------|--------------|
| <b>Assistant Professor</b>         | University of Washington (UW)      | 2016 to date |
| Affiliated Faculty                 | Clean Energy Institute (UW)        | 2017 to date |
| <b>Assistant Professor</b>         | Oregon State University (OSU)      | 2012 to 2015 |
| <b>Graduate Student Researcher</b> | University of California, Berkeley | 2009 to 2012 |
| <b>Graduate Student Instructor</b> | University of California, Berkeley | 2006         |
| <b>Graduate Student Researcher</b> | University of California, Berkeley | 2004 to 2005 |

### INDUSTRY EXPERIENCE

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|                                  |   |              |
|----------------------------------|---|--------------|
| <b>Faculty Intern</b>            | Lease Crutcher Lewis, Seattle, WA       | Summer 2017  |
| <b>Senior Estimator/Engineer</b> | Shimmick Construction, Oakland, CA      | 2007 to 2010 |
| <b>Project Engineer</b>          | Tutor Perini Corporation, Las Vegas, NV | 2006 to 2007 |
| <b>Consulting Intern</b>         | Peck & Hiller Company, Palo Alto, CA    | 2004         |
| <b>Field Engineer</b>            | Sambu Construction, Seoul, Korea        | 1999 to 2002 |

### AWARDS

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|   |            |
|---|------------|
| BE Collaboration Innovative   | 2017       |
| Excellence in Academic Research (UW CM)                                   | 2016, 2017 |
| 2015 Outstanding Reviewer (ASCE J of CEM)                                 | 2016       |
| NSF Travel Grant (CEC 2014)   | 2014       |
| <b>Early Career Award</b> (ELECTRI International)                         | 2013       |
| Best Papers Award in IGLC 18  | 2010       |
| 1st Prize in Student Competition for Supply Chain Management, UC Berkeley | 2004       |
| Student CAD Competition, Seoul, Korea                                     |            |
| 1st Prize in Presentation   | 1997       |
| 2nd Prize in Animation, and 3rd Prize in Presentation                     | 1996       |

### CLASSES TAUGHT

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|                         |  |     |              |
|-------------------------|--|-----|--------------|
| CM540                   | Sustainable Construction                     | UW  | Winter 2017  |
| URBDP 498/ENGR 497, 297 | Vertically Integrated Projects (co-teaching) | UW  | 2017         |
| CM410                   | Construction Estimating II                   | UW  | Autumn 2016  |
| CM331                   | Construction Estimating I                    | UW  | 2016 to date |
| CEM 342                 | Construction Estimation II                   | OSU | 2013 to 2015 |
| CE 420/520              | Engineering Planning                         | OSU | 2014 to 2015 |

|         |                                |     |              |
|---------|--------------------------------|-----|--------------|
| CCE 529 | Lean Construction              | OSU | 2012 to 2015 |
| CCE 102 | Problem-solving and Technology | OSU | 2013         |

## **EXTERNAL PROFESSIONAL SERVICE**

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|  |  |              |
|--|--|--------------|
| Associate Editor, Journal of Built Environments  |  | 2017 to date |
| Assistant Specialty Editor, ASCE Journal of Construction Engineering and Management                        |  | 2015 to date |
| Associate Editor, Journal of Construction Engineering and Project Management                               |  | 2015 to 2016 |
| Journal Reviewer   |  |              |
| ASCE Journal of Construction Engineering and Management  |  |              |
| ASCE Journal of Management in Engineering  |  |              |
| ASCE Journal of Professional Issues in Engineering Education and Practice                                  |  |              |
| Construction Management Economics  |  |              |
| Automation in Construction   |  |              |
| Building Research & Information  |  |              |
| Energy Efficiency  |  |              |
| International Journal of Construction Education and Research   |  |              |
| Canadian Journal of Civil Engineering  |  |              |
| Reviewer, ASCE 2014 Construction Research Congress (CRC 2014)  |  | 2013         |
| Education Committee, KACEPMA (Korean American Construction Engineering and Project Management Association) |  | 2012 to 2013 |
| Reviewer, 5 <sup>th</sup> International Conference on Construction Engineering and Project Management      |  | 2012         |
| Workshop Organizer, Project Production Systems Laboratory (P2SL)   |  | 2011 to 2012 |
| Reviewer, ASCE 2012 Construction Research Congress (CRC 2012)  |  | 2011         |
| Reviewer, 18 <sup>th</sup> Annual Conference of the International Group for Lean Construction (IGLC 18)    |  | 2010         |
| President, ACT (a student organization in architectural 3D visualization)                                  |  | 1996 to 1997 |

## **PROFESSIONAL AFFILIATIONS**

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Member, American Society of Civil Engineers (ASCE)  
Member, ASCE Construction Research Congress  
Academic Member, Lean Construction Institute  
Member, International Group for Lean Construction  
Member, Korea Institute of Construction Engineering and Management  
Member, Korea Institute of Building Construction  
Member, Korean Housing Association  
Member, Korean-American Scientists and Engineering Association  
Member, Korean American Construction Engineering and Project Management Association  
Member, Korea Construction Engineering Association

## **INTERNAL SERVICE**

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|                              |     |              |
|------------------------------|-----|--------------|
| Faculty Advisor for UW Solar | UW  | 2017 to date |
| Faculty Coach for MCA Team   | UW  | 2016 to date |
| CERC Steering Committee      | UW  | 2016 to date |
| School Head Search Committee | OSU | 2014         |
| Graduate Committee           | OSU | 2013 to 2014 |

**CERTIFICATIONS**

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|   |      |
|---|------|
| LEED Green Associate  | 2016 |
| FE/EIT in Civil Engineering (California)                        | 2006 |
| FE in Architectural Engineering, 1 <sup>st</sup> Degree (Korea) | 1999 |

**PUBLICATIONS**

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**REFEREED ACADEMIC JOURNALS**

1. Shakouri, M., Lee, H.W., and Kim, Y.-W. (2017). "A Probabilistic Portfolio-based Model for Financial Valuation of Community Solar." *Applied Energy*, 191(1), 709-726.
2. Gambatese, J., Pestana, C., and Lee, H.W. (2016). "Investigation of Alignment between Lean Principles and Practices and Worker Safety Behavior." *ASCE Journal of Construction Engineering and Management*, 04016083.
3. Choi, K. and Lee, H.W. (2016). "Deconstructing the Construction Industry: A Spatiotemporal Clustering Approach to Profitability Modeling." *ASCE Journal of Construction Engineering and Management*, 04016051.
4. Shakouri, M. and Lee, H.W. (2016). "Mean-Variance Portfolio Analysis Data for Optimizing Community-based Photovoltaic Investment." *Data in Brief*, 6(1), 840-842.
5. Choi, K., Lee, H.W., Bae, J., and Bilbo, D. (2016). "Time-Cost Performance Effect of Change Orders from Accelerated Contract Provisions" *ASCE Journal of Construction Engineering and Management*, 142(3), 04015085.
6. Kim, T.-H., Lee, H.W., and Hong, S.-W. (2016). "Value Engineering for Roadway Expansion Project over Deep Thick Soft Soils." *ASCE Journal of Construction Engineering and Management*, 142(2), 05015014.
7. Choi, K., Lee, H.W., Mao, Z., Lavy, S., and Ryoo, B.Y. (2016). "Environmental, Economic, and Social Implications of Highway Concrete Rehabilitation Alternatives" *ASCE Journal of Construction Engineering and Management*, 142(2), 04015079.
8. Shakouri, M., Lee, H.W., and Choi, K. (2015). "PACPIM: New Decision-Support Model of Optimized Portfolio Analysis for Community-Based Photovoltaic Investment." *Applied Energy*, 156(1), 607-617.
9. Choi, K., Kim, Y.H., Bae, J., and Lee, H.W. (2015). "Determining Future Maintenance Costs for Low-Volume Highway Rehabilitation Projects." *ASCE Journal of Computing in Civil Engineering*, 04015055.
10. Lee, H.W., Tommelein, I.D., and Ballard, G. (2015). "Target-Setting Practice for Loans for Commercial Energy Retrofit Projects." *ASCE Journal of Management in Engineering*, 31(3), 04014046.
11. Lee, H.W., Oh, H., Kim, Y., and Choi, K. (2015). "Quantitative Analysis of Warnings in Building Information Modeling (BIM)." *Automation in Construction*, 51(3), 23-31.
12. Xing, G., Kim, Y., and Lee, H.W. (2014) "Life-cycle Cost Analysis of Using Rainwater Harvesting Systems in Hong Kong Residential Buildings." *Journal of The Korean Housing Association*, 25(3), 53-62.
13. Park, K., Lee, H.W., and Kim, C.-D. (2014). "Developing User Interfaces of Modules for Mobile PMIS Based on Demand Analysis." *Journal of the Korea Institute of Building Construction*, 14(3), 244-251.
14. Park, K., Lee, H.W., and Kim, C.-D. (2014). "Assessment of Risk Management Practices of CM Enterprises: The Need for an Enterprise-level Risk Management Framework." *Journal of the Korea Institute of Construction Engineering and Management*, 15(3), 66-73.
15. Lee, H.W., Choi, K., and Gambatese, J. (2014). "Real Options Valuation of Phased Investments in Commercial Energy Retrofits under Building Performance Risks." *ASCE Journal of Construction Engineering and Management*, 140(6), 05014004.
16. Lee, H.W., Anderson, S., Kim, Y., and Ballard, G. (2013). "Advancing the Impact of Education, Training, and Professional Experience on Integrated Project Delivery." *ASCE Practice Periodical on Structural Design and*

- Construction*. 19, SPECIAL ISSUE: Construction Engineering: Leveraging Project and Career Success, 8-14.
17. Lee, H.W., Tommelein, I.D., and Ballard, G. (2013). "Energy-related Risk Management in Integrated Project Delivery." *ASCE Journal of Construction Engineering and Management*, 139(12), A4013001.
  18. Choi, K., Haque, M.E., Lee, H.W., Cho, Y.K., and Kwak, Y.H. (2013). "Macroeconomic Labor Productivity and Its Impact on Firm's Profitability." *Journal of the Operational Research Society*, 64(8), 1258-1268.
  19. Lee, H.W., Tommelein, I.D., and Ballard, G. (2012). "Design of an Infrastructure Project Using a Point-based Methodology." *ASCE Journal of Management in Engineering*, 28(3), 291-299.
  20. Kim, Y. and Lee, H.W. (2010). "Analyzing User Costs in a Hospital: Methodological Implication of Space Syntax to Support Whole-life Target Value Design." *Lean Construction Journal*, 2010 Issue, 55-65.

## PEER-REVIEWED CONFERENCE PROCEEDINGS

1. Borhani, A., Lee, H.W., Dossick, C.S., Osburn, L., and Kinsman, M. (Accepted). "BIM to Facilities Management: Presenting a Proven Workflow for Information Exchange." *2017 International Workshop on Computing in Civil Engineering (IWCCE2017)*, Seattle, WA.
2. Kim, Y.-W., Rezaqallah, K., Lee, H.W., Angeley, J. (2016). "Integrated Project Delivery in Public Projects: Limitations and Opportunity." *24th Annual Conference of the International Group for Lean Construction (IGLC 2016)*, Boston, MA.
3. Choi, K., Lee, H.W., Bae, J., and Ryu, K. (2015). "Investigating the Construction Industry from Key Performance Measurements." *Proc. the 6th International Conference on Construction Engineering and Project Management (ICCEPM-2015)*, Busan, S.Korea.
4. Lee, H.W., Oh, H., Kim, Y., and Choi, K. (2014). "Investigating Warnings in Building Information Modeling." *US-KOREA Conference 2014 (UKC 2014)*, San Francisco, CA.
5. Gomez, L., Lee, H.W., and Leon, A. (2014). "A Real Options-based Framework to Evaluate Investments in River Flood Control under Uncertainty." *ASCE 2nd International Conference on Vulnerability and Risk Analysis and Management (ICVRAM) and 6th International Symposium on Uncertainty Modeling and Analysis (ISUMA)*, Liverpool, UK, 1465-1474.
6. Lee, H.W., Choi, K., Gambatese, J.A., and Kim, D. (2014). "Financial Valuation for Commercial Energy Retrofits under Private Risks." *2014 Construction Research Congress (CRC 2014)*, Atlanta, GA, 524-533.
7. Lee, H.W., Kim, Y., Kim, D., and Choi, K. (2013). "LEED Perception Disparities: Designers versus Non-designers." *Proc. the 5th International Conference on Construction Engineering and Project Management (ICCEPM-2013)*, 2013, Anaheim, CA, 50-55.
8. Lee, H.W., Ballard, G., and Tommelein, I.D. (2012). "Developing a Target Value Design Protocol for Commercial Energy Retrofits – PART 1." *Proc. 2012 Construction Research Congress (CRC 2012)*, Purdue University, West Lafayette, IN, 1710-1719.
9. Lee, H.W., Ballard, G., and Tommelein, I.D. (2012). "Developing a Target Value Design Protocol for Commercial Energy Retrofits – PART 2." *Proc. 2012 Construction Research Congress (CRC 2012)*, Purdue University, West Lafayette, IN, 1720-1729.
10. Lee, H.W., Tommelein, I.D., and Ballard, G. (2010). "Lean Design Management in an Infrastructure Design-Build Project – A Case Study." *Proc. 18th Annual Conference of the International Group for Lean Construction (IGLC 18)*, Haifa, Israel, 113-122.

## TECHNICAL REPORTS

1. Gambatese, J., Lee, H.W., and Nnaji, C.A. (2017). "Work Zone Intrusion Alert Technologies: Assessment and Practical Guidance." Final Project Report. Oregon Department of Transportation, Salem, OR.
2. Lee, H.W. and Arocho, I. (2016). "Fault Tree Analysis for Accident Prevention in Transportation Infrastructure

- Projects.” Final Project Report. PacTrans. University of Washington, Seattle, WA.
3. Dossick, C. S., **Lee, H.W.**, Borhani, A., Osburn, L., Angeley, J., and Kinsman, M. (2016). “BIM to BUILDER Workflow.” Final Project Report. US Army Corps of Engineers.
  4. Harapanahalli, B.A. and **Lee, H.W.** (2015). “Quick Access to Construction Documents in Highway Construction Using Quick Response (QR) Codes.” Final Project Report. PacTrans. University of Washington, Seattle, WA.
  5. Yang, Y., **Lee, H.W.**, and Shakouri, M. (2014). “Exploring the Opportunities for Applying Lean Principles to Electrical Prefabrication.” Index #: F3406. NECA Publication,
  6. Trejo, D., Porter, F., Chen, J., and **Lee, H.W.** (2013). “Comparison of Pelletized Lime with Other Anti-Stripping Additives.” Final Project Report. Oregon Department of Transportation, Salem, OR.
  7. **Lee, H.W.**, Ballard, G., and Tommelein, I.D. (2011). Sections 2.3 and 3.3 of “Energy Risk Management in Commercial Mortgages: A Primer for Lenders.” Practical guideline prepared for Office of Energy Efficiency and Renewable Energy at U.S. Department of Energy.
  8. **Lee, H.W.**, Ballard, G., and Tommelein, I.D. (2011). “Task 4: Target Value Design and Delivery Process to Incorporate Energy Efficiency Metrics.” Technical report prepared for Office of Energy Efficiency and Renewable Energy at U.S. Department of Energy.

## PRESENTATIONS

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1. “Remote Sensing for Activity-Based Carbon Tracking of Construction Equipment.” *New Frontiers in Construction Conference (CERC 2016)*, March 4, 2016, Seattle, WA.
2. “Background Knowledge and Training for Integrated Project Delivery.” *New Frontiers in Construction Conference (CERC 2016)*, March 4, 2016, Seattle, WA.
3. “Investigating the Impact of Performance Risks on Energy Efficiency Investments: From Micro to Macro.” Yonsei University, July 18, 2014, Seoul, Korea.
4. “Investigating the Impact of Performance Risks on Energy Efficiency Investments: From Micro to Macro.” Seoul National University, June 30, 2014, Seoul, Korea.
5. “Financial Valuation for Commercial Energy Retrofits under Private Risks.” *2014 Construction Research Congress (CRC 2014)*, May 20, 2014, Atlanta, GA.
6. “Advancing the Impact of Education, Training, and Professional Experience on Integrated Project Delivery.” *2014 Construction Engineering Conference (2014 CEC)*, March 27, 2014, Seattle, WA.
7. “Exploring the Opportunities for Applying Lean Principles to Electrical Prefabrication.” *The 2014 ELECTRI Council*, July 22, 2013, Chicago, IL.
8. “LEED Perception Disparities: Designers versus Non-designers.” *The 5<sup>th</sup> International Conference on Construction Engineering and Project Management (ICCEPM-2013)*, January 9, 2013, Anaheim, CA.
9. “Developing a Target Value Design Protocol for Commercial Energy Retrofits – PART 2.” *2012 Construction Research Congress (CRC 2012)*, May 23, 2012, Purdue University, West Lafayette, IN.
10. “Developing a Target Value Design Protocol for Commercial Energy Retrofits – PART 1.” *2012 Construction Research Congress (CRC 2012)*, May 22, 2012, Purdue University, West Lafayette, IN.
11. “Application of Digital Quantity Takeoff to Estimating.” February 28, 2012, Clemson University, Clemson, SC.
12. “DOE Finance Research – Incorporating Energy Efficiency into Commercial Mortgage Underwriting.” *Project Production Systems Laboratory (P2SL) Annual Conference*, April 27, 2011. University of California, Berkeley, CA.
13. “Lean Design Management in an Infrastructure Design-Build Project – A Case Study.” *18th Conference of the International Group for Lean Construction (IGLC 18)*, July 14-16, 2010. Technion – Israel Institute of Technology, Haifa, Israel.
14. “Lean Design Management in Infrastructure DB Proposal Process.” *Project Production Systems Laboratory (P2SL)*

## POSTERS

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1. Chung, H., Lee, H.W., and Gambatese, J. (2017). "Applying Prevention through Design to the Design and Installation of Solar Energy Systems for Residential Projects." *53rd Annual International Conference of the Associated Schools of Construction (ASC)*, April 6, 2017, Seattle, WA.
2. Lee, H.W. and Arocho. I. (2016). "Fault Tree Analysis for Accident Prevention in Transportation Infrastructure Projects." *2016 PacTrans Regional Transportation Conference (PacTrans 2016)*, October 14, 2016, Seattle, WA.
3. Kim, Y.-W., Rezaqallah, K., Lee, H.W., Angeley, J. "Integrated Project Delivery in Public Projects: Limitations and Opportunity." *24th Annual Conference of the International Group for Lean Construction (IGLC 2016)*, July 21, 2016, Boston, MA.
4. Shakouri, M. and Lee, H.W. "A Portfolio-Based Decision Model for Optimal Investment in Community Solar." *2015 Graduate Research Exposition*, March 4, 2015, Portland, OR.
5. Harapanahalli, B.A. and Lee, H.W. "Quick Access to Construction Documents in Highway Construction Using Quick Response (QR) Codes." *2015 Graduate Research Exposition*, March 4, 2015, Portland, OR.
6. Gomez, L., Lee, H.W., and Leon, A. "A Real Options-based Framework to Evaluate Investments in River Flood Control Under Uncertainty." *2014 Graduate Research Exposition*, March 7, 2014, Portland, OR.
7. Harapanahalli, B.A. and Lee, H.W. "Quick Access to Construction Documents in Highway Construction Using Quick Response (QR) Codes." *2014 Graduate Research Exposition*, March 7, 2014, Portland, OR.
8. Yang, Y. and Lee, H.W. "The Opportunities of Lean Principles to Electrical Prefabrication." *2014 Graduate Research Exposition*, March 7, 2014, Portland, OR.
9. Gomez, L., Lee, H.W., and Leon, A. "A Real Options-based Framework to Evaluate Investments in River Flood Control Under Uncertainty." *The Water Research Symposium*, May 13, 2013, Oregon State University, Corvallis, OR.

## ADVISING

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### POSTDOCTORAL ADVISING

| Name          | School | Title  | Duration             |
|---------------|--------|--|----------------------|
| Jonghyeob Kim | UW     | BIM-based Maintenance Information Management Model for Continuous Accumulation and Utilization of Maintenance Data | Active               |
| Kyungmo Park  | OSU    | Investigation of Project Risk Factors Facing Construction Management Firms   | Jan 2014 to Nov 2014 |

### PHD COMMITTEE MEMBER

| Student       | School | Title  | Graduated |
|---------------|--------|--|-----------|
| Chung Ho      | UW     | Supply Chain Optimization for Prefabrication with Multiple Fabrication Shops | Active    |
| Kasim AlOmari | OSU    | Degrees of Connectivity: Systems Model for Upstream Risk Assessment          | Active    |

### MS THESIS COMMITTEE CHAIR

| Student   | School | Title   | Graduated |
|-----------|--------|---|-----------|
| Wenqi Zhu | UW     | Impact of Project Integration on Implementation of Model-based Estimating | Active    |

**MS PROJECT REPORT COMMITTEE CHAIR**

| Student              | School | Title   | Graduated   |
|----------------------|--------|---|-------------|
| Bharat Harapanahalli | OSU    | Investigating the Feasibility of Using Quick Response Codes for Document Management in Highway Construction | Spring 2015 |
| Yizhe Yang           | OSU    | Investigating the Relationship between Lean Principles and Electrical Prefabrication                        | Spring 2014 |

**MS THESIS COMMITTEE MEMBER**

| Student        | School | Title  | Graduated   |
|----------------|--------|--|-------------|
| Xiuqing Jin    | UW     | Climate-Specific Life-Cycle Cost Analysis of Different HVAC Systems  | Winter 2017 |
| Mihir Bharmal  | UW     | Information Exchange in the Design, Construction, Operation and Maintenance of Public Transit infrastructure | Winter 2016 |
| Chukwuma Nnaji | OSU    | Framework for Measuring Construction Project Performance using Energy  | Spring 2015 |

**MS PROJECT PAPER COMMITTEE CHAIR**

| Student              | School | Title   | Graduated   |
|----------------------|--------|---|-------------|
| Vaishnavi Nevrekar   | UW     | Safe working practices to prevent accidents during solar panel installation on existing houses                | Winter 2017 |
| Matthew Reed         | UW     | Implications of Autonomy for Professional Development   | Winter 2017 |
| Henrique Schuchovski | UW     | Perception of Collaboration and Compensation on Integrated Projects from the General Contractor's Perspective | Autumn 2016 |

**MENG EXAM COMMITTEE CHAIR OR MEMBER (OSU)**

| Student                            | Graduated | Student              | Graduated |
|------------------------------------|-----------|----------------------|-----------|
| Gao Han                            | 2015      | Yakun Cheng          | 2015      |
| James Pritchard                    | 2015      | Ryan Sutanto         | 2014      |
| Nishant Vadlamudi ( <b>Chair</b> ) | 2014      | Shikhar Sandeep Goel | 2014      |
| Ding Liu                           | 2014      | Tainian Chen         | 2014      |
| Anthony Peressini                  | 2013      | Paul Amort           | 2013      |
| Robert Coleman                     | 2013      | Tom Sideras          | 2013      |
| Alex Jamerson                      | 2013      | Paul Amort           | 2013      |
| Thaphat Lekaegkarat                | 2012      |                      |           |

**RESEARCH GRANTS AND PROJECTS****CURRENT PROJECTS**

| Funding Agency                          | PI (and Co-PIs)                       | Title   | Total Budget | My Share |
|---|---------------------------------------|---|--------------|----------|
| <b>UW College of Built Environments</b> | PI: Lee, H.W.<br>Co-PI: Dermisi, S.   | Impact of Energy Benchmarking and Disclosure on the Performance of Office Buildings | \$14,000     | 100%     |
| <b>Skanska</b>                          | PI: Dossick, C.S.<br>Co-PI: Lee, H.W. | Preconstruction BIM Workflow  | \$61,178     | 10%      |

|  |                                       |  |          |     |
|--|---------------------------------------|--|----------|-----|
| <b>Center for Construction Research and Training</b> | PI: Lee, H.W.<br>Co-PI: Gambatese, J. | Applying Prevention through Design (PtD) to Solar Systems in Small Buildings | \$29,470 | 85% |
|--|---------------------------------------|--|----------|-----|

#### PAST PROJECTS

| Funding Agency & Completion Date                    | PI (and Co-PIs)                       | Title  | Total Budget | My Share                    |
|---|---------------------------------------|--|--------------|-----------------------------|
| <b>Oregon DOT</b><br>March 2017                     | PI: Gambatese, J.<br>Co-PI: Lee, H.W. | Work Zone Intrusion Alert Technologies: Assessment and Practical Guidance  | \$240,000    | 20%                         |
| <b>PacTrans</b><br>November 2016                    | PI: Lee, H.W.<br>Co-PI: Arocho, I.    | Fault Tree Analysis for Accident Prevention in Transportation Infrastructure Projects  | \$60,000     | 60%                         |
| <b>US Army Corps of Engineers</b><br>September 2016 | PI: Dossick, C.S.<br>Co-PI: Lee, H.W. | BIM to BUILDER Data Transfer   | \$150,000    | 10%                         |
| <b>PacTrans</b><br>March 2015                       | PI: Lee, H.W.                         | Investigating the Feasibility of Using QR (Quick Response) Codes for Construction Document Control in Highway Construction     | \$40,000     | 100%                        |
| <b>ELECTRI International</b><br>January 2015        | PI: Lee, H.W.                         | Exploring the Opportunities for Applying Lean Principles to Electrical Prefabrication ( <b>Early Career Award</b> )            | \$27,696     | 100%                        |
| <b>City University of Hong Kong</b><br>January 2014 | PI: Kim, Y<br>Co-I: Lee, H.W.         | Establishing Interdisciplinary Research Collaboration for Developing Sustainable Design Methods of Urban Housing Redevelopment | \$15,000     | 10%                         |
| <b>Oregon DOT</b><br>November 2013                  | PI: Trejo, D.                         | Anti-stripping Additives for Reducing the Moisture Sensitivity of HMAC Mixtures  | \$177,738    | \$7,000                     |
| <b>DPR Construction</b><br>May 2012                 | PI: Ballard, G.                       | Improving Target Value Design when Applied with Integrated Project Delivery  | \$153,000    | Graduate Student Researcher |
| <b>US DOE</b><br>September 2011                     | PI: LBNL<br>Co-PI: Tommelein, I.      | Incorporating Energy Efficiency into Commercial Mortgage Underwriting  | \$760,000    | Graduate Student Researcher |